



Marine Reserves for Sustainable Fisheries Management in Rodrigues. Alternative Livelihood Options: 2

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Summary

The artisanal fisheries are extremely important to the local population of Rodrigues, however the fisheries are in serious decline and the methods used by the fishers also cause damage to the lagoon habitats. In response to the decline in fish stocks, the Rodrigues Regional Assembly, in collaboration with *Shoals Rodrigues*, has now proclaimed 4 marine reserves in the northern lagoon. It is hoped that the first reserve at Rivière Banane will be demarcated during early 2008 and in respect of this, meetings were held at 9 fishing villages during January and February 2008 in order to ensure local support for the project and to discuss alternative livelihood options. The meetings showed that in general, fishers were in support of the development of marine reserves due to recent declines in their catches and most wanted the other 3 marine reserves to be demarcated as soon as possible, however only for the sea cucumber fishery. All highlighted the problems of illegal fishing and the need for good enforcement of the reserves. All were concerned about their loss of livelihood if they were unable to fish in the reserve areas. Suggested alternative jobs included: raising livestock, cutting down invasive species (e.g. Pikon Loulou), cleaning beaches, off-lagoon fishing and working as rangers for the marine reserves; elderly fishers suggested a Voluntary Retirement Scheme. The fishers highlighted a number of problems such as a lack of market for vegetables and a poor price for livestock; fishers can't afford the loan repayments to buy boats for off-lagoon fishing and the lack of water for agriculture and farming. They were not keen to form Associations and asked for low interest loans to start up new businesses individually. A series of recommendations are suggested of how these issues can be addressed based on previous experiences from other marine reserves around the world.

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1 Introduction

Fishing is one of the largest employment sectors on Rodrigues, as there is a lack of industrial development and tourism is in its infancy. There are some 2,000 full-time, registered fishers (13% of the total workforce) with a further 2,000 people fishing on a casual basis (FRTU, unpublished data). Due to the absence of alternative employment opportunities and a lack of management of the artisanal fisheries, the fish and octopus stocks are being overexploited. The techniques used by the fishers create further problems. Octopus and large net fishers work on foot and this trampling destroys the coral reef and lagoon habitats. Basket trap fishing also results in a significant amount of damage to coral, either through accidental breakage as the boat anchor or weighted trap is dropped on coral colonies or through deliberate destruction by fishers who place coral inside their traps for bait or anchorage.

Management methods so far introduced have included the prohibition of spear fishing, reducing large net license numbers, enforcing a minimum mesh size of 9cm and closing the large net fishing season between March and October. These measures begin to address problems in the lagoon fisheries, but further effort is needed to reduce the current downward trend. In response to the decline in fish stocks, the Rodrigues Regional Assembly has proclaimed 4 marine reserves in the northern lagoon at Rivière Banane, Anse aux Anglais/Passé Cabri, Grand Bassin and Passé Demi (Figure 1). The location of the reserves was decided in collaboration with the major stakeholders through meetings at fisher communities held during 2002 (Gell *et al.*, 2002) and meetings of the Coordinating Committee for Fisheries and Marine Resources.

The regulations for management of these 4 reserves have now been agreed and it is hoped that the first reserve at Rivière Banane will be demarcated during early 2008. In response to this, fisher meetings were held during 2006 and 2007 in order to ensure support for the project (Hardman *et al.*, 2006; Hardman *et al.*, 2007). These meetings showed that, in general fishers were in support of the development of marine reserves due to recent declines in their catches, however most were concerned about loss of earnings and asked for compensation; alternative livelihoods such as planting trees, cutting down invasive species, cleaning beaches, off-lagoon fishing and working as rangers for the marine reserves were however suggested by the fishers. Further fisher meetings were held during January and February 2008 in order to ensure the on-going support of the fishers for the project and to further discuss alternative livelihood options.

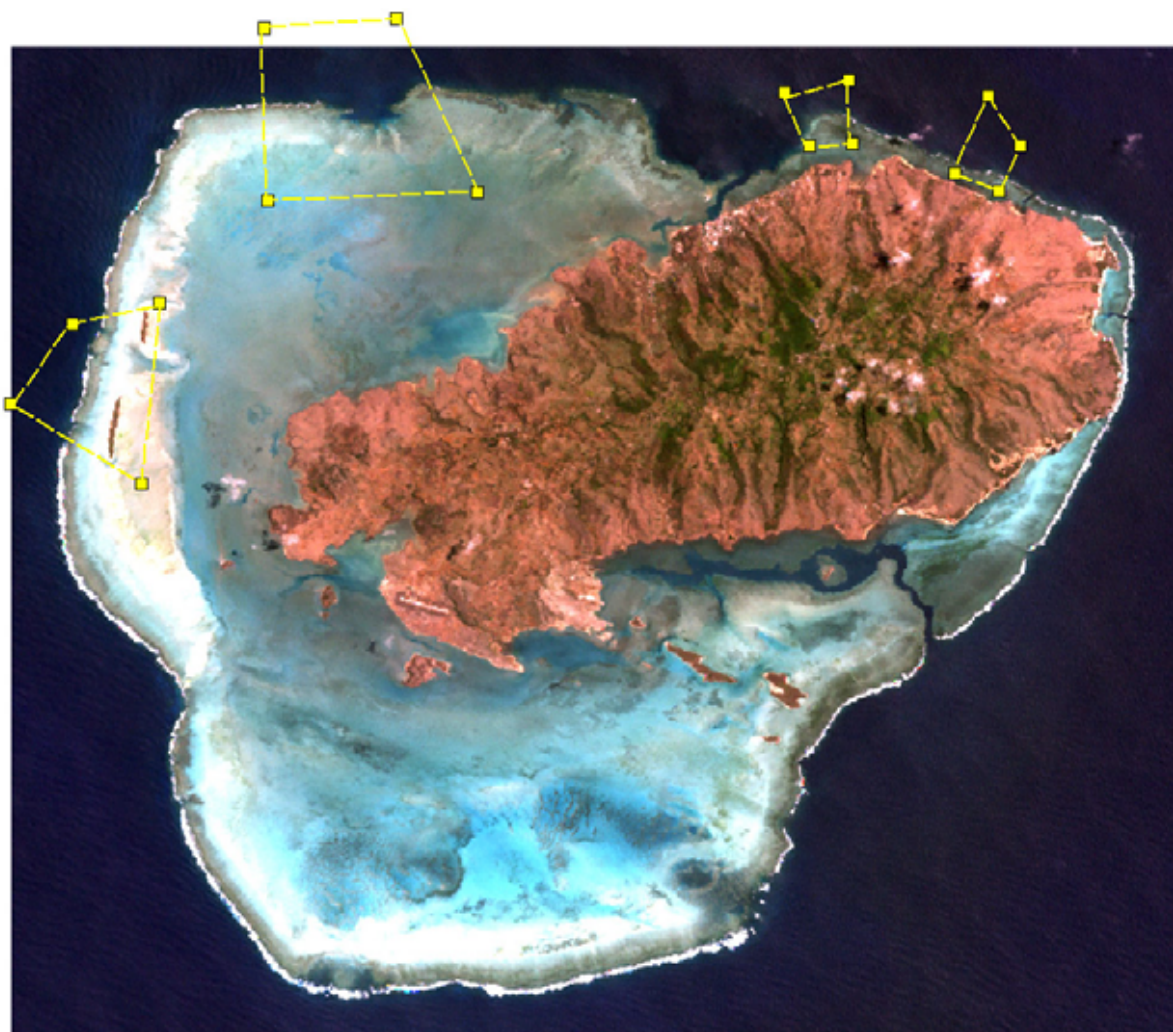


Figure 1. The 4 marine reserves in the northern lagoon.

2 Results from Stakeholder Meetings

Meetings were held at 9 fishing villages during January and February 2008. A summary of attendance at these meetings is shown in Table 1. The fishing villages were targeted to include those that will be affected by the proclamation of the 4 marine reserves. Sessions were carried out as informal discussions, with stakeholders being asked their views on the location of the reserves, enforcement and alternative livelihoods.

Table 1. Summary of stakeholder meetings January - February 2008.

Village	Women	Number of Fishers		Total
		Men		
Baladirou	9	0		9
Anse aux Anglais	15	5		20
Anse Goeland	0	8		8
Baie Malgache	0	9		9
Grand Baie	27	3		30
Baie aux Huitres	0	27		27
Baie du Nord	0	15		15
Pointe Palmiste	0	21		21
Pointe Monier	0	25		25
Total	51	113		164

The key observations and comments of the stakeholders are given below.

Baladirou (15th January)

None of the fishers at the meeting fished in the marines reserve but in general, they supported the development of marine reserves as their catches had declined. They felt that the other 3 marine reserves (Anse aux Anglais, Grand Bassin and Passe Demi) should be demarcated and all types of fishing should be banned within the reserves to give the fish stocks a chance to recover. In general, the fishers would be happy to stop fishing if offered alternative employment and they would do any jobs on the land as they felt they could earn a better living than from the sea. One fisherwoman said that she already had a group of fishers who wanted to set up a project raising goats and pigs and another suggested artisanal activities (embroidery). An elderly fisher suggested a Voluntary Retirement Scheme (VRS), whereby older fishers give up their cards in return for a one-off payment.

Anse aux Anglais (16th January)

Most fishers at the meeting fished in the Anse aux Anglais marine reserve and in general, they supported the development of marine reserves as their catches had declined. The majority of fishers felt that the remaining 3 marine reserves should only be demarcated for the sea cucumber fishery for the time being as, if all types of fishing were banned they would not be able to earn their living. They felt that there should be fines for people collecting sea cucumbers in the closed season and more Fisheries Protection Service (FPS) officers at sea, as there is a lot of illegal fishing taking place; one fisherman suggested that the fishers themselves enforce the new marine reserves working in collaboration with FPS. They suggested a VRS for fishers over the age of 55 years, other women suggested cleaning the roads and beaches and said that if they were offered another job on the land then they would stop fishing; the men however only wanted to fish. No-one was interested in raising livestock as there is no market and they do not get a good price for the animals.

Anse Goeland (21st January)

All fishers at the meeting fished in the Grand Bassin marine reserve and did not support the development of marine reserves as they felt that they were still able to earn a living from fishing and so the reserves were not necessary. One fisher said that if this area was closed for fishing he would demand 7,000 Rs compensation per month, as this is where he fishes everyday and earns his living. Others however felt that the 3 remaining marine reserves could be demarcated just for the sea cucumber fishery, but not for other types of fishing. Some said that they would not do any other jobs other than fishing and even if they were given work, they would continue to fish. Some fishers would consider off-lagoon fishing if they were provided with large boats and one would consider raising livestock; however the lack of water is a problem.

Baie Malgache (25th January)

All fishers at the meeting fished in the Grand Bassin marine reserve and in general, they supported the development of marine reserves as their catches had declined. They felt that the FPS should undertake patrols both at night and day to prevent illegal fishing. The fishers did not want to work on the land; one suggested working as a ranger in the new marine reserves; others suggested fishing on St Brandon or on the Banks.

Grand Baie (28th January)

All fishers at the meeting fished in the Anse aux Anglais marine reserve and in general, they supported the development of marine reserves as their catches had declined. Some fishers felt that the remaining 3 marine reserves should be demarcated for all types of fishing, however

others said just for the sea cucumber fishery for now. They felt that there is too much illegal fishing and that the marine reserves should be enforced by the FPS and National Coastguard (NCG), although one fisherman said that he would like to work as a ranger. Some said that they only know how to fish and could not do any other jobs; others said that if they were given work by the Government then they would stop fishing, however they would not form an Association or work in a group, they would prefer to set-up individual businesses.

Baie aux Huitres (29th January)

All fishers at the meeting fished in the Grand Bassin marine reserve and in general, they supported the development of marine reserves as their catches had declined. They all felt that the remaining 3 marine reserves should be demarcated for the sea cucumber fishery as there are no sea cucumbers left and it is affecting the health of the lagoon. They said however that the majority of their fishing is done in Grand Bassin so if this area was completely closed for fishing they would not be able to earn their living. They suggested that fishers who have cards but do not actually fish should be made to hand-in their cards, leaving more money available to pay the 'real' fishers; they also felt that enforcement was a problem and that the reserves should be enforced by the fishers themselves. One fisherman said he would like to work as a ranger for 6,000Rs per month however, rangers would need to have the right to stop and arrest illegal fishers. Most were not keen to raise livestock as they would not be able to feed their family whilst they were waiting for the animals to reach a marketable size. Some however said that if they were provided with animals and land then they would stop fishing, however they would not form an Association. One elderly fisherman suggested a VRS (25,000Rs) and another said he would cut down invasive plants (e.g. pikon loulou) for 4,000Rs per month. Some were interested in off-lagoon fishing if they were provided with a boat and training, however others felt that the loan repayments were too high

Baie du Nord (30th January)

All fishers at the meeting fished in the Grand Bassin and Passe Demi marine reserves. They did not support the development of the reserves as their catches had improved in recent years and they felt that reserves were not necessary. They did not want the remaining 3 marine reserves to be demarcated for any types of fishing including sea cucumbers and said that they would fight against it. They felt that there are too many fishers and in particular too many unregistered fishers and that the real fishes should be left to manage the sea themselves. One fisherman said that he would consider raising livestock if he was provided with animals and land, however he would continue to fish until they reached a marketable size; another suggested cutting down invasive plants for 7,000Rs per month. They felt that off-lagoon fishing was not safe and that they could not afford to buy a suitable boat.

Pointe Palmiste (8th February)

None of the fishers at the meeting fished in the marine reserves but in general, they supported the development of marine reserves as their catches had declined. They all felt that the remaining 3 marine reserves should be demarcated for the sea cucumber fishery as there are no sea cucumbers left and it is affecting the health of the lagoon. They felt that there are too many people fishing in the lagoon and that there is a lot of illegal fishing going on; they also felt that sand mining was a serious problem affecting the health of the lagoon and the fish stocks. They felt that the fishers themselves should enforce the new marine reserves, working as rangers. One man said that he did fish in the Passe Demi marine reserve but if he was given a project on the land, such as raising livestock then he would stop fishing. Others suggested fishing offshore on the Banks, however, one pointed out that he wouldn't form an Association, but would want to create his own company

Pointe Monier (11th February)

Most of the fishers at the meeting fished in the Grand Bassin marine reserve and in general, they supported the development of marine reserves as their catches had declined. They felt however, that a solution needs to be found for the fishers before fishing is completely banned in these areas as they depend on Grand Bassin to earn their living. They said that the remaining 3 marine reserves could however be demarcated for sea cucumbers only. They felt that land reclamation projects at Baie Lascars and Baie aux Huitres had affected the lagoon and caused a decline in fish stocks. One suggested cleaning beaches for a salary of 5,000Rs per month and others were keen to set-up their own businesses however they would need low interest loan facilities.

3 General Conclusions

- Most fishers agreed that marine reserves are a good idea in order to protect the fish stocks in Rodrigues.
- Most fishers however felt that the remaining 3 marine reserves should only be demarcated for the sea cucumber fishery for now as they would no longer be able to earn their living if all types of fishing were banned straight away.
- All villagers highlighted the problems of illegal fishing and said that better enforcement was needed.
- Suggested alternative jobs included: raising livestock, cutting down invasive species (e.g. Pikon Loulou), cleaning beaches, off-lagoon fishing and working as rangers for the marine reserves.
- Fishers were not keen to form an Association and would prefer to set-up their own business.
- Elderly fishers suggested a Voluntary Retirement Scheme with a lump sum payment.
- Problems:
 - Lack of market/poor price for livestock and vegetables.
 - Fishers don't have the boats or ability to fish offshore and can't afford the loan repayments to buy boats for off-lagoon fishing.
 - Lack of water is a big problem for planting vegetables.
- Support required: low-interest loans/grants to start new businesses and buy new boats, business advice and training.

4 Management Recommendations

The development of alternative income schemes for fishers affected by the marine reserves is essential to the success of the reserves. If fishers are not provided with a long-term income it is highly likely that they will undertake illegal fishing activities within the reserve areas; indeed many fishers interviewed, suggested that this would be the case. The stakeholder meetings suggest that fishers would be happy to undertake beach cleaning, cutting down invasive species (e.g. Pikon Loulou), off-lagoon fishing and agriculture. Furthermore, a number of fishers expressed a wish to be employed as rangers for the marine reserves. In addition to providing alternative incomes this would also ensure effective enforcement of the reserve regulations; involving local stakeholders promotes a sense of local ownership and a sharing of responsibility and has been shown to be very effective in many marine protected areas around the world.

Before alternative livelihood strategies are developed it is important that assessments are made of the current economic situation in the area. Coastal communities and their dependence on marine resources tend to be very complex and therefore studies are required to identify current sources of income, the number of people who will be affected and to highlight vulnerable groups such as older fishers or unregistered fishers; they will also allow factors

such as geography, gender and age to be taken into consideration. These recent meetings in Rodrigues indicate that different villages show variations in their responses to the issue of alternative livelihoods. In those villages dominated by women fishers, many would be happy to do any job offered to them by the Government if it provides them with more money. In contrast, in villages dominated by men the fishers were more hostile towards any suggestions of alternative livelihoods, stating that they have always fished and only know how to fish, although some would consider off-lagoon fishing and raising livestock. Villages that already have a history of agriculture were also more likely to consider raising livestock as an alternative livelihood, whereas many elderly fishers suggested a Voluntary Retirement Scheme.

The fishers in Rodrigues are not particularly open to new ideas such as aquaculture, or cultivating new products for foreign market (e.g. citronelle), suggesting projects of which they already have experience. This however creates the problem of all fishers doing the same thing and thus saturating the market, something that was highlighted by many of the fishers themselves. This is a common problem as fishers have limited access to new technologies and they also have little time and money to invest in new developments, which may be risky. It is therefore very important that any new projects that are developed include on-going training in the new techniques and support for the ex-fishers beyond the initial set-up phase. Many alternative livelihood projects fail because fishers are encouraged to take up new employment for which they do not possess the necessary skills. For example, in Sri Lanka ex-coral miners were encouraged to undertake tree planting and poultry farming (Perea, 2002). This project failed due to the lack of relevant experience and skills in the different farming activities and highlighted the need for a good understanding of local skills and experiences.

Many alternative income projects in similar situations to that in Rodrigues have found that the best approach is to give people an opportunity to diversify their sources of income rather than change from one type of employment to another; “single issue strategies” are unlikely to work. By giving the communities access to a wide range of training possibilities, loan opportunities and alternative livelihood projects, people are not left relying on just one source of income which could fail. The CORDIO alternative livelihoods programme found that a wide variety of alternative livelihoods schemes worked in different situations. They emphasised the value of developing projects which produce for the local market rather than relying on tourism or export. Furthermore, research in Cambodia highlights the need for multi-agency approaches to the issue of alternative livelihoods, bringing together a diversity of skills, knowledge and experience to address this complex issue (Campbell *et al.*, 2005).

5 References

- Campbell, J., Townsley, P., Whittingham, E., Ward, A., Viyak, S., Bunthoeun, S., Ponley, H., Dyna, E., Ly, N., Panha, P., Sony, C., Sopanha, C., Sophany, K., Mayonry, I., Sreymom, S. and Chhin, N. (2005). Understanding the factors that support or inhibit livelihood diversification in coastal Cambodia. IMM Ltd., 84pp.
- Gell, F. R., Lynch, T. L., Meunier, M. S., Blais, F. E. I. and Hooper, T. E. J. (2003). Marine reserves for sustainable fisheries and conservation in Rodrigues, *Shoals Rodrigues* unpublished report, 32pp.
- Hardman, E. R., Gell, F. R., Blais, F. E. I., Desiré, M. S., Raffin, J. S. J., Perrine, S. and Chinién-Chetty, M. (2006). Marine reserves for sustainable fisheries management in Rodrigues. *Shoals Rodrigues* unpublished report, 13pp
- Hardman, E. R., Blais, F. E. I., Desiré, M. S., Raffin, J. S. J., Perrine, S. and Gell, F. R. (2007). Marine Reserves for Sustainable Fisheries Management in Rodrigues: Alternative Livelihood Options. *Shoals Rodrigues* unpublished report, 13pp.

Perea, N. (2002). Alternative livelihoods through income diversification: as management options for sustainable coral reef and associated ecosystem management in Sri Lanka. South Asia Co-operative Environment Programme pp58.