A STUDY OF SOCIO-ECONOMIC ISSUES FACING TRADITIONAL INDONESIAN FISHERS WHO ACCESS THE MOU BOX

A Report for Environment Australia

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EXECUTIVE SUMMARY

Given the reported levels of depletion of trochus and trepang in the MOU Box, the protection of the remaining populations at Ashmore and Cartier Marine Reserves is now considered critical. As part of a longer term strategy to manage resources in the MOU Box and develop alternative incomes for Indonesian fishers who fish in the Box, Environment Australia commissioned this study on socio-economic issues facing traditional Indonesian fishers who access the MOU box. The aim of the study is to provide a thorough understanding and awareness of the socio-economic issues facing Indonesian fishers who fish in the MOU Box and a knowledge base from which alternative livelihoods can be explored.

Although the study focus is on Indonesian fishers who are legally allowed to fish in the MOU Box, the information presented in this report also covers Indonesian fishers who fish illegally in the Australian Fishing Zone because, in many cases, they originate from the same fishing communities and often have had past associations with fishing in the MOU Box.

Traditional Fishing in the MOU Box

Traditional fishing in the MOU Box, as it may have existed at the time of the signing of the 1974 Memorandum of Understanding and as defined in the 1989 revision has changed so substantially, that it is an appropriate time for a full consideration of the issues underlying the Memorandum. The main changes that have occurred are:

- Due to overfishing, the reefs in the MOU Box are no longer capable of providing an adequate means of livelihood to those fishers who have previously gathered trepang and trochus. This has led to a switch from sedentary resource collection to shark fishing in both the MOU Box and the AFZ (using the MOU Box as a base and refuge).

- The attractions of shark fishing and the potential profits from this fishing remain high. Fishers are using the MOU Box as a 'transition area' to better fishing grounds outside the MOU Box.

- 'Traditional fishers' such as the Rotenese, the Bajau Laut, the Madurese and some Butonese, all of whom have historically drawn upon the resources of the MOU Box, now find themselves involved in a complex and highly competitive commercial system. It is therefore an illusion to imagine that either the Australian or the Indonesian government could somehow re-establish a traditional fishery as a solution to present problems.

ALTERNATIVE INCOME STRATEGIES

Assistance, in the form of alternative incomes to fishers, could provide a means of solving some of the problems of overexploitation of resources in the MOU Box. This requires the joint cooperation of both Indonesian and Australian authorities. Any strategy for assistance must differentiate among the various fishers in eastern Indonesia such that strategies of assistance for fishers from Oelaba or Raas/Madura would probably be different those for fishers in Pepela. Strategies would also have to be long-term and focus on different problems facing these fishers.

There are a number of generic pre-requisites for any successful alternative income strategy for fishers in Indonesia, which should help to identify, and eliminate, potential pilot sites. These are as follows:

- As it is in the financial interest of vessel owners and traders/middlemen to continue their businesses (fishing; trading; credit provision), any perceived threat to their businesses may lead them to misrepresent, frustrate and undermine any attempts at alternative income strategies. The involvement of traders and middlemen is therefore vital to ensure that traders 'allow' fishers to leave the fishery and repay their debts in a different way.

- Alternative incomes should have the potential to provide incomes that are equal to, or exceed current incomes from fishing.

- Alternative supplies/substitutes of trochus and/or other income earning opportunities would need to be developed for those engaged in the handicraft industry using trochus shells.

- Markets and marketing channels should be identified prior to the initiation of alternative income programmes.

- There needs to be effective extension services/support already in place.

- Any Australian assistance has to be closely coordinated with both local and national programs.

In addition to these generic factors, The Ministry of Marine Affairs and Fisheries in Indonesia, through the Economic Empowerment of Coastal Community Development Programme, have also identified 5 critical factors, which have contributed to the success of the programme. These are relevant in the context of developing alternative income programmes:

(1) Local people should objectively identify the target group and beneficiaries.

(2) Agents of change should be recruited from local youth and work as mediators, catalysts and extension agents.

(3) Local management consultants should be hired by the project to help people during the project and prepare them to run their businesses after the project ends.

(4) An advisory group at village level should be established which consists of formal and informal leaders that work voluntarily to help people during and after the project.

(5) Micro-financial institutions should be established at village, sub-district, or district level. The structure of the institution should be flexible enough to account for different requirements in different places but needs to be totally owned by the project beneficiaries.

Alternative Income Strategies: Pepela Network and Oelaba Network, Rote

An estimated 3000 household heads would be the main target group, as they are currently affected by the current arrangements. Under these conditions, it is problematic to offer alternative livelihood possibilities and expect them to be immediately successful especially as such possibilities are likely to be misrepresented, frustrated and undermined by those who have an interest in maintaining the status quo.

The situation is further complicated by the fact that the present system involves a diverse group of fishers. Pepela is a controlling node that draws on a wider network that extends to different coastal settlements on Rote, on other islands in Nusa Tenggara Timur and further onward to South and Southwestern Sulawesi. Were alternative livelihoods to be found for all local fishers on Rote, it is conceivable that the present group of owners, or some future group, could call upon other poor fishers in its extended network to continue legal or illegal shark fishing in Australian waters.

Taking these specific considerations into account, the following is recommended:

- **Targeted Educational Assistance:** The best long-term solution for fishers on Rote (and elsewhere) is improvement in their levels of education. Specially targeted educational assistance to fisher communities on Rote – enabling young boys in particular to stay in elementary school and perhaps even continue on to secondary school – would draw younger members of the labour force away from sailing and could open new vistas for the next generation in these communities.

- **Provision of Adequate Local Credit:** Access to adequate and reliable credit could contribute to reducing the present indebtedness of local fishers; it could assist them (or more significantly, their wives) to adopt alternative livelihood strategies; and it could also assist those fishers (particularly in the Oelaba network) to increase their capacity to carry on trade rather than struggle to maintain their fishing activities.

- **Marine Based Alternative Income Opportunities:** Along the coast of Rote, the fastest growing marine-based activity is seaweed growing. Seaweed from Rote is now sold through Kupang and there is a seaweed processing plant recently established in Kupang. Skills and experience gained in these activities could then be extended to other marine based aquaculture technologies, such as sponge cultivation.

- **Tourism:** Pepela Bay is beautiful bay and could have considerable potential for marine-based eco-tourism. Nembrala, at the far western tip of Rote, has become a surfing site of some importance in Indonesia.

Alternative Income Strategies: Raas/Madura

The number of migratory fishers from Raas who fish in the MOU Box has been estimated to be just under 140 persons. In addition there are a further 130 migratory fishers who currently do not fish in the MOU Box but are fishers who could potentially fish in the Box if their current fishing grounds become depleted. Assuming approximately two fishers come from one household, this represents between 70 – 135 potential households in the target group.

There appear to be limited land based alternative income opportunities for fishers from Raas such that any alternative income strategies would have to focus on marine based opportunities. These include:

- **Fishing:** As there appears to be a clearly identifiable and limited number of Raas fishers who have historically fished in the MOU Box, it may be possible to allow continued and limited access to the MOU Box for this group of fishers. However, some system of regulation of fishing vessels involving Indonesian authorities would be necessary.

- **Aquaculture:** Marine aquaculture for high value finfish or seaweed may therefore be another possible alternative income opportunity. Seaweed farming and pearl farming (with support from a Japanese company) is currently being carried out close to Raas. The keeping of live (caught) groupers in cages may also be another alternative as it develops fish husbandry skills and can lead on to aquaculture enterprises. Whether aquaculture is an activity that can be pursued by fishers used to carrying out migratory fishing would need further investigation as it requires a considerable change of lifestyle which may not be acceptable to some.

- **Tourism:** The potential to develop tourism in Raas sub-district would require further investigation, especially given the poor transport infrastructure to the islands.

Alternative Income Strategies: the Bajau Laut

The Bajau Laut are in a special category and require special consideration. Assistance to fishers on Rote and Raas is unlikely to benefit the Bajau, even in Pepela. Their presence in Pepela is regarded as transient. Their links are to other Bajau communities, especially to settlements in the Tukang Besi Islands. What may be needed is a strategy that would assist these scattered communities throughout eastern Indonesia. Development of such a strategy is beyond the scope of this report, as it would require detailed needs assessment of these communities.

Possible Project Sites

As the majority of fishers come from Rote, this would be the most obvious place to initiate an assistance programme, but such an assistance program would need to focus on several sites on the island. On the other hand, for a pilot programme, success may be greater where there are a smaller number of fishers and less complex socio-economic conditions such as Raas.

OTHER ISSUES

Data collection and monitoring

The current data collection system at Ashmore Reef has provided a great deal of valuable information. However, data input and analysis has been hampered by a lack of resources and some valuable information has been lost/not used as a result. Two persistent problems are the lack of consistency in the identification of places and persons within and between databases and insufficient information on catches. An assessment of the fishing situation in the MOU Box based on both data sources should be made each year to monitor developments and orient policies.

Data collected by EA at Ashmore Reef and by AFMA should be standardised and each database designed to enable merging and direct comparison with the other database enabling both agencies to track vessel movements and providence of crew and vessels.

Currently, all data is collected by Australian authorities. The possibility of ongoing data collection in collaboration with Indonesian authorities should be explored.

Australian Fisheries Enforcement Policy

One clear effect of the Australian fisheries enforcement policy of destroying vessels has been to put pressure on individual and small-scale perahu owners who are unable to recover from the loss of their vessel and gear and are either forced into debt or out of fishing altogether. Conversely the larger owner/traders have effectively flourished under this policy as they are easily able to find second-hand vessels to replace destroyed vessels and they pass on the entire risk of destroyed fishing gear to their captains and crews. Their control of fishing and the indebtedness of fishers has increased.

In addition, captains and crews involved in shark fishing are financially responsible for any loss of fishing gear, usually owned by the fish trader/vessel outfitter. This gear is expensive (approximately AU$3,000) such that confiscation by Australian authorities contributes to the indebtedness of fishers, without having much impact on boatowners and traders.

1. Introduction

1.1. The Legal Framework Governing the Australian Fishing Zone[1]

Australia shares a maritime border with Indonesia that extends for some 2000 kilometres. Australia and Indonesia, as maritime nations with extensive coastal areas and enormous marine resources, were both vigorous supporters of the 1982 UN Convention on the Law of the Sea.

In the early 1970s, Australia and Indonesia were able to negotiate mutually recognized seabed boundaries with the exception of 1) the so-called `Timor Gap' which runs parallel to former Portuguese Timor, 2) the southwest extension of the Ashmore and Cartier Islands, and 3) the area between Christmas Island and Java. In addition, a water column boundary in the Timor and Arafura Seas has yet to be agreed upon.

On 1 November 1979, Australia established a 200 nautical mile Australian Fishing Zone; shortly thereafter, on 21 March 1980, Indonesia proclaimed a 200 nautical mile Exclusive Economic Zone, thus creating overlapping claims between the two countries in regard to fisheries. As a consequence, following discussion in November 1980 and in October 1981, the two countries negotiated a provisional fisheries surveillance and enforcement line that came into effect on 1 February 1982. A key provision of this `Provisional Fisheries Surveillance and Enforcement Arrangement' was the stipulation that it did not affect traditional fishing by Indonesian fishermen in accordance with the Memorandum of Understanding of 7 November 1974.

Although under no international obligation to do so, Australia has consistently endeavoured to recognize some form of traditional Indonesian fishing within its waters. Numerous problems have arisen as a result of this seemingly well-intentioned endeavour. One problem has been to define what `traditional' fishing means. Another problem has been to regulate `access' to the area permitted for traditional fishing. Underlying both of these problems is the more complex and less well recognized issue of defining who among Indonesia's traditional fishing populations has the best claim `by tradition' (i.e., some historical basis) to be given access to the area permitted for such fishing.

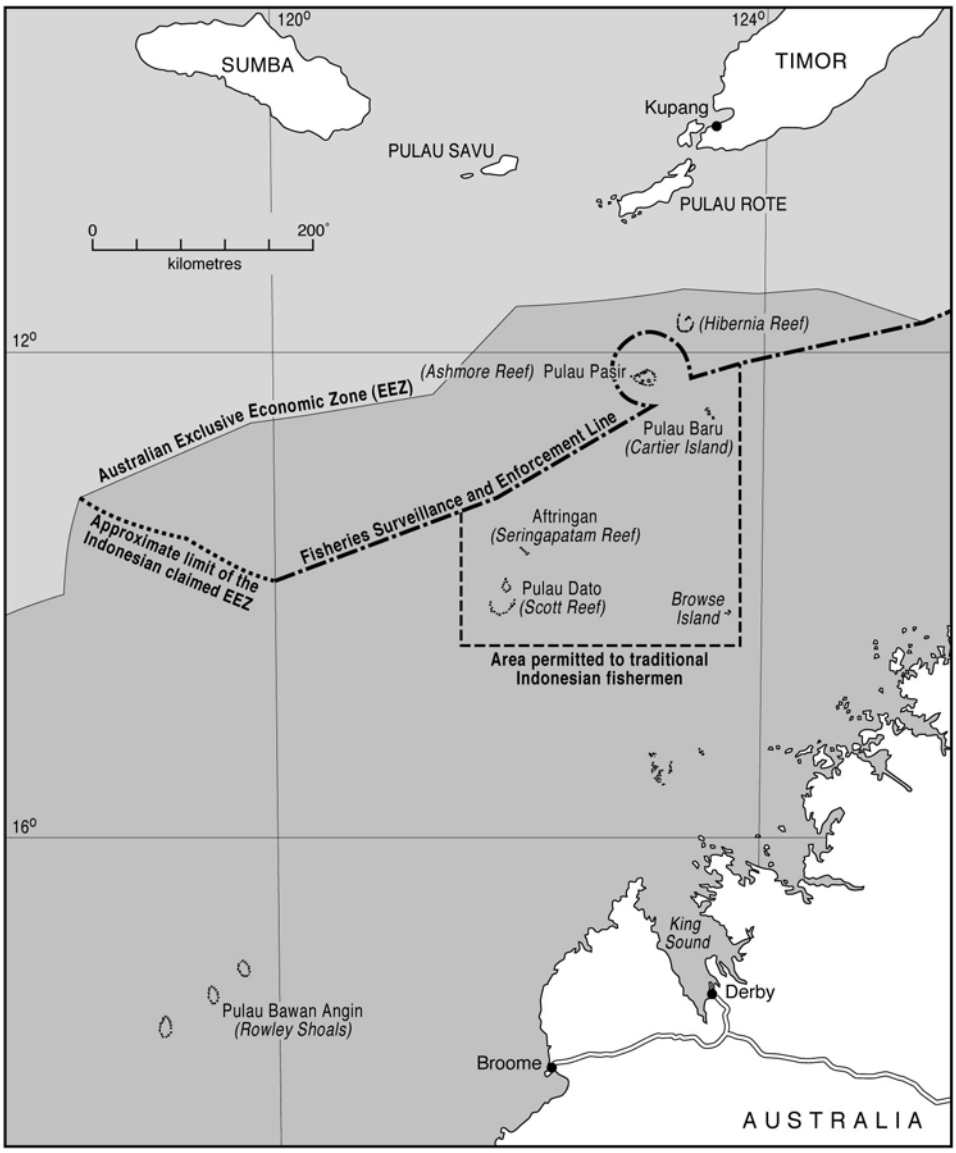
1.2. The Establishment of the MOU Box: 1974 Memorandum of Understanding

The 1974 Memorandum of Understanding identifies five small points on the northwest Australian continental shelf to which traditional Indonesian fishermen are given access. These areas are 1) Ashmore Reef, 2) Cartier Islet, 3) Scott Reef, 4) Seringapatam Reef and 5) Browse Islet (see Map 1). Ashmore Reef is the largest and most important of the five tiny areas designated in the Memorandum. It is a raised platform reef near the edge of the Sahul Shelf approximately 120 kilometres directly south of the island of Rote.

The Memorandum allowed fishing around these areas to include the taking of trochus, trepang (*bêche-de-mer* or sea cucumber), abalone, green snail, sponges and all molluscs on the seabed adjacent to these areas, but not turtles of any species. It permitted landings to obtain fresh

[1] The Department of Foreign Affairs and Trade has assembled an excellent compendium of documents relating to the issue of Indonesian fishermen under the title, *The Control of Indonesian Traditional Fishing in the Australian Fishing Zone off Northwest Australia* (Canberra, 1988). This report has relied on this compendium as a major documentary source for several sections of this paper.

water at two points on Ashmore Reef and allowed boats to shelter within the group without landing except at Ashmore. This Memorandum, which is a simple document of three pages plus a map, provides the basis for traditional Indonesian fishing in Australian waters. It came into effect on 1 February 1975.



Map 1 The MOU Box

1.3. Modifications to and Interpretations of the 1974 Memorandum

Since the Memorandum of 1974, there have been several critical modifications to its conditions, the most important of which was the declaration on 28 July 1983 of the Ashmore Reef as a National Nature Reserve. This declaration prohibited the removal of both fauna and flora on these reefs and in their surrounding waters to a depth of 50m. It was prompted by increasing concern about the impact of Indonesian fishermen on the rich and diverse marine life of these reefs. An effect of prohibition was to shift fishing effort from Ashmore Reef toward Cartier Island, Browse Islet, Scott and Seringapatam Reefs.

In 1983, a study made of the wells on Middle and East Island, two of the three sections that make up Ashmore Reef, indicated that they were either severely contaminated or that they had

dried up. In 1985, a camp was established for caretakers and in 1986, a chartered vessel was stationed at Ashmore to oversee the Reserve. The Australian Parks and Wildlife Service pressed for restrictions on Indonesian fishermen especially when reported violations of the Memorandum of Understanding continued to increase.

Following Australian proposals to re-negotiate the Memorandum of Understanding in 1986, the Embassy in Jakarta issued an Advisory Note of changes that had occurred since the signing of the original Memorandum. This Advisory Note, dated 28 February 1988, attempted to define more clearly what the Australian government intended to be meant by "traditional fishermen" indicating that, in its interpretation, any vessels powered by motors or engines fell outside the scope of the Memorandum of Understanding. It also confirmed that although Australia had subsequently extended its fishing zone to 200 nautical miles, the Memorandum allowed Indonesian fishermen access only to the 12 nautical miles specified in the Memorandum. It noted the requirements for the protection of wildlife that had come in force as a result of Ashmore Reef becoming a Nature Reserve and it directed the Indonesian government to inform fishermen that henceforth, because of the conditions of wells, landings to obtain water could only be made at West Island. Unauthorized fishing was liable to the penalties under the 1952 Fisheries Act and subsequent Fisheries Acts.

In 1989, a further important understanding was reached between Australia and Indonesia. This understanding, which revised and updated the 1974 Memorandum, was set forth in Agreed Minutes dated 29 April 1989. These minutes took into account all of the relevant developments that had occurred since 1974: 1) the two countries' extension in 1979 and 1980 of their jurisdiction over fisheries from 12 to 200 nautical miles from their respective territorial sea baselines, 2) the agreement on a provisional fishing line in 1981 and 3) the fact that both countries had become parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Australian officials noted the depletion of fishery stocks around Ashmore Reef, the contamination of wells on Middle and East Islets where traditional fishermen had been permitted to take fresh water and Australia's international obligation to protect the wildlife on Ashmore and Cartier Islands. Indonesia indicated its willingness to prevent breaches of the MOU and both sides agreed to cooperate in developing alternative income projects in eastern Indonesia for traditional fishermen engaged in fishing under the MOU.

The Agreed Minutes of 1989 also included "practical guidelines for implementing the 1974 MOU". Under these guidelines, which form the basis for present arrangements in the MOU Box, access to the MOU area continues to be limited to "Indonesian traditional fishermen using traditional methods and traditional vessels consistent with the tradition over decades of time". This definitional statement gives sense to the notion of 'tradition' specifying not just methods and vessels but also the historical continuity of such fishing activities. Such traditional fishermen were allowed to conduct their activities in the area of the Australian Fishing Zone and the continent shelf adjacent to Ashmore Reef, Cartier Islet, Scott Reef, Seringapatam Reef and Browse Islet but in addition they were given access to an expanded area set forth in an Annex to the Agreed Minutes. However, in order to cope with the depletion of certain stocks of fish and sedentary species, all fishing activities in the Ashmore Reef Natural Nature Reserve were prohibited. The Indonesian government agreed to discourage fishermen from landing on Middle and East Islets because of the lack of fresh water in wells there. Instead fishermen were permitted to land on West Islet to obtain water. Both Indonesia and Australia agreed that any taking of turtles, dugongs and clams would continue to be prohibited in the MOU Box in

accordance with CITES. In the Agreed Minutes, the development of further management plans relating to the area was also foreshadowed. These management plans covering both Ashmore Reef National Nature Reserve and Cartier Island Marine Reserve have now been issued (see (1) Natural Heritage Trust/Environment Australia, 2002 and (2) Commonwealth of Australia: http://www.ea.gov.au/coasts/mpa/cartier/plan/index.html).

1.4. Defining A Traditional Fisher and Who has Access Rights

The 1974 Memorandum of Understanding implicitly recognises some form of (residual) right of access to specific reefs between Indonesia and Australia. In the Memorandum, Australia has defined -- and has since clarified -- just what `access' is to consist of in terms of such matters as landings, the gathering of fresh water, and the definition of permitted and prohibited marine resources.

The 1974 Memorandum of Understanding is less evidently successful in defining who has such rights of access and the 1986 attempt to clarify this issue seems to have had the opposite, unintended effect of increasing possible access to these reefs.

The 1974 Memorandum of Understanding is explicit:
By "traditional fishermen" are meant the fishermen who have traditionally taken fish and sedentary organisms in Australian waters by methods that have been the tradition over decades.

This definition has two effective clauses that are intended to be interpreted as cumulative. Both clauses define `traditional fishermen' by repeating the word `tradition'.

In the attempt to clarify this definition, the 1986 Advisory Note focuses on the second of these clauses which has to do with the methods of fishing:

The Australian Government understands that "the methods which have been the tradition over decades of time" referred to in paragraph 1 of the Memorandum of Understanding do not include fishing from vessels powered by motors or engines, or any form of fishing utilising motors or engines. Such fishing will be regarded as falling outside the scope of the Memorandum of Understanding.

The practical effect of this clarification is to shift the emphasis on determining `access' to the area to what kind of boat is used to gain access. The issue, in effect, ceases to be a question of who may have traditional rights and, instead, becomes one of who has a traditional perahu. Those who patrol and monitor the area are only called up to make judgements on perahu type: whether a perahu is motorised or not.

Beginning in the 1970s, the local owners of Indonesian perahu, including the ubiquitous small perahu in eastern Indonesia, began a process of rapid motorization, adding auxiliary engines to their vessels to transform them into what are generally referred to as *perahu layar motor* (`motorised sailing perahu')[2]. Those who drafted the 1986 Advisory Note must have recognised that these changes were having a major effect on the perahu sector and that excluding motorised sailing perahu would reduce significantly the total number of perahu that might otherwise sail to Ashmore and other reefs.

[2] see Dick 1987:43,119

It is evident that this qualification of the Advisory Note had its intended effect in limiting perahu of a certain kind. But the Note also had the possible effect of leaving access open to a different class of perahu: perahu owned by those who could not afford to upgrade their vessels -- a flotilla of poormen's perahu that are generally small and not always the most sea-worthy of vessels.

Since, however, such perahu can still be found in large numbers throughout eastern Indonesia, access remained open to a potentially large number of so-called `traditional fishermen'.

By inadvertently confining access to a type of vessel found widely in eastern Indonesia, some of those fishermen who had historically sailed to Ashmore on a regular basis were in effect disadvantaged, thus distorting the original intention of the Memorandum of Understanding.

Thus, by shifting emphasis to a criterion of boat type, the first (and, by implication, the primary) of the two clauses of the Memorandum intended to define traditional fishermen, that is, fishermen who had "traditionally [i.e., historically] taken fish and sedentary organisms in Australian waters", was, to some extent, undermined.

To understand what this implies from an Indonesian perspective, it is necessary to briefly describe the history of Indonesian fishing in what is now the MOU Box, identify the main fishing and sailing populations of eastern Indonesia and to try to chart the main changes that have occurred among these populations since voyaging to Ashmore began. Although it is impossible to consider the complexity of these changes, it should be sufficient to sketch their outlines.

2. Indonesian Fishing in the MOU Box

2.1. Brief history

Ashmore Reef has its own recognised Indonesian name, Pulau Pasir, `Sand Island'. It is also referred to in the language of the island of Rote by the name Nusa Solokaek, which also means `Sand Island'.

The traditional method used by Rotenese perahu in navigating to the reef is to sail due south in initial alignment by sight with the most prominent hillpoint on the south coast of Rote. If a perahu fails to reach Sand Island after leaving sight of Rote for a full day, it would return north, realign itself and sail south again.

The fact that Ashmore is so near to Indonesia's southernmost island and that Ashmore Reef offers the prospect of fresh water has made it an area of special significance in Indonesian voyages south from the Timor area. Ashmore Reef has served and continues to serve as staging point for voyaging to other reefs in the vicinity and to points further south. The historical evidence points to the regular use of Ashmore Reef by Indonesian fishermen beginning sometime between 1725 and 1750.

Most of the southern voyaging of Indonesian perahu during this period had clear objectives. These voyages were connected with the search for new sources of trepang to supply a large Chinese market. Trepang, an edible holothurian that has the appearance of a fleshy cucumber had long been regarded among the Chinese as a kind of `sea ginseng'. As sources of this potent

delicacy became depleted along the south China coast, the search for new sources shifted to what the Chinese called Nan-hai, the `Southern Seas'. In the late seventeenth century, the fishing and sailing populations of Sulawesi became actively involved in trepang gathering and this prompted the search for high quality trepang throughout eastern Indonesia and beyond[3].

Involved in this search for new sources of trepang were populations of migratory sea peoples known as Bajau or Bajau Laut. These populations, originally located in the islands of the southern Philippines migrated first to Borneo and Sulawesi and then onward to the islands south of Sulawesi. Dutch records from the early eighteenth century document the initial movement of the Bajau into the islands of the Lesser Sundas. They also record the Bajau sailing in fleets in search of trepang. By 1728, they had reached the island of Rote and were exploring its southern coastline.

Reference to Bajau trepang expeditions from this time can be found in a letter written by the Dutch East India Company's officer in Kupang to the Governor General in Batavia, dated the 14th of May 1728. He reports that no foreign ships or boats visited Kupang since his last letter except for

"40 small Bajau Laut boats which appeared here mostly in the domain of Thie [on the southwestern coast of Rote] some of whose people came ashore under the pretext that they had come to look for trepang; since the Rotenese rulers did not, however, trust the people, they refused them their shores and made them depart from there, whereupon the boats also appeared on the 8th of March in the open sea outside of this fortress, a fact that we could not let pass without respectively informing you[4]."

According to a local Rotenese narrative, it was during this time that the Rotenese accidentally discovered Ashmore Reef. Led by Foe Mpura, a figure identifiable in Dutch archival records, who became the Ruler of Thie in 1729[5], a group of rulers from Rote set sail in an outrigger perahu from the south coast of Rote. Attempting to sail to Batavia, they were first carried southward to what they called 'Sand Island'. A short excerpt from this narrative of the `discovery' is as follows:

"The Lords …climbed on board and headed the perahu westward to sail round the 'tail' of Rote so that they might point the perahu north. But the current took them to the south, no one knows how many days, and they reached Sand Island and their perahu became stuck there. The crew of the perahu disembarked and they wandered the length and breadth of the island but they saw nothing. It is said that Foe Mpura took a stick and carved his name on it and then erected it in the middle of Sand Island. After many days, when the tide rose higher, the perahu came afloat and they boarded again and departed."[6]

[3] Most of the trade in trepang was centred on Macassar in South Sulawesi and, as a result, the trepang industry has been given a `Macassan' label. The fact is, however, that various different Sulawesi populations participated in trepang gathering. Besides the Macassar populations, the most prominent populations involved in trepang gathering were the Bugis and the Bajau. The classic study of this trepang gathering in northern Australia is *The Voyage to Marege': Macassan trepangers in northern Australia* by C. C. Macknight.

[4] *Timor Boek,* K.A. 1992.2: see Fox 1977a: 460

[5] see Fox 1977b: 101-112

[6] This is a translation from the Rotenese of an oral narrative gathered by the Dutch linguist, J.C.G. Jonker, at the end of the nineteenth century and published (in Rotenese with a Dutch translation) in 1905. Because the narrative mainly concerns the origin of Christianity, Dutch missionaries seized upon this tale and disseminated it through the schools and churches, giving it near canonical status. Virtually every Rotenese has heard this tale in one form or another.

Dutch records confirm that Ashmore was known to Indonesian fishermen in the first half of the eighteenth century. MacKnight in his study of trepang gathering in northern Australia notes the existence of another letter from the Company Officer in Kupang to the Governor General in Batavia written in 1751 which gives a report on a Chinese trader who had set out to reach "the large sandplate beyond Rote, to search for turtle-horn"[7].

By the late 1750s, the gathering of trepang had become regularized. `Macassarese' vessels began to arrive in the Timor area with formal letters of permission from the Dutch East India Company allowing them to gather trepang without hindrance[8].

Writing of his experiences in northern Australia at the beginning of the nineteenth century between 1801 and 1803, Flinders points to the link between the gathering of trepang on the Ashmore Reef and the discovery of much larger resources of trepang on the Australian coast.

"The natives of Macassar have been long accustomed to fish for trepang...upon a dry shoal lying to the south of Rottee; but about twenty years ago, one of their prows was driven by the northwest monsoon to the coast of New Holland, and finding the trepang to be abundant, they afterwards returned; and have continued to fish there since that time" [9].

The Bajau who pioneered the search for trepang on Ashmore and eventually found their way to the mainland of Australia also played an important role in the `Macassan' trepang industry in northern Australia during the nineteenth century. Earl noted the presence of Bajau at Port Essington in 1840 describing them as "that singular people the Badju, a tribe without fixed home, living constantly on board their prahus, numbers of which congregate among the small islands near the southern coast of Celebes"[10].

Traditions of the island of Rote, including local navigation techniques, together with the evidence from European records indicate not just the discovery of Ashmore by eastern Indonesian fishermen in the eighteenth century but the use of this Reef and its resources on a regular basis. Although all voyaging ceased during the Japanese occupation, regular Indonesian fishing resumed after World War II. A CSIRO fisheries survey carried out by the FRV *Warren* reported twenty-three perahu at anchor at Ashmore in 1949 as well as clear signs on the island of regular visits, including drying racks for fish and clams.

2.2. Eastern Indonesian Fishing and Sailing Populations

There are at least five distinct fishing and sailing populations in eastern Indonesia, each of which can be distinguished by the language(s) they speak, the kind of boats they sail, and by other specific cultural differences and former local political allegiances. The main populations are: 1) the Madurese; 2) the Makassarese; 3) the Bugis (or Buginese); 4) the Bajau Laut or Sama-Bajau (who are sometimes referred to as "sea gypsies") and 5) the Butonese.

2.2.1. The Madurese

The Madurese originally come from the island of Madura off the north coast of East Java but are now to be found settled in east Java as well as on various small islands in the Java Sea, such as Bawean, Raas or Kangean. Madurese sailors were important in the history of eastern

[7] Macknight 1976:95
[8] *Timor Boek* for 1759, K.A. 2857; see Fox 1977a: 461
[9] Flinders 1814,II:257
[10] Earl 1846:65

Indonesia. Rotenese traditions, for example, recount that Madurese taught them many of their sailing techniques. In eastern Indonesia today, however, one rarely encounters large numbers of Madurese.

2.2.2. The Makassarese

The Makassarese are predominantly located on the western coast of the South Sulawesi peninsula. The site of the original Makassarese kingdom was the port town of Makassar which was an independent trading centre until the Dutch East India Company conquered the town and deposed its Sultan in 1667. The Dutch utilized the port's strategic location as a rich and diverse trading entrepot. Today Makassar is known as Ujung Pandang, the city that continues to be a major maritime centre. Ujung Pandang is the hub in a complex network of trade in maritime products. Most of what is gathered, especially trochus, trepang, and shark fin, by eastern Indonesia fishermen is eventually marketed through Ujung Pandang. Few, if any, Makassarese are currently involved in sailing to Ashmore Reef.

2.2.3. The Bugis (or Ugi)

The Bugis whose original kingdoms were located along the eastern arm of the South Sulawesi peninsula are the most widely dispersed of eastern Indonesian populations. Not only have they settled widely in Sulawesi, they have also migrated extensively throughout Indonesia and also Malaysia. Bugis can be found, particularly as traders, from Sumatra to Irian Jaya or East Timor. Large numbers of Bugis are settled on the east coast of Kalimantan and a great deal of perahu trade is now carried between the Bugis of Sulawesi and East Kalimantan. Fleets of Bugis perahu, particularly from the Sinjae area, have on occasion sailed into Australian waters. A number of them were apprehended in 1995 using diving equipment to gather trochus. Relatively few Bugis perahu, however, have sailed on a regular and continuing basis to Ashmore Reef.

2.2.4. The Bajau or Bajo

The Bajau form a large linguistically closely related group that originated from the southern Philippines and are now settled in Indonesia, Malaysia and the Philippines. Comparative linguistic evidence indicates that sometime in the eleventh century, a sea-oriented group of Samal-speakers began to migrate from the Sulu Archipelago.The population that became the Indonesian Bajau probably reached Sulawesi, possibly by way of the east coast of Kalimantan, by the fifteenth century (Pallensen 1985: 121). By the eighteenth century, the continuing migration of Bajau reached the islands of the Timor area and began settlements there. There are no reliable estimates of the number of Bajau in eastern Indonesia since such estimates would be difficult to arrive at given the scattered nature of Bajau settlements and the continual movement of Bajau from one settlement to another.

The Bajau are now to be found along the coastlines of both South and Southeast Sulawesi, on Flores and on Timor as well as on many of the small islands in the sea between Sulawesi and Flores. They are also found throughout the Moluccan islands. The history of the Bajau in eastern Indonesia is closely associated with trepang gathering[11]. Despite the wide dispersal of their settlements, the Bajau in Indonesia are linguistically relatively homogeneous and, by a process of frequent movement of individuals among settlements, there exists good social communication among the Bajau. The Bajau are one ethnic group who can be historically identified as fishers who have continually and regularly sailed to Ashmore Reef and surrounding waters.

[11] see Fox 1977a: 461-463 for a long list of citations of Bajau trepang activities in the nineteenth and early twentieth century

Stacey has provided substantial documentation of Bajau involvement with Australian fishermen based in Kupang from the end of the nineteenth century. Henry Hilliard and his son, Robin, who often used the island of Rote as a staging area for their activities, were particularly prominent in these fishing enterprises and in supplying locals from Kupang for the northwest pearling industry. Bajau voyaging in northern Australian waters continued through the 1930s, was interrupted by the Japanese occupation but resumed in the 1950s.[12]

2.2.5. The 'Butonese'

Of the various maritime populations in eastern Indonesia the `Butonese' are the most difficult group to define. They do not form a single linguistic group nor are they confined simply to one island. The populations who consider themselves Butonese speak at least fourteen different languages and occupy some dozen islands in the immediate vicinity of the island of Buton. It is only in historical terms that it is possible to understand just who the `Butonese' are.

As recounted in their own traditions, the Butonese are the peoples of the islands that once constituted the realm of the Sultan of Buton[13]. Originally, the sovereignty of the Sultan of Buton embraced the island of Buton, with the neighbouring islands, both large and small, including the Tukang Besi chain of islands. Migrants from these islands and their descendants, who are now settled more widely in eastern Indonesia, still claim an identity based on this historical allegiance.

Often Butonese settlements retain the name of the area or island from which they originated. There is considerable rivalry between local Butonese settlements. Among the Butonese there are numerous differences but when it is matter of distinguishing themselves from the Bugis or Bajau, a definite Butonese identity is invariably asserted. Compared to the Bajau as well as the Bugis who, although more widely dispersed, are linguistically more homogeneous than the Butonese, the Butonese represent a diverse medley of peoples. Some Butonese, particularly those from the Tukang Besi Islands, have regularly sailed to Ashmore. The Butonese are the main fishers who sail from Dobo and neighbouring ports in the Arafura Sea to carry out illegal fishing in Australian waters.[14]

There are also smaller fishing and sailing populations, such as the Mandarese of South Sulawesi and the Savunese, the Endenese of Flores and Lamaholot-speaking groups on Solor and Lembata, but most of these populations confine their fishing and sailing endeavours within relatively limited contexts. None of these populations are known to voyage into Australian waters.

[12] StaceyN.E.T, 1999, *Boats to Burn* pp.106-145.

[13] For a brief historical sketch of the early background to the Sultanate of Buton, see Foreword (Fox 1995) to *The Navel of the Perahu: Meaning and Values in the Maritime Trading Economy of a Butonese Village* by Michael Southon. This study of the trading economy of a Butonese village is the best study of a Butonese community. Of particular interest is Southon's Chapter 2, which presents a detailed examination of the perahu economy of the village.

[14] For a discussion of this group of fishermen and their ports of origin, see Fox (1992), 'Report on Eastern Indonesian Fishermen in Darwin' in *Illegal Entry*, pp.13-24. Occasional Paper Series No.1. Darwin: Centre for Southeast Asian Studies, Northern Territory University.

2.3. Eastern Indonesia as a 'Melting Pot' of Muslim Fishers

Over centuries, the larger sailing populations have spread throughout eastern Indonesia. They are no longer confined to their home islands. Although they communicate with one another, sometimes sail together and even intermarry, each of these groups maintains its differences. These populations have worked out a traditional "division of labour" in eastern Indonesia that generally keeps them from encroaching on the others' territory. Understanding this existing situation -- the "who's who" among the fishing populations of eastern Indonesia -- offers a first step toward dealing with the problems Australia faces in dealing with incursions by these fishermen.

When one considers the evidence of the past ten years, it is apparent that the fishermen who are involved in both legal and illegal sailing voyages into Australian waters are predominantly from two groups: Bajau and Butonese. A majority of these fishers have sailed from Rote where they have settled, and in the case of the Butonese, have intermarried with local women. A relatively small number of Rotenese, some of whom have converted to Islam, are also involved in these sailing voyages. A small number of Madurese have also definitely been involved.

Bugis have also frequented Australian waters. These Bugis have come from Ujung Pandang, Selayar and Sinjae in small fleets, as indeed did many Bajau sailing from Maginti. The most recent of these 'expeditions' was in 1995, when a fleet of Bugis perahu were apprehended with equipment to dive for trepang in the Australian Fishing Zone. Since 1995, Bugis involvement in this fishery has tended to decline. Thus, taking into account this intermittent Bugis involvement, the prime actors remain Bajau, Butonese, Rotenese and some Madurese.

3. Recent Trends in Indonesian Fishing in the MOU Box

3.1. Sources of Data

There are two main sources of data on the Indonesian fishing in the MOU Box: the Australian "Ashmore Database" is a database comprising 1678 records with information on Indonesian vessels visiting Ashmore reef over the period 1986 to the end of 1999. Data was collected by National Parks officers stationed on a chartered vessel at Ashmore during the fishing season (March - December). Coverage was about 75% of the vessels fishing in the MOU Box. Full coverage was not possible, as some vessels did not stop off at Ashmore if they were fishing in other areas of the Box, like Browse Island. Each vessel recorded in the database is identified by name, date, and type of vessel, owner, captain and homeport. Information is also included on the number (and sometimes name) of the vessel's crew, catch, gear and other equipment.

This database is an invaluable source of information on voyages in the Australian waters defined by the MOU.

The other main source of data is the AFMA Apprehensions database (the "AFMA database') which records information on all vessels apprehended in the AFZ over the period 1988 – June 2001, including the MOU Box. It contains 899 records and includes similar information to the

Ashmore database (name, date, type of vessel, owner, captain, homeport, target species, crew size) as well as location of apprehension and information on the action taken by AFMA[15].

3.2. Origin of Fishers

The identification of the homeport of the vessels sailing to Ashmore is the first step in an analysis of 1) who are the "traditional fishermen" and 2) what are their activities.

The Ashmore Database provides the following information on provincial distribution of the homeports of these fishermen:

- *87.5 % of records relate to fishermen from Nusa Tenggara Timor, mainly Rote. This is approximately 80 % of a total of 534 vessels over the period 1988-99.*
- *5.6 % of records relate to fishermen from East Java Madura/Raas (including Surabaya). This is 6.7 % of a total of 534 vessels over the period 1988-99.*
- *3 % of records relate to fishermen from Sulawesi Tenggara, mainly Wanci and Kaledupa. This is 5 % of a total of 534 vessels over the period 1988-99.*
- *0.5 % of records relate to fishermen from South Sulawesi, mainly Bonerate. (0.3 % of vessels)*

Approximately 3 % of records fail to list a home port, or list a port that can not be clearly identified, or list a general area. Thus, for example, 7 records list Sulawesi without further specification.

3.2.1. Identification of Home Ports within Nusa Tenggara Timur

Since 87.5 % of all records in the Ashmore Database (1468 records out of 1678) relate to fishermen from the province of Nusa Tenggara Timur, it is important to identify the homeports of this large group of fishermen.

Identification of voyages to Ashmore by island between 1986 and 1999 (records and vessels) is as follows:

	Rote	Timor (Kupang)	Flores (Maumere)	Alor/Pantar
Records	1426	27	10	5
Vessels	393	14	9	10

Thus 85 % of all fishermen sailing to Ashmore and 93 % of all vessels come from the island of Rote. Of these fishermen, most come from two ports on the island: Pepela and Oelaba.

[15] Environment Australia also holds hard copy data of records of vessels visiting Ashmore from May 2000 to the present, as collected by the Australian Customs Service. This data has not been compiled into a database, and the completeness of this data is uncertain at this stage.

Identification of home ports on the island of Rote is as follows:

- Pepela: 1112 66 % of all voyages to Ashmore *(*or 69% of vessels*)*
- Oelaba 265 16 % of all voyages to Ashmore (19% of vessels)

Other small harbours on Rote account for 36 voyages, approximately 2 % of total voyages[16]. These other small ports are 1) Ma'e (10), 2) So'ao (9), 3) Ba'a (7), 4) Hundi Huk (6), 5) Dae Dulu (2), 6) Pantai Baru (1), and 7) Netena'en (1).

3.3. Catches

Catches on board were recorded in the Ashmore database – this included vessels on their way to and from fishing grounds so sometimes catches may not reflect the total catch of the vessel before their return to Indonesia. Nevertheless they provide the only time series data on catches in the MOU Box.

Coverage is best for sedentary species (trochus and trepang). Vessels specifically targeting shark fin catches may be underrepresented as many vessels sailed past Ashmore without stopping, usually on their way to or from Scott Reef (Steve Tasker, pers comm). In addition, the data is most reliable pre 1990 and from 1995 onwards as there were data irregularities over the period 1990-1995.

Figures 1 – 3 provide estimated total monthly catches recorded on vessels visiting Ashmore over the period 1995-1999.

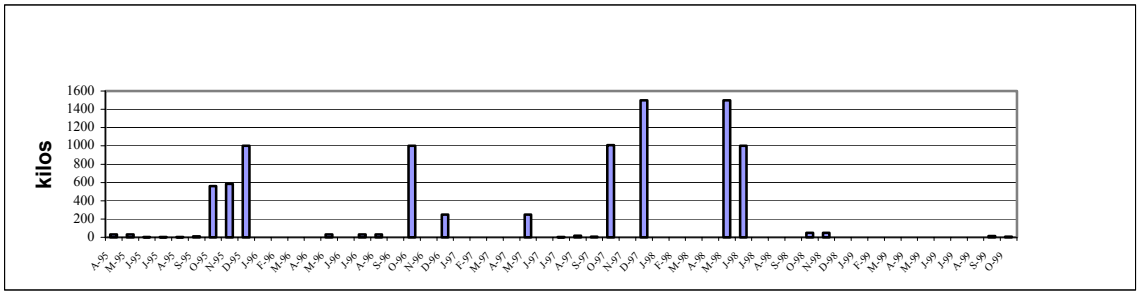


Figure 1 catches of trepang 1995-1999 as recorded from the Ashmore Database (n=48)

Up until 1997, the peak months for catches for trepang are October to December. Fishing season is dictated not by resource availability or market conditions but by the prevailing winds. As the data shows, most trips occur over the period March-June and Sept –December each year. However, from 1998 onwards the pattern changes, with peak catches in May/June 1998 and then very low subsequent catches even during traditional peak period. This is most likely a reflection of declining catches of high value species which were initially replaced with low value species and consequently low densities (and therefore catches) of all species confirmed by a 1999 CSIRO reeftop survey which noted that high value trepang stocks were over exploited in the MOU Box except on Ashmore Reef (although there was also some evidence of depletion on Ashmore). Maximum recorded catches were 1000 kg dried wt/vessel with median catches around 100 kilos dried wt/vessel. Median weights by year are likely not to be very representative given the small number of records in certain years. Probably a better

[16] 11 records in the database list Roti as 'home port' without specifying from which port on Roti the vessel sailed.

indicator of availability of catch is the number of records in each year although this also has difficulties and should be interpreted with caution. For trepang, peak years in terms of number of records were 1995 (16 records) and 1998 (17 records) compared to 2 records in 1999, 9 in 1997 and 4 in 1996.

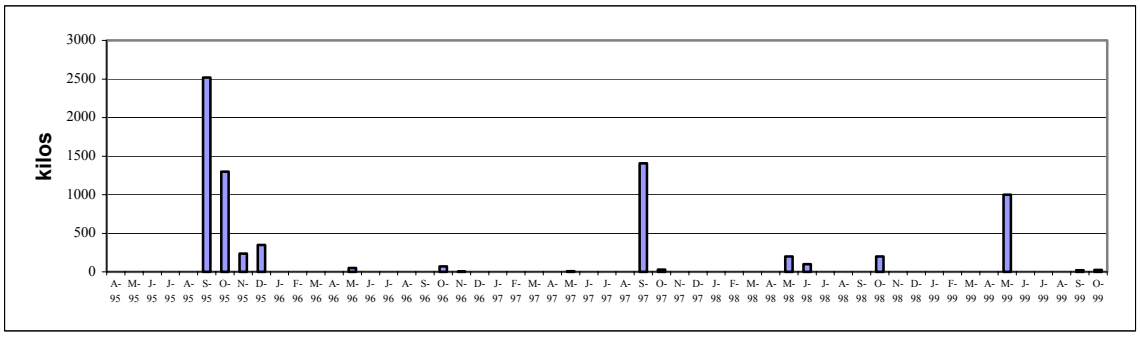


Figure 2 catches of trochus 1995-1999 as recorded from the Ashmore Database (n=85)

For trochus, there is a less clear pattern of catches over the period 1995 -1999. September – November is clearly the peak fishing months, although small amounts are recorded in May/June of each year with the exception of March 1999 where catches are high. 1995 was a big year, with some very high catches recorded for the months of September and October and then catches tail off from 1995. Maximum catch was 1000 kg/vessel with median catches of 14 kg/vessel). 1995 and 1996 had the highest number of records (22 and 50 respectively) perhaps indicating that after this time, fewer and fewer fishing trips were made to collect trochus. There were only 3 records in 1999 and 1998 and 7 records in 1997.

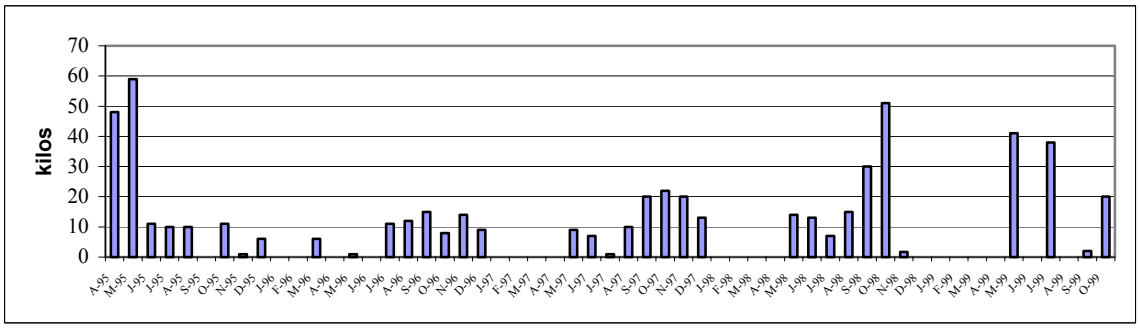


Figure 3 *Catches of sharkfin 1995-1999 as recorded from the Ashmore Database (n=79)*

Shark fishing shows a different pattern and, as mentioned previously, may not be a very good reflection of accurate catches as a significant proportion of vessels specifically targeting shark fin may not have been included in the survey. Maximum catch was 16 kg of dried shark fin/vessel and median catches were around 6 kg of dried shark fin/vessel. Median catches/vessel have reasonably steady over the period 1997-1999 ranging between 5 and 6 kg/vessel. As better shark fishing grounds are found outside the MOU Box (for example in the Sahul and Holuthuria Banks) the catches from the Ashmore database are probably not an accurate reflection of actual catches in the AFZ but may be a reasonable indication of catches taken in the MOU Box

Main gear for shark fishing are long lines from 400m to 1200m with an average length of around 500-700 metres and the number of hooks about 30 to 40. No vessels had gill nets on board.

The database also records catches of reef fish, but as this is not broken down by species and was not a target species, the data has not been analysed.

3.4. Comparison of EA Boardings Data with AFMA Apprehensions Data

Of about 540 vessels visiting Ashmore over the period 1988-1999 and assuming that the boardings data represented 75% of the vessels visiting the MOU Box (Steve Tasker, pers comm.) only 48, or 9% were apprehended by AFMA for fishing illegally outside the MOU Box. Fourteen of these vessels were apprehended more than once. Apprehended vessels ranged from being only a few nautical miles from the MOU Box to being apprehended at Rowley Shoals or near King Sound. Fisheries WA noted that those vessels that were apprehended very close to the MOU Box were only apprehended if there was considerable evidence to suggest that the vessels was fishing illegally rather than being accidentally outside the Box due to adverse weather conditions or navigation difficulties. Fifty per cent of apprehended vessels were targeting shark, and 23% were targeting trochus with the remainder trepang and reef fish.

Table 1 shows apprehensions in the MOU Box over the period 1988 – 2001 for vessels where there was information available as to their location of apprehension. There have been a total of 107 apprehensions in the MOU Box. The overwhelming proportion were targeting trepang (77 %), followed by trochus (7.5 %), shark (6.5 %), reef fish (5 %) and the remainder a combination of reef fish/shark or shark/trepang.

Table 1 Apprehension of Vessels Fishing Illegally in the MOU Box

Year	Number of vessels
1988	1
1989	2
1990	2
1993	2
1994	63
1995	21
1996	6
1997	1
1998	7
1999	2

With the exception of two Type 2 vessels (both apprehended for fishing illegally at Ashmore Reef) all vessels were Type 3 vessels. The number of apprehensions has decreased markedly but it is not clear whether this has been predominantly due to less effort or a better understanding of the MOU Box. The majority of vessels (56 %) apprehended were fleets of Type III vessels from South Sulawesi (56 %) apprehended were fleets of Type III vessels from South Sulawesi targeting trepang in the mid-1990s. For example, in one week in September 1994, 24 trepang vessels were apprehended and destroyed and during three weeks in November 1994, 35 Type 3 vessels from South Sulawesi were apprehended and destroyed). Only 16% of vessels came from Nusa Tenggara Timor. There were 18% of vessels with no homeport stated. Since 1995, apprehensions have decreased dramatically – perhaps a combination of overexploited resources, less enforcement effort in the MOU Box or the cessation of trips from South Sulawesi fishers perhaps to a combination of factors including the

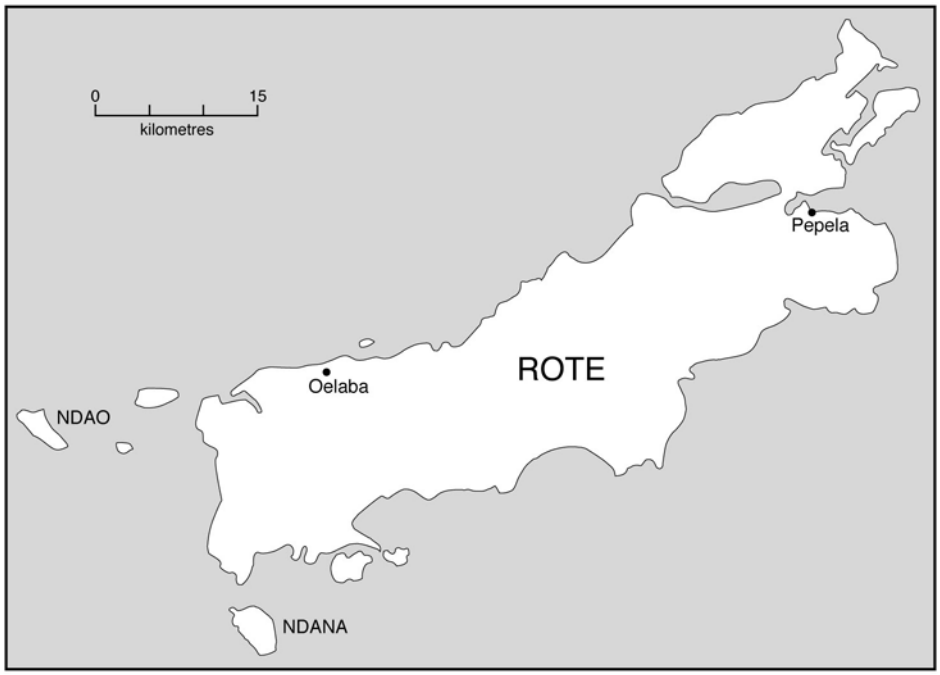
destruction of a large number of their vessels, changes in the market for trepang and reduced resource availability of high value species in the MOU Box.

4. Main Fishing Settlements on the Island of Rote[17]

Since the 1950s the island of Rote (including the island of Ndao) has been included within the larger administrative unit of Kupang. For more than two decades, however, Rote-Ndao has been accorded distinct administrative status within Kabupaten Kupang. In 2002, this status has been formally acknowledged and Rote-Ndao has been recognized as autonomous Kabupaten. Under Indonesia's new autonomy laws, this new status gives Rote-Ndao considerably greater capacity to determine its own affairs and manage its local resources. Any future proposals for development or regulation of fisheries must now involve the local Kabupaten officials.

4.1. The Settlement of Pepela[18]

Pepela is located at the south eastern 'neck' of the island of Rote on a wide, protected bay that opens to the Timor Sea (see Map 2). 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.



Map 2 The Island of Rote

[17] This section was written with the assistance of G. Tom Therik,Universitas Artha Wacana, Kupang.

[18] Pepela is the Rotinese name of this settlement. This name is often 'Indonesianized' and written as Papela. Both spellings are now equally common. In 1996 and again in 1998, Pepela was the subject of a number of studies undertaken by the Indonesian Institute of Sciences (LIPI: Lembaga Ilmu Pengetahuan Indonesia) in cooperation with the Population Study Centre of the University of Nusa Cendana and the Regional Research Centre of the Artha Wacana Christian University in Kupang. These local research reports provided by Dr Tom Therik who supervised the investigation on behalf of Artha Wacana provide the baseline data for this section. This section also relies on the unpublished PhD thesis by Natasha Stacey, *Boats to Burn: Bajo Fishing Activity in the Australian Fishing Zone* (1999).

Pepela forms a sub-village (*dusun*) within the larger village complex (*desa*) of Londalusi. Londalusi is comprised of five such sub-villages: 1) Papela, 2) Eahun, 3) I'iyah, 4) Oebalo Lain, and 5) Daehuti. The subvillage of Eahun serves as the capital of the district of East Rote (*Kecamatan Rote Timur*). Pepela is thus only 2 kilometres from the administrative seat of government in East Rote. Eahun was previously the capital of the historical domain of Oepao, first recognized by the treaty with the Dutch East India Company in 1690. Another *dusun*, I'iyah, in the village of Londalusi is closely linked to Pepela, whereas the two other 'outer' *dusun*, Oebalo Lain and Daehuti, are distinguished from the rest. Most of the inhabitants of these *dusun* are made up of local farmers rather than fishers.

The neighbouring coastal village of Seru Beba, in the domain of Ringgou, has four sub-villages: 1) Hailean, 2)Lo'okoen, 3) Noli and 4) Rarano. The four sub-villages that make up this village have approximately 260 households. Between 20-30% of the men from Seru Beba work, at least part-time, as crew members on perahu that sail from Pepela.

Another coastal village, Fai Fua at the far eastern end of the domain of Oepao, consists of four sub-villages: 1) Batuida, 2) Manuoen, 3) Nusak Lain and 4) Oek Sosolok. The village as a whole has about 240 households. In Nusak Lain and Oek Sosolok, as many as 70% of the population is dependent on fishing and other marine activities. Fishers from this village work as crew members on Pepela perahu. Increasingly, however, in this village, fishers are able to earn a better income from local seaweed cultivation and many have therefore ceased to sail from Pepela.

4.1.1. Population

The current population of Pepela is over 1350[19]. 82% of household heads identify their occupation as full-time fishing. As such, Pepela is the largest fishing village on the island of Rote and possibly the largest exclusive fishing village in the Timor area. It is the organisation centre for crew recruitment for voyages into Australian waters; it is also the initial marketing centre for the marine products obtained on these voyages. In addition to drawing on its own local manpower, Pepela is linked to other fishing villages on Rote, Flores, Alor and Timor from which both captains and crew are recruited. Pepela is also the site of a settlement of Bajau Laut who regularly sail into Australian waters. Most of these Bajau Laut have come from the Tukang Besi Islands of Southeastern Sulawesi and continue to maintain close contacts with the home villages.

The initial founding of Pepela is by no means clear. Local traditions recount the arrival and settlement of Muslim immigrants at the beginning of the 20th century. These initial settlers are said to have come from Southeast Sulawesi, particularly Binongko in the Tukang Besi Islands. These early settlers included a mix of Butonese and Bajau but also Madurese and a number of families of Arab origin. Many settlers came by progressive migration via other predominantly Butonese and Bajo settlements on the islands of Alor, Pantar and Flores.

Whereas Rote has an overwhelmingly Christian population, whose rulers converted to Christianity in the early 18th century, Pepela has always been predominantly Muslim. Rotenese from the near neighbouring settlements often join Pepela sailors on their voyages.

[19] This is an estimate based on census figures for 2000. According to local figures, in 1996, Pepela had a population of 1,185: 362 adult men; 336 adult women; 202 boys and 285 girls. Whereas there were proportionally more girls than boys, there were 8% more adult men than adult women. Extrapolating from Londalusi's total population of 2968 in 1994 to its reported population of 3398 in 2000 shows an increase of just over 14%. A minimal 14% increase in Pepela's population would put it at 1355 inhabitants.

Some of these Rotenese have converted to Islam; others, however, have remained Christian. Although these local Rotenese – possibly up to 20% of the population – provide social links to the rest of the island's population, Pepela's inhabitants form an almost exclusive enclave. Indonesian, rather than Rotenese, is the principal language of Pepela.

While keeping itself distinct from most of the local Rotenese population, Pepela is at the centre of a nexus of connections to other Muslim fishing communities in the region: 1) Oelaba on the northcoast of west Rote, 2) Sulamu at the western end of the Bay of Kupang, 3) Binongko village (named after the island of origin) and other settlements on the Bay of Alor, and 4) Wuring on the northcoast of central Flores. Linkages also extend to the Tukang Besi Islands, particularly to the original island of Binongko, as well as Kaledupa and Wanci. Pepela also draws crew members for its perahu from a number of neighbouring coastal settlements such as Haelean and Rarano in the village of Serubeba, Ringgou.

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 a "New Settlement" (Kampung Baru) built up from the sea.

In the late 1980s there was an influx of Bajau immigrants from the island of Wanci in the Tukang Besi Islands. Initially these Bajau came as temporary migrants and would often return to their villages on Wanci at the end of a season's fishing. Their arrival led to a major change in Pepela from the gathering of marine products such as trochus and trepang to intensive shark fishing. (*See below*)

Over a period of years, many Bajau built houses and took up more permanent residence in an area of Pepela near the beach. Eventually, this area of Pepela, known as Tanjung Pasir, was officially designated as a separate internal division of the settlement. In September 1994, the anthropologist, Natasha Stacey, conducted a survey of Bajau living in Pepela. At that time, there were 43 Bajau houses in Tanjung Pasir. Altogether there were "50 Bajo houses in Pepela, with a total of 292 people living in these houses, 134 adults and 158 children". A majority of these Bajau had come "from Mola Selatan (28 households), with lesser numbers originating from Mola Utara (8 households), Mantigola (10 households) and La Manggau (2 houses)."[20]

Tanjung Pasir is clearly distinguished by the fact its houses are all raised on poles and are constructed of woven palm leaf on simple wooden scaffolding; whereas most other dwellings in Pepela were at ground level and built of more durable materials. A lack of water is particularly acute in Tanjung Pasir.

Despite the historical diversity of the settlement and the fluidity of its population, a survey by local researchers found that 95% of Pepela's present inhabitants had lived there for five years or more. Although their origins were various, a core of Pepela's population had lived in the village for three generations and regarded it as their only permanent home.

4.1.2. Education and Employment[21]

Education levels in Pepela are much lower than in the rest of the island of Rote[22]. This is the case despite the existence of a local elementary school (SD Negeri) with eight full-time

[20] Stacy, *Boats to Burn*, pp 66-67.
[21] This subsection is based on a local research survey of 75 respondents from Pepela: Data Buku Dasar 1996.

teachers. Based on a local research survey, only about 52% of the population had completed elementary school. (None of the Bajau in Tanjung Pasir had, however, completed elementary school and most were reported to be illiterate.) An additional 27% had completed junior high school and a further 16% had completed senior high school. No one was reported to have had any education beyond high school. Children as young as 12 are taken on fishing voyages to learn the ways of the sea.

Local statistics confirm this pattern. Londalusi, of which Pepela forms a significant part, has the lowest school attendance in East Rote. Only 82% of school age children (7-12) attend elementary school compared to rates of over 90 to 100% for other districts. Although there is a junior high school within 15 minutes walking distance of Pepela, only 62% of children aged 13-16 attend this school[23].

97% of those surveyed were involved in fishing, either full-time or part-time. Of these, 60% were employed full-time, either by local perahu owners or by local traders; 30% were employed part-time by an owner or trader but also did other work for themselves. Only about 10% of respondents identified themselves as independently employed in fishing. (Many Bajau would be included in this category.)

Seasonal factors affect employment patterns. During the west monsoon from January to April, winds and waves limit fishing. Only the Bajau are reported to fish regularly during this season. 93% of the population, however, is involved in fishing during the east monsoon from May to June and again from September to December. July and August are a time of strong winds and most fishermen curtail fishing during this period.

Interruptions to fishing force most families in Pepela to seek other sources of income. Occupations that contribute additional income vary but include local trading, particularly of dried fish, and local construction, boat building and repair. No one in Pepela is reported to own agricultural land nor is anyone involved in farming or gardening. (Thus rice and other basic food stuffs must be purchased locally or obtained by trading fish.) When in need, most families borrow from wealthy local perahu owners (for whom they work and to whom they may well be related) or from traders. Most Pepela families are bound by bonds of dependence based on kinship and debt.

The differences in wealth among families are evident in the settlement. As a whole, Pepela is by no means a poor village. Pepela has electricity and 92% of the population relies on it for household lighting. Local researchers noted that there were more electric goods in Pepela than in the town of Ba'a, the island's administrative centre. 52% of families own a radio and 37% own a television set. In 1996, there were already 43 parabola antenna in Pepela.

4.1.3. Perahu Ownership

Perahu ownership is probably the most difficult subject on which to obtain complete and reliable information. Figures for the number of perahu vary based on different ways of classifying sailing vessels. Official government statistics for 2000 list 300 "jukung" (canoes),

[22] Rote is noted for its high education levels. In the early 18th century, the local rulers of the island with assistance from the Dutch East India Company, began their own Malay schooling system. This tradition has persisted to this day.
[23] *Rote Timor Dalam Angka 2000*: Table IV.1.5. BPS, Kupang.

and 133 "perahu" for Pepela plus 15 other motorized vessels[24]. In 1996, local researchers estimated that there were more than 150 "perahu" in Pepela.

Local researchers have identified five principal perahu owners. These perahu owners are also the principal outfitters for perahu voyages and the main local traders who purchase the marine products obtained from these voyages. Some of these owner/outfitter/traders work in close cooperation with other marine produce traders located on Rote or in Kupang. In some cases, these owners are 'heads' of families who generally cooperate as a single unit. Locally these five are sometimes referred to, in Pepela, as the five "conglomerates" who control all fishing that goes on in Pepela.

For the purposes of this report, these five owners will be identified simply as 1) Haji A, 2) Haji B, 3) Haji C, 4) Haji D and 5) Si E.

This reported configuration of ownership is independently confirmed in an analysis of the Ashmore database of vessels recorded as arriving at Ashmore Reef from 1986-1999. This database provides records on 1112 vessels from Pepela. For only 19 of these vessels is the owner's name omitted (but the owners of most of these named vessels can be reasonably identified by reference to other records in the dataset). Many vessels are recorded more than once and this provides a means of checking the consistency of the information on owners. It is also possible in several instances to identify the transfer of a vessel to a new owner, possibly by purchase or by inheritance. (The major difficulty in analysing ownership is in interpreting the great variety of spelling and abbreviation of names of particular owners.)

Pepela, as homeport, accounts for 66% of all vessels recorded as arriving at Ashmore over the thirteen years covered by the database. Consequently ownership data from Pepela would appear to provide critical relevant information on a majority of the vessels sailing to Ashmore.

In analysing this data to obtain a broad understanding of ownership, it is useful to identify prominent families as well as particular individuals. Vessels may be transferred among family members or ownership may be shared among related individuals. (Hence ownership may appear under one family member's name and a few years later under another.)

Perahu Owners in Pepela

1) Haji A's Family

From the database, Haji A's family appears to be the most prominent perahu owner family in Pepela. This family includes four family members. The Ashmore database lists perahu owned by all four of these family members.

According to the database, Haji A owned 34 perahu, five of which he disposed of, transferring/selling them to others in Pepela. One perahu he passed on to or shared with another member of his family. Another member of the family had 14 perahu, at least four of which were transferred to yet another member of the family. In addition to these four perahu, this particular member of the family is recorded as having another five perahu. One more

[24] *Rote Timur Dalam Angka 2000*: Table V. 5.3. BPS, Kupang. The problem with local statistics is that they use different categories for identifying boats. Official figures (for Londalusi) are as follows: jukung (canoe): 300; perahu kecil (small perahu): 35; perahu besar: (large perahu): 98; motor (motorized perahu?): 2; kapal motor (fully motorized boat ?): 13.

member of the family is recorded as having two perahu, including the one obtained from Haji A himself. In total, Haji A's family is recorded as having a total of 54 perahu.

Recent research confirms this number. As of 2002, Haji A is said to own fifty perahu. It was also said locally that as soon as he hears that one of his perahu has been apprehended by Australian officials, he is able to order another perahu from Sulawesi to maintain his fleet. The fact is, however, that he is also able to obtain perahu from those local perahu owners who are deeply indebted to him.

2) Haji B's Family

Another prominent perahu owning family is Haji B's family. The names of seven family members of Haji B's family appear on the database. Haji B's grandfather was a trader based in Binongko who regularly visited Pepela. His father moved to Pepela, married a local Rotenese woman and concentrated his attention on perahu fishing[25]. At this time, all fishing in Pepela was directed entirely to gathering trepang, trochus, clam and turtle shells.

Although Haji B's father is mentioned in the 1996 Indonesian research report as one of the principal perahu owners in Pepela, only 3 perahu are listed under his name in the Ashmore Database. (One of these perahu, he seems to have transferred to a Bajau fisherman for several years before reacquiring it.) Perahu under his name sailed to Ashmore from 1987 to 1997.

The majority of perahu in the database are listed under the names of other members of this family. According to the database, Haji B is credited with eleven perahu, which have sailed each year to Ashmore from 1987 to 1999. He is now regarded as the head of the family. In the database, the seven members of Haji B's family are cited as owning a total of 23 perahu.

3) Haji C

In 1996, Haji C was reported to be largest perahu owner in Pepela according to an Indonesian research report. Like others who own a fleet of perahu, he is also a large trader, outfitter and moneylender. In the Ashmore Database, he is listed as the owner of 25 perahu, three of which he transferred or sold to others in Pepela in 1995. The database indicates that his fleet of perahu sailed to Ashmore regularly from 1993 through 1998.

Haji C does not appear to have the support of a large family and thus in competition with Haji A and B, his fortunes over the past several years seem to have declined. Locally he is no longer seen to be as wealthy as Haji A.

4) Haji D

The full extent of Haji D's perahu ownership is difficult to determine. Although Haji D has fewer perahu than Hajis A, B, and C, nevertheless he is a significant owner and a major trader and moneylender. He has other enterprises besides those associated with voyaging. Several perahu are listed under his name in the Ashmore Database but he is said to have "distributed" most of his perahu among his various relatives. Haji D works closely with the main Chinese

[25] See Stacey, *Boats to Burn*, p.65.

merchant who deals with marine products based in the town of Ba'a on Rote. Through this merchant, Haji D is also involved in purchasing marine products in Ba'a and in Oelaba.

5) Si E

Like Haji D, Si E is not credited with owning a large number of perahu. He is, however, regarded as one of the five controlling traders and outfitters of perahu in Pepela. The Ashmore Database lists only 4 perahu under his name, one of which has, on occasion, operated from the settlement of Oelaba.

Other Pepela Perahu Owners

6) Si F

Another large perahu owner, according to the database, is Si F. Si F was the first Bajau to settle in Pepela in the early 1990s. He originally came from Mola Selatan on Wanci but moved to Tomea on Kaledupa before settling in Pepela. He is the largest Bajau perahu owner. He is not, as yet, reported to be a trader, outfitter or moneylender. Nevertheless he provides an important link to the Bajau community in Pepela. Si F is listed as having 10 different perahu according to the Ashmore Database.

7) Si G

Si G is another Bajau who has been notably successful since settling in Pepela. Si G, originally from the village of Mola Selatan on Wanci island, is the second largest of the Bajau perahu owners. He is listed as the owner of five perahu on the Ashmore Database.

8) Perahu Owners with One or Two Perahu

One prominent perahu owner of Arab descent – once the rival of Haji A – died around 1996 and no perahu have been listed under his name since then. His remaining perahu were undoubtedly sold after his death and possibly renamed. A number of other individuals or families can be identified in the Ashmore Database who have, over a period of years, owned three or four perahu. Since 1997/98, only one or two perahu have been listed for each of these individuals or families, suggesting that their 'fortunes' as relatively small operators has waned and the fortunes of the major traders have increased.

Taken together, this group of owners with a couple of perahu each forms a significant block but their total ownership is less than that of Haji A and his family. Of the 300 specifically named perahu in the database, one third are owned by the families of Haji A, B and C.

In addition, there are also single perahu owners listed on the database. It is important, however, to distinguish between those perahu that were mainly involved in trepang and trochus fishing and those that adopted new methods for shark fishing. (See Discussion Below: 4.1.12). The transition occurred during the 1990s. It is useful therefore to distinguish between the perahu that sailed before 1996 and those that continued to sail thereafter.

A large number of single perahu owners – some 80 on the database – ceased to sail after 1996. Many of these owner/operators may simply have 'retired' from fishing rather than adopting new methods. A significant number of individually owned perahu may have been apprehended; many, however, were sold or transferred to larger perahu owners in payment of

debts. (When a perahu has retained its name, it is possible, using the database, to trace its transfer to one of the larger owners.)

Approximately 50 'individually-owned' perahu are listed in the database as continuing to sail after 1996. However, several of these supposed owners are listed as owning perahu that – on other voyages – are attributed to one or another of the large owners. One can only conclude from this and other evidence that the large owners are involved in various kinds of transfer (or 'lending') arrangements of their perahu to individuals in Pepela. These arrangements also 'transfer' the risks associated with possible apprehension. Attributing ownership to others may also be a way of avoiding local levies.

Among the category of individual owners, the largest identifiable group is that of the Bajau Laut who have settled in Pepela. Increasingly they have been forced into greater dependence on the larger owner/traders of Pepela. For the Bajau, this is a matter of survival. In the words of the Bajau themselves: "A dry paddle is a dry cooking pot" (*Tohu busei, tohu perio' – Kering dayung, kering periuk*.)

9) Bajau Perahu Owners

Natasha Stacey provides a detailed analysis of the sailing patterns of Bajau from Pepela from August to December 1994[26]. These voyages involved (1) perahu owned by Mola Bajau living in Pepela but also perahu that operated out of Pepela but had originally departed either from (2) Mola on Wanci island or (3) Mantigola on Kaledupa island in the Tukang Besi group. Also included is information on (4) Pepela-owned perahu 'borrowed' by Bajau from Mola or Mantigola.

Many but not all of the 22 named perahu owned by Bajau living in Pepela can be identified on the database. (Three of these perahu were apprehended in late November or early December during the 1994 fishing season.) There are only a few Bajau who own more than one perahu. Many Bajau own their own perahu and either they, or a son or a close relative, will sail that perahu.

Eight out of 13 Pepela perahu 'borrowed' by Bajau are recorded in the database. They all belong to large perahu owners: members of Haji A's family or Si F. It appears that the large perahu owners in Pepela advantage themselves by calling upon dependable Bajau captains and crew to sail a portion of their perahu.

Three of the 9 Mantigola vessels that operated out of Pepela in 1994 appear on the database, at a later date, under Pepela ownership. In two cases, these perahu were sold to a large Pepela perahu owner to pay debts; in one case, the owner may have decided to settle in Pepela. Similarly, 6 of the 26 Mola vessels that operated out of Pepela in 1994 ended up in Pepela, most sold to large perahu owners. Thus the continuing use of Pepela as a strategic port for sailing south into Australian waters provides a steady stream of new boats to replenish the stock of existing vessels in the settlement.

Since the time of Stacey's research in 1994, the dependence and indebtedness of the Bajau to one or another of their main trader/owners has increased considerably. Several Bajau captains are now so far in debt, they must simply do as they are told. In the words of one Bajau captain:

[26] *Boats to Burn*, Appendix 6, p.332ff

"Now I only wait for my boss: when he orders me to depart, I must depart because I have to pay back my debt." (Sekarang ini saya hanya menunggu bos saja; kapan ia suruh saya berangkat, saya mesti berangkat karena saya harus melunasi hutang.) This means that the Bajau must undertake more voyages, including voyages during the most risky time of the year. And as a consequence, the Bajau have suffered the loss of many of their perahu and crews.

4.1.4. The Network of Owners Centred on Pepela

Pepela is the hub of a network linking other fishing settlements in the local region. This creates a complex web of ownership and local port identification. Thus, on the Ashmore Database, a number of perahu are listed as sailing from Pepela in some years and from Oelaba in other years. Some owners located in Pepela keep some of their own perahu in other ports. Transfers of perahu occur between ports. Where an owner has a perahu in more than one port, it is essential to take account of total ownership in determining that owner's overall standing in the local fishing network.

The Apprehensions Database

The Apprehensions Database is a rich source of information on 1) ports of origin, 2) owners, 3) captains and 4) vessels apprehended in Australian waters. These data have various potential uses but require local knowledge of eastern Indonesia to be of particular benefit. Multiple spellings, different designations for the same port of origin and gaps in many records present specific problems. On the other hand, with knowledge of a particular area, it is possible to overcome many of these problems. It is also possible to cross-check information on vessels and owners in the Apprehensions Database against information in the Ashmore Database.

It is essential to recognize that, in the Apprehensions Database, there are a large number of apprehensions of perahu from Dobo, Saumlaki, Merauke, Tepa and various other locations in the Arafura Sea. This is a separate group of mainly shark fishers and dealing effectively with this group of fishers would appear to represent a problem as large, if not larger, than that of the fishers in the Timor Sea.

Perahu from Pepela in the Apprehensions Database

In the case of Pepela, the Database is of considerable use. Perahu from Pepela are identifiable under various spellings of 'Pepela' (Papela, Papella, Papela Roti). They are also listed under 'Londa Lusi', the village of which Pepela forms a part. Some are simply listed under the general label, 'Roti'. (Not all perahu, however, listed under 'Roti' are from Pepela.) With local knowledge of Pepela owners and their perahu, it is also possible to identify perahu from Pepela, where the record gives no port of origin.

With care and caution, it seems possible to identify most of the perahu from Pepela that were apprehended for illegal fishing in Australian waters.

There are 990 records in the Apprehensions Database. Of these records, 150 apprehensions have been of perahu from Rote and it would seem that at least 137 of these perahu come from Pepela. This represents 14% to 15% of all apprehensions. (Were one to exclude the large number of apprehensions from Dobo and other ports in the Arafura Sea, this percentage would appear significantly larger.) With only three exceptions, all apprehensions were for shark fishing. The largest number of apprehensions occurred from the end of May to the beginning of November 1996. During this time, 46 perahu were apprehended.

By cross-checking ownership records in the Ashmore Database against ownership records in the Apprehensions Database, it is possible to identify owners who have suffered substantial losses due to apprehensions over the period from 1988 to 2002. Not surprisingly the large perahu owners of Pepela suffered the greatest losses. By their very numbers, perahu within their fleets most frequently violated the rules on fishing outside the boundaries defined by the MOU. Some indications of these losses are as follows:

4.1.5. Haji A's Family

Chief among those whose perahu were apprehended is Haji A. He has had 18 – possibly 19 – perahu apprehended between 1994 and 2002. Only the first of these apprehensions, in 1994, was for illegal trepang fishing; in 1996, another perahu was apprehended for illegal trochus fishing. All of the rest of the offences were for illegal shark fishing. In addition, three other members of his family have had four different perahu apprehended. This makes a total of 22 or more perahu from Haji A's family that have been apprehended for illegal fishing in Australian waters.

4.1.6. Haji B's Family

The Haji B's Family has also had several perahu apprehended. Apprehensions have affected most members of the family. The family has had 5, possibly 6, perahu apprehended for illegal fishing.

4.1.7. Haji C

Haji C's name appears under a great variety of spellings. Deciphering these spellings indicates that Haji C has certainly had 8 and possibly 9 perahu apprehended – all for illegal shark fishing.

4.1.8. Si F

Si F has had 2, possibly 3 perahu apprehended.

4.1.9. Si E

Si E has had 2 perahu apprehended.

4.1.10. Other Perahu Owners and the Consequences of the Apprehension Policy

Various small-scale perahu owners have had perahu apprehended and in many cases, this seems to have led to their 'retirement' from fishing.

One clear effect of the Australian apprehension policy has been to put pressure on individual and small-scale perahu owners whose capital is limited. Without sufficient capital to recover from the loss of their vessel, these individuals and families have been forced into debt or out of fishing altogether. Although they have suffered losses, the larger owner/traders have effectively flourished under this policy. Their control of fishing has increased.

These large owner/traders persist in voyaging into Australian waters and continue to be involved in illegal shark fishing. These owners have to be recognized as the key stakeholders in all fishing operations.

4.1.11. Large Owners as Key Stakeholders

The large perahu owners in Pepela are the most important initial 'purchasers' in a chain of trade that extends from Rote to Kupang and then on to Makassar or Surabaya and beyond.

Thus they play a key role in negotiating the prices of marine products with intermediate traders or the so-called "*bos*" (from the English word, "boss"). In some cases, they function as inter-island traders.

These large owners are also the principal outfitters of perahu, both for their own fleets and for individual perahu, owned by others in the community. In addition and most significantly large perahu owners also take responsibility for the members of the crews who regularly sail on their perahu as well as the families of these crew members. These owners are the main (and almost the only) source of credit that maintains the families of crew members while they are on voyages or when a family crisis occurs. For a good proportion of these fishers, the larger owners also provide employment during the season when the winds and sea curtail sailing activities. As such they are central figures in a network of debt and obligation that binds the community. In addition most perahu owners have earned enough to be able to afford the pilgrimage to Mecca. With the status of haji, they are accorded respect within the Muslim community. As a consequence, these owners are the most influential stakeholders in the community. They are the chief patrons in the community.

Stacey described the trading situation in Pepela in 1994. The main trader or *bos* was the largest perahu owner in Pepela. He operated with capital from a Hong Kong couple whom he supplied and he worked in conjunction with his uncle, who was regarded as another *bos.* Together they controlled about 40-50% of trade. A third intermediate trader or *bos* was of Chinese origin and lived in the town of Ba'a. He was married to the daughter of the previous Chinese merchant, who was the main trader in marine products on the island from the 1930s. He worked with another larger perahu owner who was also regarded as a *bos*. He and his brother in Aru supplied their marine products to an older brother in Ujung Pandang. Another Kupang-based trader had begun operations in Pepela just two years before. He was financed by a trader from Surabaya and operated from Kupang through collectors based in Pepela. He relied on another large perahu owner who was his chief supplier. At least one other Kupang trader purchased marine products, particularly from Bajau in Pepela[27].

In 1992, a cooperative, KUD "Mina Sepakat", was established in Pepela to provide for the needs of fishermen and their families. Although some 121 fishermen became members of the Cooperative, it was unable to function successfully because its management board consisted of various large perahu owners who were intent on continuing to supply the needs of the fishermen for goods and credit. As the Head of the Cooperative explained to local researchers, the fishermen were too obligated to their patrons to be able to utilise the Cooperative. On the other hand, Pepela does have its own pawn shop which was established in 1995 and is reported to be used particularly during the non-sailing season and during the fasting time leading to the main ceremonial period of the year.

Since 1994, there has been a further consolidation of control of trading in the hands of the five "bosses" or "conglomerates" as they are referred to locally. Haji A, in particular, has consolidated his control over an even larger share of the market. He is now the dominant figure both in trade and perahu ownership. (As a result, the market share for Haji B and Haji C may have in fact declined over the past decade.) Haji D continues to work with his Chinese partner based in Ba'a and has expanded by shifting some of his efforts to trade in Oelaba. There may now be fewer Kupang-based traders who deal with Pepela, especially now that Haji A has

[27] This paragraph is based on information in Stacey, *Boats to Burn*, pp 249-251 and on personal fieldwork in Ba'a and Pepela.

moved to Kupang. From there he may well be expanding his operations into the Kupang market.

4.1.12. The Transformation of Fishing in Pepela

The fishermen of Pepela distinguish between two kinds of fishers: shark fishers (*nelayan hiu)* and reef fishers (*nelayan karang)*. Until the early 1990s, Pepela fishermen were predominately, if not exclusively, reef fishers. As reef fishers, they were mainly concerned to gather trepang, trochus and, where possible, turtle shells. They would also do some fishing but would dry the fish, including shark, for later sale. All of this changed in the 1990s.

At the beginning of the 1990s, the local price of shark fin increased from Rp 25,000 per kg to Rp 150,000 per kg for quality cuts largely because of strong demand from Hong Kong[28]. This market price gave advantage to the Bajau in particular who had specialised in shark fishing. Many of these Bajau from the Tukang Besi Islands began shifting to Pepela where they were better positioned to sail into Australian waters. The initial shift of the Bajau fishermen was seasonal, which meant that they would return to Wanci or Kaledupa for a period and then regroup in Pepela. Eventually, however, this strategic positioning led to more permanent settlement in the Tanjung Pasir area of Pepela. Recognizing the changing market and perhaps experiencing a decline in resources of trepang and trochus, Pepela fishers began learning shark fishing techniques from the Bajau. They did this initially by assigning young men from Pepela to perahu with Bajau captains and crew. The change-over in techniques occurred over a period of several years. By 1996-97, the target of virtually all perahu sailing from Pepela was shark fin. Local Pepela fishermen, who had learned their shark fishing from the Bajau fishermen, quickly – and somewhat contemptuously – discarded various traditional Bajau methods and accompanying taboos and adopted more effective longline technology. Within five years, these fishermen saw themselves as better shark fishers than their teachers.

The shift to shark fin fishing also brought about a change in voyaging times. Previous voyages into Australian waters for trepang and trochus would last for one to two months. Shark fishing voyages, however, would normally be for at most two weeks to a month. With a quicker turn around time, the number of voyages increased.

4.1.13. Current Prices (2002) in Pepela for Shark Fin

Prices for shark fin have held up remarkably well and have probably increased, particularly for first class shark fin. Shark fin is sold, not simply by weight, but by size of fin, which is the prime indicator of quality. (Because it is not sold by weight alone, the report of the weight of shark fin on perahu that are apprehended proves little indication of the value of the catch.) Even a relatively small amount of fin can have high value.

2002 prices for shark fin in Pepela are as follows. Calculated at Rp 4800/4850 = $A 1.00, present prices give a good idea of the potential profits that are to be gained.

1st Class Fin (>40 cm) per kg: Rp. 400,000 to 600,000 ($A 82.00 - $ 125.00)
2nd Class Fin (30-40 cm) per kg: Rp. 150,000 to 200,000 ($A 31.25 - $ 41.50)
3rd Class Fin (<30 cm) per kg: Rp. 40,000 to 75,000 ($A 8.33 - $15.50)

[28] Various rupiah prices – both historical (ie, mid-1990s) and current – are quoted in this and other sections of the report. A rate of Rp 1,600 = $A 1.00 is an approximate conversion for the mid-1990s. After 1997, there was a substantial devaluation of the rupiah and fluctuation in the currency after 1997. The conversion rate used for current rupiah prices has been calculated at Rp 4800/4850 = $ 1.00. This is appropriate to provide an idea of equivalence between the Australian and Indonesian currency. It is not necessarily a precise figure.

Several factors are critical to understanding the present situation. The Arafura sea – the primary fishing ground of eastern Indonesian fishers – has now been heavily overfished. Shark have been heavily targeted. As a result, they are becoming harder to catch and the size of the shark that are now caught has diminished. Among local fishers, it is now said that the Indonesian shark catch currently yields only 3rd Class Fin while the Australian catch regularly provides 1st Class Fin. The profit differential between shark fishing in Australian waters can be 10 times that of local shark fishing!

The profit differential is even greater for Pepela traders[29]. These Pepela prices are 'tied' prices because most fishers are obliged to sell their catch to specific bosses to whom they are bound by debt. Elsewhere on Rote, the price for 1st Class Fin can be as high as Rp 800,000 per kg = $A 166.00 per kg.

If one were to use the information on shark fin catches of perahu apprehended in Australian waters – maximum catch 16 kg; median catch 6 kg (See Section 3.3) – and for present purposes, if one were to assume that this dried fin were all of 1st Class quality, the value of the largest catch could have been between Rp 9,600,000 and Rp 12,800,00 ($A 2000 and $A 2666.). The value of the median catch could have been between Rp 3,600,000 and Rp 4,800,000 ($A 750. and $A 1000).

At present, older second-hand perahu can been obtained for no more than Rp 7,500,000 (less than $A 1500.00); or for even less, if the owner is forced to sell because of a debt. By contrast, a new perahu can sell for Rp 14,500,000 – more than double the price of an older vessel. Hence because of the risk of apprehension, the strategy of large owners has tended to concentrate on the use of older and cheaper vessels. This diminishes the risk of substantial financial loss for owners but puts crews at greater risk because of the quality of the perahu they now sail. In the present market, it is possible to cover the cost of a lost perahu on the basis of one, or at most two, successful voyages.

These hypothetical calculations allow one to evaluate statements (in interviews in 2002) by local Bajau Laut about their efforts. The highest income they claimed to have obtained from one voyage was Rp 11 million. A voyage that returns a profit of only Rp 2.5 million is barely considered a success; while a voyage that only returns Rp 1 million is a loss-making effort that puts them further into debt.

Because of their debt obligations, the Bajau report that they increased the number of their voyages, sailing even in the most hazardous seasons and have reduced their turn-around time so that for most voyages, they are at sea for no more than 15 days.

4.1.14. Fishermen's Income and the Financing of Voyages

Fishermen's income (as distinct from that of owners of perahu) is dependent on the financing arrangements for voyages. In eastern Indonesia, there is no one system for voyage financing, but instead a variety of local systems. The Bajau in the Tukang Besi Islands have a different system from that of Pepela and one of the attractions of Pepela is its advantageous financing arrangements for voyages.

[29] In the 1996 Indonesian report on Pepela, local researchers estimated that there was a 16% to 23% mark up on Pepela prices in the Kupang market and a further 16% mark-up when shark fin was sold in Makassar or Surabaya.

In Pepela, credit is offered by a small number of *bosses* who are also the main perahu owners and outfitters. In financing a voyage, the first component is provision for crews and their families during the voyage. Approximately 50 kg of rice and Rp 150,000 are supplied for the family of each crew member per month. This provision creates an individual debt separate from the expense of the general provisions for crew itself.

The local expression used in Pepela for this component is *ransum* (from the Indonesian – originally Dutch – word, *rangsum*, meaning 'ration'). This can be a variable amount. It can be as high as Rp 1 million per crew member.

The perahu owner puts his vessel at risk. Unless it is a family perahu, owned by more than one member of a family, the crew do not have to make up the cost of a lost vessel. Some perahu owners provide the captain with a bonus of 10 to 20% of their share for the safe return of a perahu.

Table 2 provides an idea of the general costs of a perahu and the equipment needed for shark fishing (as of 1996).

Table 2 Estimated Costs of Outfitting a Perahu in Pepela

(1996 Prices in Rp; $A = Rp 1600)[30]

a. Perahu (5 ton)/unit	8,000,000
b. Nylon Line 150 Kg @ Rp. 8.000	1,200,000
c. Fish Hooks 200 Hooks @ Rp.4.500	900,000
d. Cord Line 5 Kg @ Rp. 37.000	185,000
e. Anchor Line 200 meter @ Rp. 7.500	1,500,000
f. Lead 20 Kg @ Rp. 2.500	50,000
g. Floats 18 items @ Rp.10.000	180,000
h. Weights 150 items @ Rp. 3.500	525,000
i. Spears 6 items @ Rp.6.000	36,000
j. Machetes 3 items @ Rp.5.000	15,000
k. Petromax Lamps 2 items @ Rp.75.000	150,000
Cooking Equipment	10,000
Canoe Rental: 2 boats @ Rp 25,000	50,000

Much of this equipment can be used on repeated voyages and forms part of the standard equipment of a particular perahu. The most important equipment is the vessel's set of long lines with their hooks. An owner of such lines (generally trader/outfitters) may supply these lines in return for a share of the voyage's profits.

Interestingly, these lines earn a share of the profits from a voyage but do not share in the risk of the voyage. The price for a set of these lines is set (current price: Rp 5,000,000) and each

[30] This information is taken from Table 4.7, Buku I, Data Dasar p 163: Laporan Penelitian, Program Rehabilitasi dan Pengelolaan Terumbu Karang (Coremap), Propinsi Nusa Tenggara Timur, Lembaga Ilmu Pengetahuan Indonesia (LIPI) & Pusat Studi Pendudukan, Universitas Nusa Cendana, Kupang 1996.

member of the crew including the captain purchases an equal share. If any equipment is lost or damaged, such costs are deducted from profits before shares are allocated.

In Pepela, the local expression for the component consisting of hooks and lines is simply *tal*" or *tali plastik*. It is the cost of this *tali* component that has contributed most to the current fishers' indebtedness. Whereas the owner of the perahu must suffer the loss of any perahu that is apprehended, the "cost" of the "tali" is divided equally among the captain and his crew, so that if a perahu is apprehended and its equipment seized, this loss creates a debt that must be repaid.

If a voyage is unsuccessful (for example, if a perahu returns with only a little shark fin), the captain and crew must repay the cost of the *ransum* borrowed for the voyage. If hooks and lines are lost or seized, their replacement cost must also be repaid.

Calculations are based on the total value of the sale of all shark fin[31]. Stacey reports one such division. The owner takes the first third of these profits and deducts from the remaining profit the cost of all provisioning and such things as canoe 'rental' costs. The remainder is then divided into equal shares among all crew members (or among crew members with a separate full share to the owner of the long lines).

The Bajau, whose perahu come from the Tukang Besi Islands, have a different system of raising capital and dividing shares. Each crew member contributes 1 share (in 1996 = Rp 300,000) and the owner of the perahu 3 shares. This capital is used to purchase equipment and cover the cost of supplies for the voyage with Rp 150,000 allocated to the family of each crew member. When profits are divided, these shares are repaid first; then the remaining profits are allocated as follows: 3 shares to the perahu owner; 1 share to each member of the crew; 1 share for the long lines; and a ¼ of a share for each canoe.

Increasingly large owners have been able to set other rules for the division of profits from shark fin fishing.

4.1.15. Captains and Crew: Some Illustrative Cases

The following are a few illustrative cases of particular individuals and their relations as captain or crew of perahu sailing in Australian waters.

Si J

Si J is 28 years old and comes from a hamlet near Pepela. He works as the captain (*juragan*) on a perahu owned by Haji A. The perahu is an old design *sope* and has a crew (ABK: *anak buah kapal*) of six young men in addition to its juragan. Si J and his crew, who regularly sail together, are Rp 6 million in debt to Haji A for previous *tali* and *ransum* loans. Si J has been apprehended twice by Australian patrols. The first time he was sentenced to 4 months in Broome; the second time, his sentence was for 18 months, but was reduced to 12 months. Despite having been apprehended, Haji A continues to employ Si J and his crew who remain bound to him because of their debts. Haji A is their continuing patron.

Si J's most recent voyage was a short one (21 April to 8 May 2002) but it was very successful. He returned to Pepela with 10 kg of dried shark fin. The entire catch was sold to Haji A who set the price for the catch. Income was divided in the following way:

[31] See Stacey, *Boats to Burn*, pp. 259-263.

1. One portion for the perahu: Haji A
2. One portion for the *tali*: Haji A
3. One portion for the captain: Si J
4. Two portions for the six crew members (minus their *ransum*) divided equally.

In addition because the shark fin from the voyage sold for more that 5 million, Si J as captain was given a 'premium' by Haji A of Rp 250,000.

Si K
Si K who is 23 years old lives in the same hamlet as Si J but he is an ordinary crew member and has sailed for various *bosses* in Pepela. On his most recent trip (April 2002), he was a crew member on a perahu whose captain (*juragan*) came from the tiny island of Barnusa, near Alor. The perahu was a 7 ton vessel with a crew of 4 men plus the captain. The perahu did not call in at Ashmore but sailed directly to an area for shark fishing.

The voyage was reasonably successful. They sold all their shark fin to Haji A. They also brought back a small amount of dried shark meat which they sold separately at Rp 1,500 per kg. Most of the shark which they caught were simply thrown back into the sea after the fins had been removed. For his voyage, Si K earned Rp 600,000 ($A125.).

Si L
Like Si K and Si J, Si L who is 41 years old comes from the same hamlet. Almost a third of all men from this hamlet are drawn as crew members for perahu from Pepela. In April 2002, Si L took part in a shark fishing voyage as one of the six crew on a Pepela-owned perahu with a captain who came from Solor. They had been in Australian waters for 16 days and had already caught 20 shark when their vessel was apprehended by an Australian patrol boat. Their perahu was destroyed and they were detained in Darwin for 9 day before being sent home. On their return to Pepela, the crew and captain – seven men in all – were held responsible for a debt to the perahu owner of Rp 5 million. This means that all of them are bound to this *boss* for the next voyage he designates.

These three simple cases illustrate various critical aspects of the local situation in Pepela: 1) the way in which Pepela draws on a network of fishers: captains from different ports in the region and crew from nearby coastal settlements; 2) the dependence of local fishers on a small group of owner/traders; and, 3) the potential profits and losses from shark fishing.

4.1.16. The Vicissitudes of Shark Fishing: Unpredictable Profits and Losses

Stacey recorded the earnings of eleven Bajau shark fishing perahu that sailed from Pepela between August to December 1994. The range of these earnings was significant. One perahu earned just over Rp 3,000,000 ($A 1875.00) on its first voyage and then a startling Rp 15,500,000 ($A 9687.50) on its second. Another perahu earned Rp 1,500,000 ($A 937.50) on its first voyage and just Rp 520,000 ($A 325) on its second; it was therefore forced to make yet another voyage but succeeded only in obtaining shark fin worth Rp 900,000 ($A 562.50). These earnings did not cover costs; and as a result, the owner, captain and each crew member was left with a personal debt of Rp 70,000 ($ 43.75) by the end of the season. During this same season, other Bajau perahu were apprehended and their boats, equipment and catch were forfeited. When the crews of these perahu returned to Pepela, they all had substantial outfitting

and provisioning debts owing to Pepela bosses, which they were under obligation to repay[32]. Elsewhere Stacey has recorded any number of cases where Bajau perahu owners were forced to sell their perahu in Pepela or in the Tukang Besi Islands to repay accumulated debts[33]. On the other hand, some Bajau who were successful over several seasons of shark fishing managed to save enough to be able to purchase their own perahu. Overall, Stacey has estimated that most crew members managed to earn between Rp 100,000 ($A 62.50) and Rp 500,000 ($A 312.50) for four to five months fishing[34].

In 1996, in interviews with local researchers, fishermen in Pepela estimated their income from shark fishing at about Rp 400,000. 37% of these fishermen indicated that they frequently experienced shortages; another 55% admitted to occasional shortages; and only about 8% were never short of money. To be able to survive, 73% of fishermen said that they saved when they were able to, while 27% complained that they were never able to save. 84% stated that when they were in difficulties, they turned to the owner of their perahu or its captain for assistance.

4.1.17. Development Projects in Pepela

Various development projects have been proposed and some have been trialed in Pepela but none has yet proven successful. Most proposed projects have sought to utilize the relatively pristine waters of the Pepela Bay. It is considered to be ideal for seaweed farming, pearl farming and also for raising milk fish (*nener*). Were fishermen to do more local fishing, their wives would have the time for drying and marketing fish. More marketing of dried fish was done in the past than is done now. Previously fishermen would dry fish, including shark during their voyages. At present, all parts of the shark are disposed of except the fin and very little other fishing is done during a voyage.

4.2. The Settlement of Oelaba[35]

Oelaba is located on the north coast of western Rote (see Map 2). The settlement is built on the tidal mud flats formed at the mouth of the Mbisa River. Oelaba's 'harbour' is protected by a dense cluster of mangroves and is subjected to strong tidal fluctuations. Passages through the mangroves allow access to the sea. Whenever the tide goes out, perahu that are 'harboured' near the shore become beached on the mud flats; only when the tide comes in, do these perahu refloat and are able to make their way to the open sea.

Oelaba is one of five sub-villages (*dusun*) that make up the village (*desa*) of Oelua. The village of Oelaba consists of 5 hamlets with the following number of households (HH: Household Heads):

1. Dusun Oelaba 178 HH
2. Dusun Oelua 116 HH
3. Dusun Oedai 111 HH
4. Dusun Lasi Lai 121 HH
5. Dusun Helotula 126 HH

To the east of the village of Oelua is the village of Netenaen. This village consists of 4 hamlets with the following households:

[32] See Stacey, *Boats to Burn*, pp. 263-269.
[33] See Stacy, *Boats to Burn*, Appendix 6, pp 332ff.
[34] See Stacy, *Boats to Burn*, p. 264.
[35] This section was written with the assistance of G. Tom Therik,Universitas Artha Wacana, Kupang.

1.Dusun Netenaen	50 HH
2.Dusun Hundihuk	200 HH
3.Dusun Oetele	70 HH
4.Dusun Fulamon	40 HH

In addition to Oelaba, both Netenaen and Hundihuk appear in the Ashmore Database as minor ports on Rote from which fishermen sail into Australian waters. Netenaen and Hundihuk are coastal villages and can be considered as forming part of a single network of fishers. Oelaba is the centre of this network and a number of perahu in Hundihuk are owned by residents in Oelaba.

The village of Oelua belongs to the District of Rote Barat Laut and was until 1962 the capital of the traditional domain of Dengka and the official residence of the rulers of this domain. The administrative centre for the District has now shifted to Busalangga, which is about 13 km from Oelaba.

4.2.1. Population

In 1997, the population of Oelua came to 2,389. This population consisted of 545 households: 1287 males and 1102 females. Official population figures for 2000 show a decline in Oelua's population to 2,102: 1081 males and 1021 females. If these figures are correct, they indicate a substantial exodus of men from the village.[36]

In 1997, the sub-village of Oelaba had a population of only 685. There were 143 households with 352 males and 333 females. Virtually all households (138 out of 143) identified their occupation as a combination of fishing and trading.

Whereas Oelua is a predominantly Christian village, Oelaba is predominantly but not exclusively Muslim. In 2000, Oelua was reported to have 1512 Protestants, 14 Catholics and 576 Muslims.

According to local history, the founding of Oelaba was closely associated with the ruler of the domain of Dengka, Ch. A. Tungga, who is reported to have granted Butonese traders the right to settle in his village in 1927. Since that time, they have intermarried with the local Rotenese population.

The first Butonese perahu owner is said to have been Haji Mui; his perahu was named *Bunga Karang*. Another Butonese by the name of Mudimin built the first perahu for the Raja Tungga and gave it the name *Bismilla.* Initially the Butonese in Oelaba engaged in trade, selling Rotenese lontar syrup to Alor and the Tukang Besi Islands. They also engaged in local fishing.

Although the first settlers in Oelaba were Butonese, Oelaba has developed a population with diverse backgrounds through continuing migration and intermarriage. The settlement includes households of Bugis and Bajo origin as well as Butonese from settlements on Flores and Alor. Some Savunese have also settled in Oelaba and many settlers have married with Rotinese.

[36] There is sufficient discrepancy in population figures for Oelua in different sources to remain skeptical about the accuracy of local census-taking. In all sources, it is clear, however, that Oelaba is a far smaller settlement than Pepela – indeed Oelaba has less than half the population of Pepela.

According to local accounts, it was only in the 1970s that fishers from Oelaba began sailing to Ashmore Reef to gather trepang and trochus. Prior to this time, only a small number of Rotenese would regularly voyage to Ashmore for these products. These Butonese fisher-traders of Oelaba fitted trepang and trochus into their existing trading patterns. They would sail to Ashmore in August, but instead of returning directly to Rote would sail elsewhere (Kupang, Alor or Southeastern Sulawesi) where they would sell their catch, buy other goods for sale on Rote and, if possible, make a second voyage to Ashmore.

Another occupation reported for these fishers was the making of lime from particular species of living coral. When the supply of this coral was exhausted along the coast of Rote, fishers from Oelaba would gather coral from the reefs in Australian waters and bring it back to Rote as ballast for the making of lime.

4.2.2. Education and Employment

Most fishers in Oelaba are also traders so that when they are not sailing, they often engage in selling their goods in markets that are held on a rotating basis in different parts of the island. In turn, these traders purchase lontar syrup locally for their inter-island trade. When not involved in sailing or trading, men seek employment as labourers or in other service activities. When their husbands are away, wives also engage in local trade.

Attitudes to education in Oelaba are similar to those in Pepela and quite unlike the general, positive attitudes throughout the rest of Rote. Education is not highly valued. In a research survey carried out in Oelaba, 70% of those surveyed had completed elementary school but almost 10% had not. 13% had finished junior high school and only 7 % had completed senior high school.

This lack of education has little to do with a lack of facilities. There are three elementary schools and one junior high school in the village of Oelua. The senior high school is located in a neighbouring village 6 km from Oelua.

Oelaba's sailing and trading network extends to ports in several provinces in eastern Indonesia: Kupang and Alor in Nusa Tenggara Timur, Bau Bau in Sulawesi Tenggara, Donggal in Sulawesi Tengah, Ujung Pandang in Sulawesi Selatan and Surabaya in Jawa Timur. One of the main destinations in this network is Bau Bau on Buton, Sulawesi Tenggara.

There is considerable occupational mobility: many, if not most, experienced crew members expect eventually to be able to captain a perahu, and many experienced captains manage to own their own vessels. There is far less of a divide between perahu owners, captains and crew members in Oelaba than in Pepela since most individuals are also involved in trading. Local trading on Rote supplements inter-island trading and in some cases, local trading can earn almost as much as inter-island trading. Differentials in income, however, are still prominent. Based on the research survey conducted in Oelaba, a perahu owner in 1997 who was also engaged in local trade could earn Rp 7,500,000 ($A 4687.50) compared with a crew member of a perahu who might only earn Rp 500,000 ($312.50). The single most prominent source of income for all levels of fishermen was said to derive from voyaging to the Ashmore and other reefs in the Australian Fishing Zone.

When asked to identify their principal source of income for a research survey in 1996, 45% of respondents stated that this was 'fishing', 24% said 'trading' and another 20% said that it was

other 'service activities'. 64% of respondents said that they had experience with bank saving. As many as 28% of respondents had been involved in credit schemes to increase their working capital.

Since 1996, there has been a greater shift to inter-island trade. Oelaba (Netenaen and Hundihuk) fishers insist they still only fish for trepang and trochus. In other words, if a perahu sails from any of these ports, then it is outfitted for gathering and drying trepang and trochus. However, some perahu from Oelaba have shifted to Pepela where they can be outfitted for shark fishing and indeed engage in shark fishing. This is still said to be a minor activity of the Oelaba, Netenaen and Hindihuk boats.

The fishers themselves readily admit that the stock of trepang and trochus on Australian reefs has declined considerably and thus this component source of their total income has also declined. The pattern of trading and fishing that now occurs is as follows:

The period from April to June is devoted mainly to local inter-island trade, most of it between Rote and Kupang. July is generally windy and these winds can persist into August. During this time, most fisher/traders remain at home. At the end of July or early August, perahu set sail for Australian waters to gather what they can of trepang and trochus. Pepela perahu make only one voyage, which may last for upto two months, and then return to Rote where they purchase large quantities of local lontar syrup and bring this for sale to Kendari, returning in March to resume their local trade between Rote and Kupang.

Hundihuk fishers do less inter-island trading. Many perahu from Hundihuk make two voyages into Australian waters: the first at the beginning of August until mid-October and the second from November to the end of December.

Oelaba does not give the appearance of being a poor settlement.[37] Most houses are of permanent or semi-permanent construction. They have electricity as well as a WC, a proper washing area (*kamar mandi*) and a good array of household furnishings. These furnishings include such items as parabola antennae, televisions, radios, tape recorders and even VCD players. In 1997, there were 6 parabola antennae, 24 television sets and 34 radios in Oelaba. Electricity was available every night from 6 pm. There were some 24 small kiosks selling goods in the settlement.

4.2.3. Perahu Ownership

In Oelaba, there appear to be no individuals or families that own a large number of perahu. Most perahu owners own just one perahu; there are only a few cases of individuals who own more than one perahu. A significant number of these owners have Rotenese names rather than Butonese, Bajo or other distinguishable names. This reflects the interrelation and intermarriage among the population of Oelaba.

The Ashmore Database lists records on 265 perahu that have visited Ashmore from 1988 to 1999. Many of these records concern perahu that have made multiple visits to the reef. Thus, for example, one perahu made 10 voyages between 1988 and 1992; another made 8 voyages between 1987 and 1990; a third perahu made 7 voyages between 1991 and 1998 and a fourth 7 voyages between 1991 and 1998. The pattern of voyaging shows interruptions to regular

[37] It should be noted, however, that Oelua was designated by local authorities as a recipient of additional development funding under the Indonesian government's 'Marginal Village Development Scheme' (IDT).

annual trips to Ashmore, which may well reflect the use of particular perahu for alternative trading voyages in some years. Some perahu are listed as sailing from Oelaba in some years and from Pepela in others. The Database also indicates some 'borrowing' or 'transfer' of perahu between owners, possibly along family lines.

Whereas the list of owners on the Ashmore Database for Pepela is dominated by the names of individuals who orginated from other islands, the Database for Oelaba includes a significant number of prominent Rotinese family or clan names. Several family members may in fact own one perahu among themselves or together with members of other families.

In Oelaba, as in Pepela, perahu owners in general and the wealthier of these owners in particular are involved in the trade in marine products, but their trade is not confined to marine productions. Indeed a greater proportion of their income now comes from inter-island trade in other products, such as lontar syrup. In Oelaba, a small group of owner/traders has not come to prominence and there appears to be far less dependence on dominant patrons than in Pepela. It should be noted, however, that Haji D is increasing his operations in Oelaba with the help of the main Chinese merchant in Ba'a who trades in marine products.

5. Raas, Madura District[38]

Madura, located east of Java, comprises four districts (see Map 3). From west to east these are: Bangkalan, Sampang, Pamekasan, and Sumenep. The first three districts are on the Madura mainland. Sumenep district, known as the Small Island District, has 76 small islands, 26 of which are inhabited. The District consists of 17 sub-districts, 9 in the mainland and 8 in the small islands. The eight sub-districts in the archipelago part are Giligeting, Talango, Nonggunong, Gayam, Raas, Arjasa, Sapekan, and Masalembo. Fishers from Raas sub-districts fish in Australian waters.

There are seven small islands in the Raas sub-district: Raas, Sarok, Tonduk, Talango, Aeng, Tengah, Guwa-Guwa and Komirian. The biggest island is Raas, whose main town Ketupat is the administrative and commercial centre of the sub-district.

5.1.1. Population

In 2000, the population of Raas sub-district was 33,927 persons, and the number of households was 9,803, giving an average household size of 3.5 persons. Population has remained relatively stable in the area with limited permanent migration into or out of the sub-district for the last 6 years as shown in Table 3.

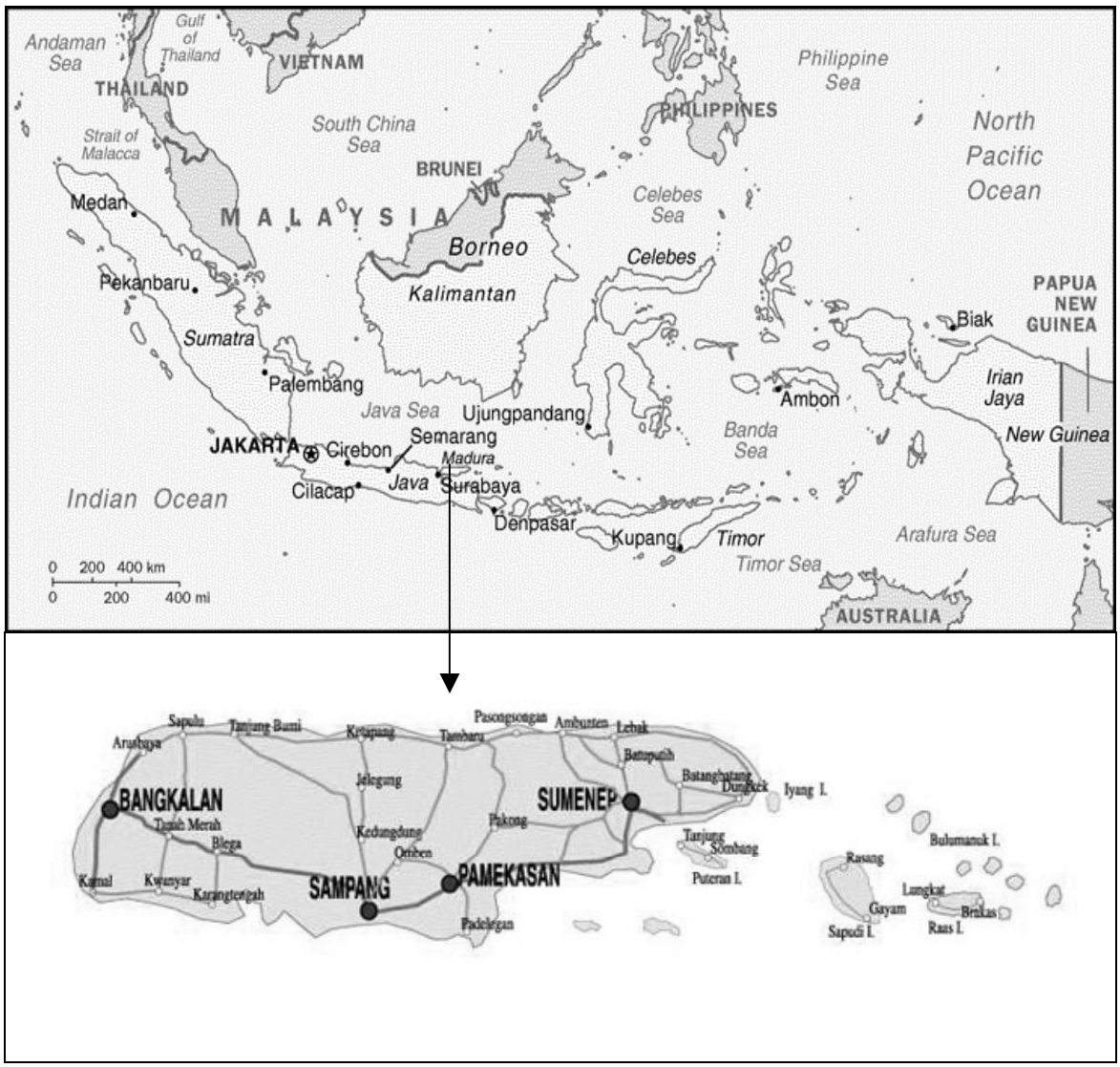
Table 3 Population in Raas sub-district 1996 –2000

Year	1996	1997	1998	1999	2000
Number	33786	33792	33898	33915	33927

[38] This section is based on the research undertaken by Dr Victor Nikijulow, Director, Directorate of Capital and Investment Systems , Ministry of Marine Affairs and Fisheries, Indonesia

5.1.2. Education and employment

Whilst there are 40 elementary schools and one junior high school, the nearest senior high school is in Sumenep, on the main island of Madura. According to interviews carried out, very few students go to senior high school, as having a junior high school certificate is sufficient to work in local government institutions or in business and trade.



Map 3 Map of Madura and Raas

Employment figures for 2000 show that fishing, followed by cultivation of food crops are the main economic activities (see Table 4). Fishing includes all activities related to capture fisheries but not aquaculture, as there are, as yet, no aquaculture activities in the sub-district. As the majority of the land on the island is stony and rocky, cultivation of food crops is limited to narrow lowland areas. The main crops grown are corn, sweet potato, cassava and coconuts. Cows (sold to Surabaya and Sumenep), goats, sheep, chicken and ducks are raised. Many people carry out more than one activity (e.g. food crops and animal husbandry).

Table 4 Employment by Sector in Raas, 2000

Occupation	Number of persons	%
Fisheries	9,857	29%
Food Crops	7,849	23%
Animal husbandry	5,325	16%
Trade	3,497	10%
Industry	2,266	7%
Construction	1,400	4%
Transportation	995	3%
Mining	608	2%
Government officials and army	258	<1%
Plantation Crops	287	<1%
Service	321	<1%
Others	1,522	<5%
Total	34,185	

5.1.3. Housing

There are two types of housing in Raas sub-district. The majority of houses are small, simple houses made from palm leaves and bamboo with a crushed coral floor and no water or electricity. Fishers who crew on vessels which fish in the MOU Box live in this type of house. There is also a permanent housing complex comprised of large permanent dwellings with water and electricity. These are mainly owned by fish traders and boat owners as well as government officials whose wives are fish traders.

5.1.4. Fishing activities

Table 5 shows the number of fishers in Raas sub district. In 2000, there were a recorded 2,257 fishers, of which 267 (12%) were migratory or mobile fishers (*nelayan andong*), of which half live on Brakas and Tonduk. Only *nelayan andong* from these villages said they fished in Australian waters i.e. 136 people. With a median crew size of 12 (Ashmore database), this would mean approximately 10 vessels fish in Australian waters. This tallies with the data collected in 2001 for Raas which identified 10 vessels fishing in the MOU Box.

Vessels (and the name of their owner) that currently fish in the MOU Box are shown in Table 6. Eight of the 10 boats were from Brakas village, while the other two were from Tonduk. People whom usually have a kinship relationship with the owners skippered the vessels. Crews in one boat tend to come from the same village and may be related. Cross checking this ownership information with the Ashmore and AFMA databases shows that the stated owners are occasionally different to information collected in Raas (see Table 6). However, vessels may have changed hands since the time they were recorded on the database or different names were used. Also, a few vessels have moved homeport from Surabaya to Madura.

Table 5. The Number of Fishers in Raas Sub-district. 2000

Village	Fishers		Frequency of fishing				Total
	Owner	Crew	Full time	Part time major	Part time minor	Andong	
Ketupat	99	101	126	36	14	24	200
Jungkat	23	22	28	8	4	5	45
Keropoh	106	107	134	38	15	26	213
Karang Nangkah	90	89	113	32	13	21	179
Poteran	52	51	65	18	8	12	103
Alas Malang	37	51	55	16	6	11	88
Brakas	324	360	419	119	67	79	684
Tonduk	239	238	301	85	34	57	477
Guwa-guwa	134	134	169	48	19	32	268
Total	1,104	1,153	1,410	400	161	267	2,257

According to interviews carried out in Raas, most of the boat owners are second and third generation fishers. They started out as crew members and then inherited vessel(s) when they got married.

Table 6. Name of Owners and Boats Entering Australian Waters in 2001

Village	Vessel Name	Crew Size	Ashmore/AFMA database notes
Brakas	Rukun Desa	12	Recorded in Sept. 1996, 98 and 99. Different owner.
	Bunga Indah	13	From Buton in 1986 – maybe sold? Recorded in 9/99 owned by someone else. AFMA apprehended type 3 on 12/90 from Kadatua and type 2 in 9/98 (origin n/s) and destroyed both.
	Nusantara	11	Recorded in 3/97, owned by Pak Muhri.
	Irian	13	Possibly Irian Jaya, recorded in 9/98. Owned by different owner.
	Bunga Tanjung	13	Recorded in 3/86 and 8/90 and had a different owner Apprehended by AFMA in 6/93 as a Type 3 vessel from Bau Bau with another owner stated Vessel was destroyed by AFMA.
	Dinar	12	Came in 1996. Same owner. Same owner recorded but from Surabaya in 1986.
	Karya	10	Possibly Karyu Utama recorded in 9/99.
	Indah	10	Possibly the same as Sinar Indah recorded in 3/90 with bad information on owner etc
Tonduk	Sinar	9	No record.
	Sumber	11	Possibly Sumber Jaya with a different owner and recorded in 9/97 9/98 (twice).

There are an estimated 60 sailing boats in Raas, which include vessels that may have an auxiliary engine (Table 7). The majority of Raas fishers fish in local waters. Fishers that fish offshore use the golekan boat (Type 1) as shown in Figure 4. These are sail and engine powered vessels that travel to the MOU Box to fish for trepang and trochus[39].

[39] Not all engine-powered boats are golekan vessels.

Table 7 Vessels in Raas by Village

Village	Sail	Engine	Total
Ketupat	5	47	52
Jungkat	1	11	12
Keropoh	6	49	55
Karang Nangka	5	42	47
Alas Malang	3	24	27
Poteran	2	21	23
Brakas	18	154	172
Tonduk	13	111	124
Guwa-guwa	7	63	70
TOTAL	**60**	**522**	**582**

Figure 4 Golekan vessel from Raas

5.1.5. Travel to the MOU Box

Trips to the MOU Box are made twice a year. Frequency depends on weather conditions rather than resource availability and fishing season. The first trip starts in March and ends in June. The second trip begins in August and lasts until November. Fishers leave in a fleet of several boats because they cover long distances and can assist each other if any vessel runs into trouble. The time between the two trips is spent preparing for the next trip, repairing the gear and vessels and fishing in other waters.

The trip from Raas to Rote Island usually takes 20 days, and then it takes a further 6 days to reach the MOU Box. Approximately 60 days are spent in the MOU Box. This means that half the trip is spent getting to and from the MOU Box, and the remainder spent fishing. The travel times of *nelayan andong* fishers from Madura, including to the MOU Box is shown in Figure 5.

The stopover in Rote is done to provision boats with food and fresh water and sometimes to find possible buyers of their trepang catch. If prices are agreed, these fishers will remain in Rote on their return in order to sell their catch. Usually, trepang is sold in Rote and trochus sold in Raas.

However, the most important reason for the Rote stopover is to remove the engine from the vessel before sailing to the MOU Box. According to the fishers, this practice was started in 1995 as a strategy to avoid possible detention by the Australian authorities.

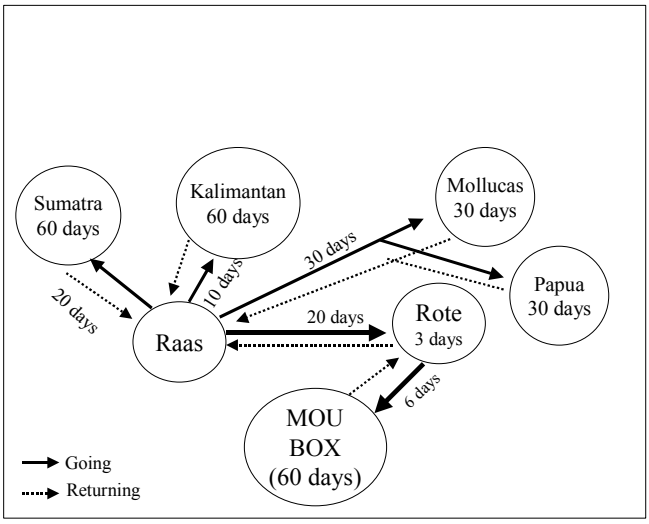


Figure 5 Trip times of Madurese andong fishers

All fishers interviewed in Raas for this study said that they knew that the MOU Box was in Australian waters and that they made a conscious decision to fish there, just as their elders and ancestors had done so. They felt they had no alternative but to fish there, as resources in other areas were no longer available. Some fishers also said that if the resources were not utilised by Australians then they thought it was not wrong to fish it. When asked what they would do if access to the Box was closed, they replied that they would look elsewhere in both the short and long term. If trepang or trochus resources were depleted in the Box, they replied that they would catch other species (short term and long term) or stop being fishers (long term).

Fishers call the reefs and the waters around Ashmore as *Karang Ashmore*. Almost all fishers are able to draw a map of the reefs, and plan exactly how long it will take from Madura to get there/ the MOU Box. The AFMA map informing fishers of the MOU Box and the AFZ is used by fishers to help navigate.

5.1.6. Estimated Income from Fishing in the MOU Box

Income generated from fishing activities in the MOU Box has been estimated in Table 8, based on interviews with fishers in Raas.

According to the share system in Madura, all crew members, boat and engine owners receive the same share. Generally the same person owns the boat and engine. The owner also has the first right to purchase the catch (trochus) at market prices. As mentioned earlier, trepang is usually sold in Rote. Trochus is used by owners to make handicrafts and ornaments or sold to big traders in Surabaya or Sumenep. Securing the supply of trochus is obviously an important element to a vessel owner's return on his investment.

The current price of a vessel is reported to be about Rp 45,000,000 (= AUD $ 9000). Compared to other types of fishing boats, the cost is quite high as the vessel is made from teak that has to be brought from other areas of Indonesia. A new engine is about the same cost as a

vessel which explains why the engine owner, receives the same share of the catch as the boat owner.

Operational costs have been estimated to be Rp 25,000,000 (AU$ 5000) for oil, provisions, gear, canoes and other expenditures. Each fishing boat is also usually supplied with about Rp 6,000,000 ($ AU 1200) per trip to finance all other possible expenditures such as monies (legal and illegal) paid to officials met on the journey or during the stopover in Rote. All costs are paid by the vessel owner up front and deducted from revenues before any shares are paid out. If the vessel does not return (sinks, confiscated etc), the owner bears the losses. Based on these estimates, fishers can expect to earn between approximately AU$ $970 – $2080 per trip. Given that GDP per capita has been estimated to be US$ 730 (AU$ 1340) in 2001 (World Bank), these estimates may be rather high.

These estimates have been based on average prices of trochus and trepang currently paid to fishers[40]. Whilst the average price of trepang is about the same as that of trochus in Raas, trepang prices are slightly higher in Rote because the market is more competitive with a larger number of traders. Thus fishers prefer to sell their catches there. The Jakarta wholesale price of trepang ranges from 100% to 400% more than the price paid to fishers. Jakarta wholesale price of trochus was not available as trochus is a protected species and officially banned.

A comparison of the incomes earned from fishing in the MOU Box compared to incomes earned by fishers who fish near Raas suggests that MOU Box fishers earn between 60% - 240% more per month based on the average earnings of a local fisher of Rp 750,000 (AU$150). If the order of magnitude of these estimates is correct, there is a clear financial incentive for fishers to remain fishing in the MOU Box.

Table 8 Estimated Income/Trip AU$ ($1 = Rp 5000)

	Maximum	Minimum
Crew size = 12		
Trip length = 4 months		
Catch (sea cucumber and trochus) (kg)	1,500	1,000
Average beach price	24	20
Gross revenue	36,000	20,000
Operational Costs		
Oil	1,600	1,600
Provisions	1,200	1,200
Other expenditures	1,200	1,200
Total operational costs	5,000	5,000
Total Costs per trip	6,000	6,000
Net Revenue (Profit) ($)/trip	30,000	14,000
Income of boat owner (trip)	2,500	1,167
Income of engine owner (trip)	2,500	1,167
Income of all crew fishers (trip)	25,000	11,667
Income of each fisher (trip)	2,083	972
Monthly income of each fisher	521	243

[40] However it is unclear whether these estimates include the much lower value trepang being fished in the MOU Box since the higher value trepang has been overexploited. If not, then incomes may be substantially lower.

5.1.7. Formal and informal credit

There is no formal bank or other credit provider in Raas. Fishers rely on the provision of informal credit from moneylenders who are usually middlemen or owners of fishing vessels. This creates a relationship of obligation and patronage and secures for the trader, a supply of product, usually at prices lower than market price. Once the relationship is established, it is difficult to break and tends to last forever. For fishers, borrowing money from moneylenders requires no collateral and there is usually no specified repayment schedule – repayments are made whenever fishers are able to do so. If the moneylenders are not middlemen, average interest is 5%/month or 60% per annum. Current bank interest rates are 18% p.a.

5.1.8. Institutional structures

There is a sub-district fisheries office in Raas which is manned by one clerk and an extension agent, who owns 3 fishing boats and one passenger boat which travels from Raas to Sumenep. The clerk reports to the head of the sub-district (*camat*) whilst the extension agent reports to the Sumenep Fisheries Office. The Economic Empowerment of Coastal Community Development Programme (described in Section 7.1) is managed by the Sumenep District Fisheries Service. An NGO was contracted to work for the EECC but since the project has ended, it is no longer involved. The management of the EECC is currently undertaken by fishers themselves through a micro credit/financial institution known as LEPP-M3.

6. Wakotobi, South east Sulewesi[41]

The Wakotibi Islands are made up of four main small islands Wangi-Wangi, Keladupa, Tomia and Binongko, with 4 sub-districts named after each of these islands. There are 64 villages. The islands were renowned for their smithing skills, making knives, spears, shovels, and other iron-made household utensils. However this profession is dying due to substitution with manufactured goods.

Historically, the other main economic activity was fishing with fishery products sold in Bau-Bau (the capital Buton District), Kendari (the capital of Southeast Sulawesi Province), Makasar, Ambon, and Surabaya.

Today, the main occupations are fishing, dry land or semi arid agriculture, trading, and cottage industries. However, due to low rainfall, agriculture is very limited to the cultivation of corn and the staple crop, cassava. The harvested area and production of cassava and corn are given in the Table 9.

There are about 565 families running home industries, mostly handicrafts and ornaments made of shells and corals. Most of the home industries are allocated in Binongko, the furthest and southernmost island. An economic survey conducted by the district statistical agency in 2000 indicated that more than 50% of the 21,164 households were under the national poverty threshold. They consisted of 6,102 poor and 5,792 very poor households. These poor households were generally dependent on fishing and farming.

There were more than 3,300 fishers in Wakatobi who were members of about 3,100 fishing households. Mainly traditional fishing is used such as hook and line, troll line, and traps.

[41] This section is based on the research undertaken by Dr Victor Nikijulow, Director, Directorate of Capital and Investment Systems, Ministry of Marine Affairs and Fisheries, Indonesia

Almost every household has these three fishing gears. Almost 98% of the boats were sail powered. There were only 25 inboard powered and 177 outboard powered-boats. The inboard powered-boats, however, were less than 30 GRT and only used to fish in the inshore waters. There were also about 2,786 dugouts, used for fishing and as a means of family transport.

Table 9 Statistics on Wakatobi Islands, South Sulawesi.

	Wangi-Wangi	Kaledupa	Tomia	Binongko	Total
Number of isle	9	24	11	4	48
Inhabitant isle	2	3	3	1	9
Number of village	21	17	16	10	64
Developed village	5	2	3	0	10
Population (2000)	42,879	14,936	16,592	13,546	87,953
Land area (km^2)	448	104	115	156	823
Pop. Density	96	144	144	87	
Number of household	10,162	3,776	4,279	2,947	21,164
Poor household	3,409	1,180	789	724	6,102
Very poor household	2,526	784	999	1,483	5,792
Corn harvested area (ha)	49	312	527	67	955
Cassava harvested area (ha)	283	380	451	19	1,133
Corn production (ton)	80	506	751	89	1,426
Cassava production (ton)	3,416	4,806	5,807	226	14,255
Home industry	88	84	66	327	565

Fishers who fished in the MOU Box are no longer found in Wakatobi due to the lack of suitable vessels and the fact that there are no traders or middlemen who are ready to buy catches. District fishery officials report that fishers who used to fish in the MOU Box have converted their businesses to trade and transportation due to declining resources and the high risk of being detained by Australian authority.

Given that arable land is scarce, rainfall is limited, communication and transportation are poor, the only viable industries are marine-based, either fishing or tourism. Currently there is a foreign owned dive resort on Kaledupa (the island has an airstrip), which mainly attracts European tourists and can accommodate 22 tourists. This is regarded as a positive development but generates limited employment opportunities in Kaledupa.

7. Indonesian Government Alternative Livelihood Programmes[42]

7.1. Indonesian Government Economic Empowerment of Coastal Community Programme (EECC)

The Ministry of Marine Affairs and Fisheries is currently involved in a countrywide government-financed program known as the Economic Empowerment of Coastal Community

[42] This section is based on the research undertaken by Dr Victor Nikijulow, Director, Directorate of Capital and Investment Systems, Ministry of Marine Affairs and Fisheries, Indonesia

Programme (EECC). This commenced in 2000. In that year, the program covered 26 districts in 7 provinces in Indonesia. Based on the evaluation of the 2000 results, it was then expanded to include 125 coastal districts in the whole (30) provinces of Indonesia. The program was widely evaluated by government and non-government institutions, by Jakarta and provincial governments, by the House of Representatives, and to a lesser extent by international agencies. According to the Ministry, the results of these evaluations was positive and it was concluded that it had to be maintained and expanded to cover more districts. In 2002, the program is being conducted in 90 districts, with 37 new districts added. In total, this program has reached 153 districts.

The main objective of the EECC program is to improve the welfare of coastal communities through empowerment of human resources and the optimal and sustainable utilization of marine resources. Specifically, the objectives of the program are:

(1) To enhance well-being of the people through development of real economic activities, improving human resources, people participation, capital injection, and local institutional capacity building;

(2) To improve capacity of local people to manage marine resources, and

(3) To foster partnership between local people and large-scale private entrepreneurs.

The target beneficiaries of the program are (1) crew fishers, (2) fishers using non-powered boat, (3) fishers using powered boat with a maximum engine size of 15 hp, (4) small-scale fisher/ farmers, (5) small-scale fish processors, (6) small-scale fish traders, and (6) small-scale businessmen running activities that directly support the fishery business such as engine repairers and ice suppliers. Beneficiaries can develop their businesses by enlarging and up-scaling their existing activities or finding other profitable activities. Due to the overcrowding of fishers in inshore waters, most of the beneficiaries have chosen not to develop fishing activities and have focused on fish processing, marketing, and aquaculture.

However in the eastern areas of Indonesia, the potential for expansion of capture fisheries is considered to still exist by both fishers and government, such that most of the beneficiaries have chosen to increase fishing effort by buying bigger boats or more gear or motorising their existing vessels.

The total number of beneficiaries in the 2001 program was 23,649 families that are bound in 1,808 groups. In 2000, it was 5,842 families in 290 groups. Although this is a small proportion of the overall fishing population of Indonesia, the Ministry of Marine Affairs and Fisheries consider the program to be a learning process from which other programs using district and provincial budgets can be developed.

7.2. The EECC in Madura/ Raas

As natural resources are limited in Raas, the scope for alternative livelihoods apart from marine-based activities is very limited. Many “non-fishery” activities are dependent on fishing, such as handicrafts and food vending. Therefore the opportunity cost of fishers tends to be very small.

Women are generally involved in handicrafts, small scale fish processing, fish marketing, and food street hawking. Women from households whose husbands fish in the MOU Box do supplement incomes from fish processing and marketing but on a very small-scale. For example, wives of fishers can earn around Rp 3,000 (AU$0.60) per day. This is enough to supplement family income whilst her husband is away and if more money is required, it would be borrowed from the boat owner.

The implementation of the EECC program in Madura was undertaken in 2000 and 2001, covering 6 villages and 4 sub-districts (Table 10). The total number beneficiaries were 166 families. Reports by Sumenep Fisheries Service reveal that number of beneficiaries has increased with the establishment of a revolving fund.

The total amount of money allocated to the fund was Rp 767 million (AU $15,340) consisting of Rp 500 million in 2000 and Rp 267 million in 2001. In addition, there was Rp 250 million allocated in 2001 for developing a small processing plant to produce dried anchovies. Project participants supply the raw material to the plant which belongs to the project participant, but is operated and managed by the LEPP-M3. Profits generated by the plant are then used to provide credit to other fishers. The plant has exported dried anchovies three times to Japan by collaborating with an export company in Surabaya.

After the implementation of the EECC program in these 4 sub-districts, an international oil company located in the neighbouring sub-district of Sapekan developed a cold storage facility for the catch for the fishers in the district, especially fish landed by the EECC participants. The organisation and management of the facility is currently under discussion.

Tonduk Village is one of the EECC program sites. Fifty small-scale fishers (not migratory) are involved in the program which was granted Rp 250 million (AuU$5000). Although fish farming and other aquaculture were also considered as the alternatives, fishers eventually choose fishing (particularly of groupers) as their preferred activity. As there were insufficient funds to build new fishing boats, funds were used to motorise fishing vessels, replace and improve fishing gear. This enabled fishers to fish further offshore, in the waters of Sumenep and adjacent waters of Sumba and Lombok. A live fish collection boat owned by traders normally accompanies these vessels.

Table 10 Activities of the EECC Program in Sumenep District, Years 2000 and 2001

Village	Sub District	Beneficiaries (Household)	Activities	Fund Allocated (Rp)
Tonduk	Raas	50	Grouper fishing, collecting, and trading	250 million
Pagerungan	Sapekan	50	Grouper fishing	250 million
Palasa	Tolango	38	Grouper fishing, Fish farming	73.5 million
Gapurana	Talango	20	Anchovy fishing and Processing	60 million
Ban Baru	Gili Genting	38	Anchovy fishing and Processing	73.5 million
Ban Maleng	Gili Genting	20	Anchovy fishing and Processing	60 million

7.2.1. Lessons Learned from the EECC in Raas and Buton

From the implementation of the EECC program and experiences in Raas and Buton the Ministry of Marine Affairs and Fisheries reports that the following lessons have been learned.

- Fishing still dominates in Raas and Buton. Attempts to provide alternative livelihoods are still limited in scope and scale.
- Attempts have been made to introduce fish farming and aquaculture, but this has been unsuccessful. Temporary holding of live groupers in cages may be a simple way to introduce aquaculture.
- Although fishers can form organizations and work in accordance with organization rules they need external assistance in order to reach a common understanding.
- Fishers are now becoming acquainted with simple bank procedures. This can be used to introduce formal bank procedures to the development of village-based economic activities
- As land-based resources are limited, alternative incomes are likely to be focused on marine resources. Apart from fishing, handicraft and ornament making can be considered as alternative income activities. Women currently involved in these activities are eager to improve their products. However as these handicrafts and ornaments are made of shells and corals, there is a need to find alternative and preferably artificial, substitutes. Although efforts have been initiated, they have not been widely accepted.

8. Conclusions and Recommendations

8.1. Changes in the Nature of Fishing in the MOU Box

Traditional fishing in the MOU Box, as it may have existed at the time of the signing of the Memorandum of Understanding, has now been transformed. Change has occurred in two main areas: fishing patterns and vessel ownership.

Fishing patterns: Previously, traditional fishing was directed toward the gathering of trepang and trochus shell. Ashmore Reef and Cartier Island were central to these pursuits. Now, only perahu from Oelaba (Rote) and Madura/Raas, continue to sail to the MOU Box to gather trepang and trochus. These vessels constitute about 25 % of the total number of vessels which have visited Ashmore over the period 1986 – 1999.

Most Indonesian vessels visiting the MOU Box come from Papela and fish in the Box and/or use it as a base (and refuge) to access Australian waters where vessels are not allowed to fish. A number of factors –overexploitation of trochus and higher value trepang resources in the MOU Box area, high prices of shark fin since the early 1990s, and the increasing depletion of shark resources in Indonesia – has led to a switch from trochus and trepang gathering to shark fishing since the early 1990s. As better shark resources are

found just outside the MOU Box, the Box is used as a base (and refuge) to access Australian waters where vessels are not allowed to fish.

A large number of shark fishers are also entering Australian waters from ports such as Dobo, Saumlaki, Merauke, Tepa and various other locations in the Arafura Sea. Since they enter Australian waters from a different direction, they do not use the MOU Box as a base. Nevertheless, they constitute a separate but significant wave of fishers who are responding to the same conditions as those coming from Pepela. (A separate identifying study of this group based on present databases might be appropriate.)

Conditions in eastern Indonesia provide the backdrop to these changing fishing patterns. The exploitation of local marine resources, particularly through overfishing by larger commercial fishing operators, is putting greater pressure on small-scale fishers. Unsustainable pressures on resources and on the fishers who previously relied upon them make Australian waters appear particularly attractive. Despite the risks involved, the returns relative to other possible alternative livelihoods continue to support overall efforts.

Concentration of vessel ownership. Shark fishing requires a higher cost in outfitting vessels as long line gear is almost as expensive as the vessel itself. Also, voyages tend to be of shorter duration but occur more frequently. In addition, the risks of vessel apprehension in the AFZ (but outside the MOU Box) are greatly increased but so are the potential profits, if a voyage proves successful. The potential for higher profits comes with greater risks of apprehension, vessel and gear loss. Thus has led to the present situation in Pepela, where vessel ownership is now concentrated in the hands of a small group of trader/owners to whom a large number of fishers are bound by debt and patronage. These larger trader/owners are able to spread their risks over their entire fleets. As they have increased their fleets, often buying perahu from single owner/operators, they can also call on a larger pool of indebted labour from the crews of the perahu, which they have taken over.

8.2. Australian Fisheries Enforcement Policy

One clear effect of the Australian fisheries enforcement policy of destroying vessels has been to put pressure on individual and small-scale perahu owners whose capital is limited. Without sufficient capital to recover from the loss of their vessel and gear, these individuals and families have been forced into debt or out of fishing altogether. Although they have suffered losses, the larger owner/traders have effectively flourished under this policy and their control of fishing and the indebtedness of fishers has increased. They have been easily able to find second-hand vessels to replace destroyed vessels and pass on the entire risk of destroyed fishing gear, a substantial proportion of fixed costs, to the captains and crews of their vessels. This gear is expensive (approximately AU$3,000) such that confiscation by Australian authorities contributes to the indebtedness of fishers, without having much impact on boatowners and traders.

8.3. Data collection and monitoring

The current data collection system at Ashmore Reef has provided a great deal of valuable information. However, data input and analysis has been hampered by a lack of resources and

some valuable information has been lost/not used as a result. One persistent problem is the lack of consistency in the identification of places and persons. For personal names, this is not easily overcome but a checklist of likely home ports could be prepared as a guide for use.

Standardising identical data collected by EA at Ashmore Reef and by AFMA would improve baseline information on vessel ownership, home ports, target catches and names and origin of crew members. In addition, the ability to merge databases would enable both agencies to track the movements and providence of crew and vessels (such as vessel destruction by AFMA); information, monitor developments and orient policies.

In addition, there is a recognised need to collect additional information on catches For example, shark fin is not priced simply by weight but by size/quality of fin cut as well as by weight and trepang needs to be identified as to whether it is high or low value.

Finally, as all data is currently collected by Australian authorities, the possibility of ongoing data collection in collaboration with Indonesian authorities should be explored.

8.4. Possible Options for Consideration

Australia could reasonably argue that the nature of fishing has changed so substantially since the Memorandum of Understanding was agreed upon, that now is the appropriate time for full consideration of the issues underlying the Memorandum.

1) A reconsideration of issues would have particular pertinence in light of the recent publication and promulgation of the first management plan for Cartier Island Marine Reserve and the second management plan for Ashmore Reef National Nature Reserve (Commonwealth of Australia, 2001).

2) Such reconsideration would also have relevance given the scientific evidence of severe and continuing depletion of marine resources in the MOU Box as reported by CSIRO[43] and AIMS [44] and quoted in the EA Management Plans document[45]:

    - Trepang species with high commercial value have been heavily over-exploited, and all species of trepang are found in very low densities, except for Ashmore Reef National Nature Reserve where trepang are present but evidence of depletion is clear.

    - Trochus stocks have been virtually exhausted on most reefs, except in Ashmore Reef National Nature Reserve were trochus are present but evidence of depletion is clear.

    - Low abundances and small sizes of sharks on the shallow reef-edges and shoals suggest that current fishing efforts may be seriously depleting the shark population.

[43] Skewes et al (2001)
[44] Smith et al (2000); Smith et al (2002)
[45] Commonwealth of Australia (2001) p. 28

3) Whether or not full reconsideration is given to the issues underlying the Memorandum, recognition should be given to the changes that have occurred since 1974 and 1989. These are:

- The reefs in the MOU Box are no longer capable of providing an adequate means of livelihood to those fishers who have previously gathered trepang and trochus. This has led to a switch from sedentary resource collection to shark fishing in both the MOU Box and the AFZ (using the MOU Box as a base and refuge.

- The attractions of shark fishing and the potential profits from this fishing remain high. Although there is insufficient information on the status of northern Australian shark populations, these populations are still fished less than those in eastern Indonesia. These relativities underlie the present situation. Moreover, the waters defined by the MOU Box are increasingly being used by fishers as a 'transition area' to better fishing grounds outside the MOU Box. These waters provide greater fishing opportunities and potentially greater profits.

- 'Traditional fishers' such as the Rotenese, the Bajau Laut, the Madurese and some Butonese, all of whom have historically drawn upon the resources of the MOU Box, now find themselves involved in a complex and highly competitive commercial system. It is therefore an illusion to imagine that either the Australian or the Indonesian government could somehow re-establish a traditional fishery as a solution to present problems.

- The plight of many poor fishers is tied up with the present system. Assistance to these fishers could provide a means of solving some of the problems of overexploitation of resources in the MOU Box. This requires the joint cooperation of both Indonesian and Australian authorities. Any such assistance would have to be differentiated, multi-focused and long-term.

8.5. Alternative income strategies

Any strategy for assistance must be multi-focused and must differentiate among the various fishers in eastern Indonesia. It must also be proportioned in relation to the problem itself. Strategies of assistance for fishers from Oelaba or Raas/Madura would need to be different from strategies for fishers in Pepela. Similarly, strategies for development among other coastal settlements within different networks of fishers would probably need to be different as well.

However, there are a number of generic pre-requisites for any successful alternative income strategy for fishers in Indonesia. These are as follows:

- **The involvement of vessel owners and traders/middlemen**. It is in the financial interest of vessel owners and traders/middlemen to continue their businesses (fishing; trading; credit provision) provided demand for

resources in the MOU Box or the AFZ remain high.[46] This suggests that any perceived threat to their businesses may lead them to misrepresent, frustrate and undermine any attempts at alternative income strategies. Furthermore, as fishers currently fishing in the MOU Box are often in long term debt relationships with these key community members, they will be under considerable pressure to continue fishing for them. The involvement of traders and middlemen is therefore vital to ensure that traders 'allow' fishers to leave the fishery and repay their debts in a different way. This may require giving assistance to traders to develop alternative products and/or markets, which provide incomes greater or equal to those currently earned, or to actively engage traders in alternative income activities. The scale of this task particularly in places like Papela where the trading network is well established and far-reaching should not be underestimated.

- **Incomes should be equal to, or exceed current incomes**. Adoption of alternative incomes by fishers are more likely to be faster if incomes are equal to, or exceed, incomes currently earned from the trepang, trochus or shark fisheries.

- **Alternative product/incomes for the handicraft industry should be included**. Alternative supplies/substitutes of trochus and/or other income earning opportunities would need to be developed for those engaged in the handicraft industry using trochus shells.

- **Markets should be identified.** Uptake of alternative income activities is more likely to be quicker and more successful if markets and marketing channels are identified prior to the initiation of alternative income programs.

- **Effective extension support**. An institutional structure that enables effective support to be given to any alternative income-generating project is critical to more rapid and sustained adoption of an alternative income. For example, if the current fisheries extension officer in Raas is also involved in fishing and trading, he may have a conflict of interest with any alternative income development and extension programs. Alternative extension agents would have to be found.

8.5.1. Critical factors contributing to the success of the EECC.

Based on the experiences of the EECC, the Ministry of Marine Affairs and Fisheries have identified 5 critical factors have been identified which contribute to the success of the program and are related to the process of introducing alternative income activities:

[46] For example, in Raas, when owners/traders were asked what they would do in the short term if they were not allowed to enter the MOU Box or resources in the Box were depleted, they replied that they would do nothing, but in the longer term they would stop giving support to fishers. This implies that unless they consider that a reduction of fishing effort in the MOU Box is to continue in the long term (although more clarification is required as to what is understood by long term), they are unlikely to take any positive action to prevent fishing in the Box.

(1) Local people should objectively identify the target group and beneficiaries using participatory methods and reliable data and information.

(2) Agents of change should be recruited from local youth and work as mediators, catalysts and extension agents to help people to solve their problems.

(3) Local management consultants should be hired by the project to help people during the project and prepare them to run their businesses after the project ends.

(4) An advisory group at village level should be established which consists of formal and informal leaders that work voluntarily to help people during and after the project.

(5) Micro-financial institutions should be established at village, sub-district, or district level which are able to release project money to the beneficiaries, run a revolving fund, collect repayments, and redistribute the money to new beneficiaries in the same village. The body and structure of the institution should be flexible enough to account for different requirements in different places but needs to be totally owned by the project beneficiaries.

8.5.2. Rote: Pepela Network and Oelaba Network

Specific Considerations

A large number of local fishers with limited incomes and few alternative means of livelihood are caught up in the present system. (It is reasonable to assume these individuals comprise more than 3000 household heads.) They are the victims of current arrangements. Under these conditions, it is problematic to offer alternative livelihood possibilities and expect them to be immediately successful. Such possibilities are likely to be misrepresented, frustrated and undermined by those who have control over local fishers.

To this, it must be added, however, that fishers from Rote – both crew and owners – are aware that they involve themselves in 'illegal' activities when they sail beyond the MOU Box. Information on what they may or may not do has been repeatedly given to them and a large number of fishers have been warned and/or apprehended by Australian patrols. These fishers may not agree with the present situation and restrictions. Indeed there is considerable local sentiment that supports the notion that Ashmore Reef (Pulau Pasir) ought to be regarded as an Indonesian territorial possession. Nevertheless, owners and crew are aware of the risks involved in what they are doing.

The fishers who still attempt to gather trepang and trochus are also painfully aware of the diminishing reef resources in the MOU Box. They are in effect the remnant part of a larger group of fishers for whom this awareness has led to the adoption of other pursuits. While a majority of this group has switched to shark fishing, others – particularly those in Oelaba – have switched to inter-island trading or have left fishing entirely.

The situation is further complicated by the fact that the present system involves a diverse group of fishers. Pepela is a controlling node that draws on a wider network that extends to different

coastal settlements on Rote, on other islands in Nusa Tenggara Timur and further onward to South and Southwestern Sulawesi. Were alternative livelihoods to be found for all local fishers on Rote, it is conceivable that the present group of owners, or some future group, could call upon other poor fishers in its extended network to continue shark fishing activities. Bajau who participate in the Pepela network are potentially independent of this network and are not confined to only one or two localities.

Targeted Educational Assistance as an Investment in the Future

The best long-term solution for fishers on Rote (and elsewhere) is improvement in their levels of education. Fishing activities are notorious for drawing young boys away from schooling. As a consequence, the education of the male population of fishers on Rote is far lower than the rest of the local Rotenese population. Girls in these communities, however, often stay in school longer than their male counterparts. Their educational attainment is therefore generally higher.

Specially targeted educational assistance to fisher communities on Rote – enabling young boys in particular to stay in elementary school and perhaps even continue on to secondary school – would draw younger members of the labour force away from sailing and could open new vistas for the next generation in these communities.

Provision of Adequate Local Credit in Fishing Communities

Micro-finance is a key feature in virtually all Indonesian government efforts to alleviate poverty and to provide improved means of livelihood. A well-functioning, independently-operated cooperative or some form of savings and loan (*simpan-pinjam*) institution is needed to assist fishers in both the Pepela network and in the Oelaba network. The Indonesian Ministry for Marine Affairs and Fisheries's scheme (described above) offers one possible mechanism. There is also a local NGO known as TLM, which has specialised in providing credit on Rote. A combination of both government and directed NGO-credit provision could be doubly beneficial.

Access to adequate and reliable credit could contribute to reducing the present indebtedness of local fishers; it could assist them (or more significantly, their wives) to adopt alternative livelihood strategies. It could also assist those fishers (particularly in the Oelaba network) to increase their capacity to carry on trade rather than struggle to maintain their fishing activities.

Marine-based Alternative Income Opportunities

Along the coast of Rote, the fastest growing marine-based activity is seaweed growing.[47] Nowhere is this activity more prominent than in coastal villages in the vicinity of Pepela. Fishers on the tiny islet of Usu near Pepela, for example, have now withdrawn from participation as crew members on Pepela perahu to concentrate on seaweed growing. Were this marine activity to continue to increase, it would have a similar effect on other fishers in the Pepela network.

Seaweed from Rote is now sold through Kupang. A seaweed processing plant has recently been established in Kupang as part of this nascent industry. Seaweed cultivation could be the focus of Australian assistance. Assisting fishers and their wives with start-up costs to be able to take part in this activity; providing assistance in the transport of seaweed and even possibly

[47] Villagers on the island of Savu were the first to take up this activity on a substantial scale but the relative isolation of that island and the costs of transport have now made Savunese villages less competitive than coastal villages closer to Kupang.

establishing a processing plant for seaweed in East Rote could be potential projects for Australian assistance.

Skills and experience gained in these activities could then be extended to other marine-based aquaculture technologies. The Ministry of Marine Affairs and Fisheries is committed to the development of a range of new aquaculture technologies. It would be useful to select a site in Pepela Bay for joint cooperative efforts. Sponge cultivation, for example, can yield a useful marketable product while at the same time can provide potential high value chemical extracts. Pepela Bay could become the locus for a wide-variety of aquaculture technologies.

Tourism
Pepela Bay is beautiful bay and could have considerable potential for marine-based eco-tourism. Nembrala, at the far western tip of Rote, has become a surfing site of some importance in Indonesia. Pepela, which has better transport access to Kupang, represents another site that could possibly be developed for activities such as diving and sailing. Similar sites are now being developed in areas of much poorer access, such as Kaledupa in the Tukang Besi Islands. Pepela could possibly be added to the network of Indonesia's marine-based tourist attractions.

Potential Sites
To be effective, any Australian assistance should be closely coordinated with both local and national programs. This year Rote has been elevated to the status of an independent Kabupaten. This should facilitate the coordination of island-wide project development. Any such assistance should be targeted and adapted to the different conditions within the Pepela network and in the Oelaba network. Assistance in the provision of credit access may have the greatest and most immediate impact within the Oelaba network whereas a more varied aquaculture-oriented set of projects could, over a period of years, have a considerable effect on the Pepela network.

8.5.3. Raas/Madura

Target group
The number of migratory fishers from Raas who fish in the MOU Box has been estimated to be just under 140 persons (see section 5.1.6). In addition there are a further 130 migratory fishers who currently do not fish in the MOU Box but are fishers who could potentially fish in the Box if their current fishing grounds become depleted. Assuming up to two fishers come from the same household, this represents between 70 and 135 households for whom alternative incomes would have to be found if fishing effort in the MOU Box is to be limited or prohibited. In all probability the number of households might be less, as it is likely that there may be a significant proportion of households with more than two migratory fishers.

Another possible target group could be fishers in the EECC program who have upgraded their vessels. These developments may increase the number of migratory fishers in Raas if local fishing grounds become depleted. However, in the short term, the probability of this occurring is quite low as this would require depletion of all local fishing grounds, as well as a major lifestyle change for fishers and access to greater amounts of working capital to enable longer journeys to be made.

Marine-based Alternative Income Opportunities
As previously mentioned, there appear to be limited land based alternative income opportunities for fishers from Raas. This section briefly explores marine-based alternatives for MOU Box fishers.

Fishing
There are already increases in fishing effort in areas adjacent to Raas through the EECC program (see section 7.2). Eventually, this is likely to create pressure on resources and create a longer term overfishing problem. Encouraging MOU Box fishers to fish waters closer to home is therefore unlikely to be a viable long term option. Equally, "redirecting" fishing effort away from the MOU Box to other fishing grounds fished by migratory fishers will merely transfer fishing effort elsewhere until those resources become overfished.

As there appears to be a clearly identifiable and limited number of Raas fishers who have historically fished in the MOU Box, it may be possible to allow continued and limited access to the MOU Box for this group of fishers.

Aquaculture
When fishers were asked what they would do if resources were depleted in Indonesia, they responded that in both the short and long term they would start working as fish farmers. Marine aquaculture for high value finfish or seaweed may therefore be another possible alternative income opportunity. Seaweed farming and pearl farming (with support from a Japanese company) is currently being carried out in Sapekan sub-district, part of Sumenep District. Sapekan has a comparative advantage over Raas sub-district because it is the business and trading centre for Sumenep district. The keeping of live (caught) groupers in cages may also be another alternative as it develops fish husbandry skills and can lead on to aquaculture enterprises. Whether aquaculture is an activity that can be pursued by fishers used to carrying out migratory fishing would need further investigation as it requires a considerable change of lifestyle which may not be acceptable to some. In addition, some activities may be considered to be "women's work", such as seaweed farming, and may not be acceptable. This perception often changes when incomes from the activity exceed those earned from fishing/ or by the men of the household. However, given that fishers involved in the EECC and more generally have already discussed aquaculture, and the fact that there is so little land based options, aquaculture may be the most feasible alternative economic activity.

Tourism
The potential to develop tourism in Raas sub-district would require further investigation, especially given the poor transport infrastructure to the islands. In the short term however, this is unlikely to generate incomes for the estimated number of target households as the experience in Wakatobi has shown.

Possible Sites
Although Rote would be an obvious choice of pilot site as the majority of fishers in the AFZ come from there, Raas offers the opportunity to develop marine aquaculture on a more manageable scale as there are a smaller number of fishers and relatively less complex socio-economic conditions. Furthermore, as Raas fishers target trepang and trochus, rather than shark, a pilot project may have greater impact in reducing effort in the MOU Box on those species.

8.5.4. Other coastal settlements

The Bajau Laut are in a special category and require special consideration. Assistance to fishers on Rote is unlikely to benefit the Bajau, even in Pepela. Their presence in Pepela is regarded as transient. Their links are to other Bajau communities, the closet and largest of which is Sulamu on the Bay of Kupang. The most important of these links is still to settlements in the Tukang Besi Islands. What may be needed is a strategy that would assist these scattered communities throughout eastern Indonesia. Development of such a strategy is beyond the scope of this report as it would require detailed needs assessment of these scattered communities.

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