



Marine Reserves for Sustainable Fisheries Management in Rodrigues. Alternative Livelihood Options: 1

Hardman, E. R., Blais, F. E. I., Desiré, M. S., Raffin, J. S. J., Perrine, S. and Gell, F. R.²

¹ *Shoals Rodrigues*, Pointe Monier, Rodrigues

² Wildlife and Conservation Division, Department of Agriculture, Fisheries and Forestry, Knockaloe Farm, Peel, Isle of Man, British Isles.

April 2007



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

Hardman, E. R., Blais, F. E. I., Desiré, M. S., Raffin, J. S. J., Perrine, S. and Gell, F. R.

¹ *Shoals Rodrigues*, Pointe Monier, Rodrigues

² Wildlife and Conservation Division, Department of Agriculture, Fisheries and Forestry, Knockaloe Farm, Peel, Isle of Man, British Isles.

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 approved the creation of 4 marine reserves in the northern lagoon. It is hoped that the first reserve at Rivière Banane will be proclaimed during the 2007 and in respect of this, meetings were held at 7 fishing villages during January and February 2007 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, however all were concerned about their loss of livelihood if they were unable to fish in the reserve areas. Suggested alternative jobs included: planting trees, cutting down invasive species (e.g. Pikon Loulou), cleaning beaches, off-lagoon fishing and working as rangers for the marine reserves; fishers also showed an interest in aquaculture. Many fishers would like to start up new businesses such as raising livestock or planting vegetables and elderly fishers suggested a Voluntary Retirement Scheme. The fishers highlighted a number of problems such as a lack of market for vegetables, fruits and handicrafts; fishers can't afford the loan repayments to buy boats for off-lagoon fishing and the lack of water for planting. They asked for financial help to start up new businesses as well as business advice and training. A series of recommendations are suggested of how these issues can be addressed based on previous experiences from other marine reserves around the world.

Contents

1 Introduction.....1
2 Results from Stakeholder Meetings.....2
3 General Conclusions.....4
4 Management Recommendations.....5
5 References.....6

List of Figures

Figure 1 The 4 marine reserves in the northern lagoon.....2

List of Tables

Table 1 Summary of stakeholder meetings February-March 2006.....2

Acknowledgments

This work was funded by the U.K. Department for Environment, Food and Rural Affairs (DEFRA) Darwin Initiative. The authors would like to acknowledge the co-operation of the Rodrigues Regional Assembly and the Mauritius Oceanography Institute in the undertaking of this work.

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 (nearly 20% 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, in collaboration with *Shoals Rodrigues*, has now approved the creation of 4 marine reserves in the northern lagoon at Rivière Banane, Anse aux Anglais/Passe Cabri, Grand Bassin and Passe 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 draft regulations for management of these 4 reserves have now been agreed and it is hoped that the first reserve at Rivière Banane will be proclaimed during 2007. In response to this, fisher meetings were held during 2006 in order to ensure support for the project (Hardman *et al.*, 2006). These meeting 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. Further fisher meetings were held during January and February 2007 in order to discuss alternative livelihood options and to ensure the on-going support of the fishers for the project.



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

2 Results from Stakeholder Meetings

Meetings were held at 7 fishing villages during January and February 2006. 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 February-March 2006.

Village	Women	Number of Fishers		Total
		Men		
Anse aux Anglais	44	5		49
Grand Baie	17	9		26
Baie aux Huitres	0	14		14
Baie Malgache	0	12		12
Anse Goeland	0	22		22
Rivière Banane	10	5		15
Baie du Nord	0	15		15
Total	71	82		153

The key observations and comments of the stakeholders are given below with a full transcript of the meetings provided in Appendix 1.

Anse aux Anglais (24th 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. They also suggested that collection of sea cucumbers should be stopped, that there should be a closed season for octopus and that there should be better enforcement of fisheries regulations to prevent illegal fishing. In general, the fishers would be happy to stop fishing if offered alternative employment. Suggestions were: planting trees and vegetables and starting up a new business; they also thought that aquaculture was a good idea. Problems were: fishers cannot afford the loan repayments to buy large boats to fish off-lagoon. The fishers asked for financial help to start up new businesses.

Grand Baie (25th January)

All fishers at the meeting fished in the Anse aux Anglais or Riviere Banane marine reserves and in general, they supported the development of marine reserves as their catches had declined. They also suggested a closed season for octopus, stopping fishers breaking coral and a Voluntary Retirement Scheme for older fishers. Suggestions for alternative employment were: cleaning beaches and raising chicken or pigs; they also thought that aquaculture and acting as rangers for the marine reserves were good ideas. Problems were: lack of water for planting, no market for handicrafts. The fishers asked for financial help to start up new businesses.

Baie aux Huitres (26th January)

All fishers at the meeting fished in the Grand Bassin reserve seasonally and in general, they supported the development of marine reserves. They suggested that the older fishers should be offered voluntary retirement as they were ready to give up their cards and stop fishing; illegal fishing and the collection of sea cucumbers should also be stopped. Suggestions for alternative employment: fishers should be given financial help to start up their own businesses e.g. raising cows or chickens. Problems were: market for fruit and vegetables is saturated.

Baie Malgache (30th January)

All fishers at the meeting fished in the Grand Bassin or Passe Demi marine reserves and in general, they supported the development of marine reserves as their catches had declined. Suggestion for alternative employment: rangers for the marine reserves, off-shore fishing on the Banks, cutting down Pikon Loulou, planting endemic trees and beach cleaning; they also thought that aquaculture and taking tourists snorkelling were good ideas. Problems: lack of water for planting and fishers only have small boats so can't fish off-lagoon.

Anse Goeland (3rd February)

All fishers at the meeting fished in the Grand Bassin marine reserve. 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. If however, they were given compensation or alternative employment they would support the reserves. They also suggested that illegal fishing should be prevented. Suggestions for alternative employment: off-lagoon fishing; they also thought that aquaculture and acting as rangers for the marine reserves were good ideas. Problems: not enough tourists to earn a living; illegal fishing.

Rivière Banane (22nd February)

All fishers at the meeting fished in the Rivière Banane marine reserves and in general, they supported the development of marine reserves as their catches had declined. They suggested that there should also be better enforcement of fisheries regulations to prevent illegal fishing. Suggestions for alternative employment: cleaning beaches, planting trees, cutting down Pikon Loulou and setting-up their own business; they also thought that aquaculture, off-lagoon fishing, acting as rangers for the marine reserves and taking tourists snorkelling were good ideas. Problems: no market for handicrafts (piment, achard); competition for vegetables from Mauritius. Fishers asked for financial help to set up new businesses/buy boats as well as training.

Baie du Nord (28th February)

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. If however, they were given compensation they would support the reserves. They also suggested a closed season for octopus, the collection of sea cucumbers should be stopped and fishing for octopus using 'la fourine' should be stopped. Suggestions for alternative employment: beach cleaning, planting trees and raising pigs; they also thought that aquaculture and acting as rangers for the marine reserves were good ideas. Problems: fishers do not earn enough money to buy new boats or pleasure craft licenses. Fishers asked for financial help to set up new businesses.

3 General Conclusions

- Most fishers agreed that marine reserves are a good idea in order to protect the fish stocks in Rodrigues, but they need to be properly enforced.
- Other suggestions for protecting the lagoon:
 1. Stopping illegal fishing through better enforcement of current fisheries regulations.
 2. Stopping the collection of sea cucumbers
 3. Closed season for octopus and limitations on the gear used to collect octopus.
- Fishers were very concerned about how they would earn a livelihood when the reserves areas are closed as they catch the most fish/octopus in these areas, however they would be happy to stop fishing if offered alternative jobs.
- Suggested jobs include planting trees, cutting down invasive species (e.g. Pikon Loulou), cleaning beaches, off-lagoon fishing and working as rangers for the marine reserves. Fishers also showed an interest in aquaculture.
- Fishers would like to be given financial help to start up new businesses such as raising livestock or planting vegetables.
- Elderly fishers suggested a Voluntary Retirement Scheme with a lump sum payment.
- Problems:
 - Lack of market for vegetables, fruits and handicrafts – the market is already saturated, so need to develop new products.
 - 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.
 - There are not enough tourists to earn a living from snorkelling and boat trips and fishers need training.
- 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, planting trees, cutting down invasive species (e.g. Picon Loulou), off-lagoon fishing and agriculture; some fishers also showed an interest in aquaculture. 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. These will identify current sources of income, the number of people who will be affected and will highlight vulnerable groups such as older fishers or unregistered fishers. 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. By giving the communities access to a wide range of training possibilities, loan opportunities and alternative livelihood project, 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. They found that food processing projects and other projects producing new products for local people were particularly good because they had a stable market and were not reliant on changeable tourist or export demand. Similarly, in the Philippines suggested alternative employment options included: sea cucumber farming, seaweed farming, pearl oyster farming, aquaculture of crabs and rabbitfish, farming (rice, pineapple, lemons, bananas), ecotourism, education/monitoring of marine reserves and artisanal crafts (bags, hats, jewellery) (Kühlmann, 2002). Projects need however to be developed with environmental sustainability in mind so that retraining or redeploying people isn't just displacing the problem to another sector

A proportion of alternative income opportunities will come from the marine reserve itself and the more fishers from the reserve area that can be employed part- or full-time in marine reserve related work the better. In other marine reserves, jobs for local fishers (male and female) have included rangers, community liaison officers, souvenir production and sale, data collection and other scientific work, sign production and other artwork, tourist guides, education officers etc. In Kenya and Tanzania, for example, fishers participate in fisheries monitoring in collaboration with local government institutions, scientists and NGOs (Obura *et al.*, 2002).

It is very important that projects 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.

5 References

- 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 Chinien-Chetty, M. (2006). Marine reserves for sustainable fisheries management in Rodrigues. *Shoals Rodrigues* unpublished report, 13pp
- Kühlmann, K. J. (2002). Evaluations of marine reserves as basis to develop alternative livelihoods in coastal areas of the Philippines. *Aquaculture International* **10**: 527 – 59.
- Obura, D. O., Wells, S., Church, J. and Horrill, C. J. (2002). Monitoring of fish and fish catches by local fishermen in Kenya and Tanzania. *Marine and Freshwater Research* **53**: 215-222.
- 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.

Appendix 1

24th January 2007 9:30 – 10:15 Anse aux Anglais
Attended by between 30 and 49 fishers (5 men, the rest women).

Eric Blais (EB) opened the meeting, welcomed everyone and explained the reason for our visit. He said that the reserves should be proclaimed in February and showed everyone the map of the reserves and explained that Rivière Banane will be the first to be demarcated. He also explained the role of *Shoals*, to carry out monitoring of the reserves and to act as a link between the fishers and the Rodrigues Regional Assembly (RRA), who will be the ones making all of the decisions.

EB asked how many people fished in the reserve area – all fished in the Anse aux Anglais reserve. All fished for octopus and for fish using a hand-line; 1 man fished off-lagoon and 1 was a basket trap fisher. No one collected sea cucumbers. EB asked what they thought of this and they said that if they take sea cucumbers then they won't be able to catch octopus (they often find sea cucumbers close to the octopus) and also there will be no fish in the lagoon because the fish eat small sea cucumbers, so they all thought it was a bad thing.

EB asked if their catches had declined in recent years and they all agreed that their catches had declined a lot and that there's nothing left in the sea. He asked if they thought the reserves were a good idea. There was little response so EB explained that the reserves would be No-Take zones and that their aim is to allow fish and octopus to recover. The fishers then agreed that they were a good idea. EB showed them a map of the reserves and asked if they thought they were in a good place. The fishers all agreed that they were. EB asked them what else could be done to protect the lagoon. One person suggested that collecting sea cucumbers should be stopped because soon there will be none left; a man suggested seaweed farming and a woman suggested having a closed season for octopus, as there is for the seine net fishery, to give the octopus time to grow. One man said that people are diving for octopus but the Fisheries Protection Service (FPS) and the National Coastguard don't do anything about it. He said that there needs to be better enforcement to stop illegal fishing.

EB asked if they couldn't fish what other jobs would they be prepared to do. One woman said working on the land, anything, for example planting vegetables or planting trees. EB asked what they thought about aquaculture. They didn't know what he meant so he suggested aquaculture of sea cucumbers for example and they thought this was a good idea. He asked what they thought about off-lagoon fishing. One man said that they are being encouraged to fish off-lagoon but he only gets paid 1,500Rs per month and a loan for a boat is 3,000Rs per month, so he can't afford the loan and it's a very big risk. If he was paid for example, 4,000Rs per month then he could afford to buy a boat and engine. Another woman said that they should be given money to start-up a new business. They said that they are ready to leave the sea and start a new job, if there is one.

EB asked if they had any other questions or suggestions. The off-lagoon fisher asked about the Bad Weather Allowance and whether it is the same in and off lagoon. He wanted to know if he needed to report to Fisheries if it's bad weather off-lagoon, but good weather in lagoon. There were no other questions, so EB thanked everyone for coming and closed the meeting.

25th January 2007 8:45 – 9:15 Grand Baie

Attended by 26 fishers (17 women and 9 men).

Eric Blais (EB) opened the meeting, welcomed everyone and explained the reason for our visit. He said that the reserves should be proclaimed in February and that their purpose is to allow fish to grow and fish stocks to improve; he said that they will be No-Take zones and then showed everyone the map of the reserves. He explained that Rivière Banane will be the first to be demarcated to see how it works.

EB asked how many people fished in the reserve area – all fished in the Anse aux Anglais reserve and 1 man also fished in the Rivière Banane reserve. The women fished for octopus and for fish (Bengue) using a hand-line; the men fished with lines inside and outside the reef. There were no trap fishers and no one collected sea cucumbers.

EB asked if their catches had declined in recent years and they all agreed that the fish and octopus had declined because the coral was dead due to people trampling on it and breaking it and also because of people collecting sea cucumbers. EB asked if they thought the reserves were a good idea and they agreed that they were and said they should be respected, but 1 woman said they still need to get food to live and support their families. EB asked what else could be done to protect the lagoon. One man suggested a 3-month closed season for octopus; another said that it's them who break the coral on the reef so we need to find a solution for that. An elderly woman said that the older fishers like her will stop fishing soon, but that they should be given a sum of money to stop (pension), however the younger people should be allowed to carry on fishing.

EB asked if they couldn't fish what other jobs would they be prepared to do. He explained that the role of *Shoals* is to liaise between the fishers and the RRA and put their ideas and suggestions forward. One woman suggested cleaning beaches. EB explained about aquaculture and some thought it could be a good idea. No one was keen to do off-lagoon fishing. When EB suggested planting, 1 woman said that the problem is water. If this problem could be resolved and she could get help to put up shade to protect the plants in summer, then she would be willing to give up fishing. The fishers thought that using rangers to protect the reserves was a good idea and some men showed an interest in doing this. No one was interested in handicrafts as they said that no one will buy them, there's no market for them. Three women said that if they were given financial help to start-up farming (chickens, pigs), then they would do that.

EB asked if they had any other questions or suggestions. One woman answered that the reserves are a good idea, but the fishers need food to live and for their children and the RRA has to find a solution for this. There were no other questions so EB closed the meeting and thanked everyone for coming.

26th January 2007 9:15 – 9:45 Baie aux Huitres

Attended by 14 fishers (all men).

Eric Blais (EB) opened the meeting, welcomed everyone and explained the reason for our visit. He said that the reserves should be proclaimed soon and that their purpose is to allow fish to grow and fish stocks to improve. He showed everyone the map of the reserves and explained that Rivière Banane will be the first to be demarcated to see how it works.

EB asked how many people fished in the reserve area – all fished around Ile aux Fous, but fished in Grand Bassin seasonally. There were 4 octopus fishers, the rest fished with lines and basket traps.

EB asked if their catches had declined in recent years and they all agreed that they had. One man said that there is nothing left in the sea, all the coral is dead and now he only catches very small fish. Another said that the population has increased and another said that there is too much damage in the lagoon and that breaking coral means there will be no fish. EB asked if they thought the reserves were a good idea and they agreed that they were and if they are enforced they will work well. EB asked if they thought the reserve was in a good place. The fishers said that lots of people fish and earn their livelihood at Grand Bassin as it's a very good source of fish, so where will they fish if it's closed? EB explained about spill-over from the reserve and used examples from Australia and the Seychelles where there are now a lot of fish outside the reserve area. One fisher said that the reserves would need guardians and EB said that we hope to train 2 fishers to act as rangers.

The fishers discussed the collection of sea cucumbers. None of them collected them and 1 man said that sea cucumbers clean the sand and oxygenate it and so collecting them will damage the environment. Another agreed that collecting them is damaging the lagoon and that Rodrigues is suffering so that one person can get rich. EB asked what else can be done to protect the lagoon. One man said stop fishing altogether! One elderly man said that he has been fishing for 73 years and he is ready to stop and hand-in his card for a lump sum. Most of the other elderly men agreed that they are ready to stop fishing. EB explained that the role of *Shoals* is to liaise between the fishers and the RRA and pass on their comments. Another man said that he had witnessed large boats fishing at night near to the reef taking everything and that this should be stopped. They also agreed that the collection of sea cucumbers should be stopped.

EB asked if they couldn't fish what other jobs would they be prepared to do. One man said that they'd always fished and that even if the sea is finished, fishermen will stay fishing. Another said that he would fish with a very small seine net to catch the small fish. EB explained that this is the same as collecting sea cucumbers and is unsustainable and will damage the lagoon. One man asked what alternatives there are. If he plants bananas or limon he will only get 0.5Rs for each, there's no market for them. EB asked what they thought about being rangers for the new reserves, but no one was very keen. They said that Fisheries is corrupt and have their own fishing team who fish illegally at night. One man said that fishers should be given 600,000Rs to start up their own businesses. EB asked whether they would be satisfied to be given land or a building worth the same value instead of the money, but the fisherman said he'd use the money to start-up 2 or 3 businesses (such as raising cows or chickens), due to the risks, if one failed he'd still have the others to earn a living.

EB asked if they had any other questions or suggestions. The elderly fisherman again said that he was ready to give-up his card and stop fishing. There were no other questions so EB closed the meeting and thanked everyone for coming.

30th January 2007 9:00 – 9:30 Baie Malgache
Attended by 12 fishers (all men)

Jovani Raffin (JR) opened the meeting, welcomed everyone and explained the reason for our visit. He said that the reserves should be proclaimed in February and that they will be No-Take zones. He showed everyone the map of the reserves and explained that Rivière Banane will be the first to be demarcated.

JR asked if they thought the reserves were a good idea. They all agreed that they were a good idea but they need to be well enforced and no one should be allowed in them. Sabrina Desiré (SD) asked who they thought should police them and they said FPS and the National Coastguard.

JR asked how many people fished in the reserve area – they all fished in the Grand Bassin reserve and some fished in the Passe Demi reserve. They all fished for octopus as well as fishing with lines and basket traps. None of the fishers collected sea cucumbers and said it is a bad thing.

JR asked if their catches had declined in recent years and all said that their catches have declined, the sea is finished, the coral is dead and there are no fish. JR asked if they thought the reserves were in a good place. One fisher said that he has traps offshore in the Passe Demi reserve and another said that if they can't fish at Grand Bassin then there is nowhere for them to fish. He said that the Grand Bassin reserve should be offshore and shouldn't include the pass. JR explained about spill-over from the reserve and that they will be able to catch more fish outside the reserve area in 2-3 years time. SD then explained that the fishers could work taking tourists snorkelling in the reserve. The fishers said that they didn't have the right to do that, but SD said that they could get training to do this and she also suggested that they could act as rangers for the reserves. JR asked what else could be done to protect the lagoon. One fisher answered that fishing should be stopped completely for a certain amount of time to let the fish recover.

JR asked if they couldn't fish what other jobs would they be prepared to do. One fisher said that he'd want compensation, payment each month. Another said that he'd be willing to act as a ranger for the reserves and another fisher suggested off-lagoon fishing on the Banks with large boats. Another fisher suggested cutting down invasive plants such as Pikon Loulou and replanting endemic species and another suggested beach cleaning. They showed some interest when JR suggested aquaculture and taking tourists snorkelling but said for agriculture, the problem is the lack of water. SD explained that the fishers could get together to form a co-operative and apply for funding to set up an agricultural project or to buy a boat and navigation equipment. They talked about the IFAD project to buy community boats and the fishers said that a consultant had come to talk to them about it but that nothing had ever happened. SD explained about the RRA plan to develop off lagoon fishing, but they said that the problem is that most fishers can't go offshore as they only have small boats and don't know how.

JR asked if there were any questions and as there were none he thanked everyone for coming and closed the meeting.

3rd February 2007 15:00 – 16:00 Anse Goeland

Attended by 22 fishers (all men)

Eric Blais (EB) opened the meeting, welcomed everyone and explained the reason for our visit. He said that the reserves should be proclaimed in February and that Rivière Banane will be the first to be demarcated. He showed a map of the reserves and explained that fishers will be able to pass through the reserve, but will not be allowed to fish in it. The fishers did not agree with the reserve at Grand Bassin, they said that they all fish there and catch lots of fish there and that there is nowhere else to fish. EB explained the purpose of marine reserves and the spill-over effect, however they were still not happy and the debate became quite heated. EB again stressed that as a result of the reserves, fish stocks will also increase outside of the

reserve area and so in the long run their catches will increase. He also explained the role of *Shoals* to liaise between the fishers and the RRA. The fishers asked if they are not happy with the reserves, can they be stopped. EB explained that the reserves were agreed in collaboration with the fishing community and that over 80% of fisher supported them.

EB asked how many people fished in the reserve area – they all fished in Grand Bassin and all catch octopus and fish with traps and lines. Five also collected sea cucumbers.

EB asked if their catches had decline in recent years. One man said that the sea is finished, but another said that his catches have actually improved this year and he's catching more fish than people want to buy. He said that fish stocks in the lagoon are fine; he is able to earn his living, there are plenty of fish and there is no need for a reserve. EB explained that the reserve will improve the situation for fishers in the long term and gave example of successful marine reserves in Australia and the Seychelles.

EB asked if they thought marine reserves were a good idea. They agreed that in principle marine reserves are a good idea, but they need to earn a living. If the RRA gave them a salary (compensation), then they could implement the reserves. EB asked what they thought would happen if we did nothing and just let the situation continue as it is. The fishers agreed that the situation cannot just be left as it is and said there needs to be proper rules and regulations and that illegal fishing needs to be stopped.

One fisher asked if tourists would be allowed to visit the reserves and said that fishers could take tourists to earn money, but another said that there aren't enough tourists for all of the fishers to earn living from this. EB asked if they couldn't fish what other jobs would they be prepared to do. One fisher said fishing is the only job he knows how to do. EB suggested off-lagoon fishing and some were interested; he also suggested seaweed farming and again some were interested, although one fisher was concerned that dying seaweed would drive the fish away. EB suggested the fishers could act as rangers in the reserves and 1 fisher said he'd be happy to do this although he would need to be given a rifle to prevent illegal fishing. The fishers finally agreed that if they were given enough money by the RRA or another job then they will stop fishing. They need money to feed their families and would do whatever job the Government gives them so long as they can earn enough money from it.

EB asked if there were any questions. One man said that the algae he puts in his basket traps (Sargassum) is only found in the Grand Bassin reserve, so where can he get it now? They also talked about sea cucumbers and said they collected them because they need to earn a living. One fisher who used to collect them has now stopped because he knows what will happen to the lagoon. He said that the RRA should stop the people who buy and export them. Another fisher added that we need to stop illegal fishing first – there's plenty of fish in the lagoon, but illegal fishing needs to be stopped. There were no other questions so EB thanked everyone for coming and closed the meeting.

22nd February 2007 15:00 – 16:00 **Rivière Banane**

Attended by 15 fishers (10 women, 5 men)

Jovani Raffin (JR) opened the meeting, welcomed everyone and explained the reason for our visit. He said that the reserves had been discussed in the Regional Assembly and that Rivière Banane will be the first to be demarcated. He also explained that they will be No-Take zones, however that tourists will be able to snorkel in the reserve if they pay for a permit.

JR asked how many people fished in the reserve area – they all fish in the reserve at Rivière Banane as well as people from Roche Bon Dieu, Brulé, Trefles and Mon Lubin. They all fished for octopus and fish using traps and lines. Around 10 people collect sea cucumbers in the area, although no one at the meeting did.

JR asked if their catches had declined in recent years. They all agreed that their catches had declined and thought that the reserve was a good idea and is in a good place – it's nice for tourists to visit. JR asked what else could be done to protect the lagoon. They said that there needs to be better enforcement – more patrols and patrols at night as there is a lot of illegal fishing (snorkelling for octopus etc). JR said that they should report this to Fisheries, but they said that people would find out that it was them who had reported them and it would cause trouble for them.

JR asked if they couldn't fish what other jobs would they be prepared to do. They said that they'd do any jobs and suggested cleaning beaches, planting trees and removing Pikon Loulou. Sabrina Desiré (SD) said that they could form a co-operative to produce things like fruit juice. They agreed that this was a good idea but one man said that in Rodrigues everyone would copy and do the same thing and then he wouldn't be able to sell it any more. He said the same thing had happened with piment and that everyone sells it in Port Mathurin now. SD agreed that the market is saturated and that everyone's doing the same thing and so they need to think of new ideas. One woman said that in Rodrigues working as a group doesn't work because one person always want more or thinks that they're working more than the others. Another woman said that the problem with selling vegetables is that vegetables are imported from Mauritius and many people prefer to buy those than vegetables from Rodrigues as they're often cheaper. JR asked what they thought about off-lagoon fishing and they said they were interested, but they'd need a big boat as it wouldn't be possible in their small boats. They also thought aquaculture was an interesting idea as it might encourage the fish to come back to the lagoon; some were also interested in working as rangers in the reserves in collaboration with Fisheries. They would be interested in taking tourists snorkelling, but said they'd need a boat and training. Others would be interested to set-up their own business but they have no capital to do so. JR asked what help they would need to do other jobs and they said a boat, training and financial support to start-up the business.

JR asked if they had any questions. One man said that the politicians should come to the village and talk to them about the reserves and future plans. There were no other questions so JR thanked everyone for coming and closed the meeting.

28th February 2007 15:00 – 16:00 **Baie du Nord**
Attended by 15 fishers (all men)

Jovani Raffin (JR) opened the meeting, welcomed everyone and explained the reason for our visit. He said that Rivière Banane will be the first marine reserve to be demarcated and that they will be No-Take zones, however that tourists will be able to snorkel in the reserve if they pay for a permit. He explained that the role of Shoals is to act as a link between the fishers and the RRA. JR showed the fishers the map of the reserves and asked how many people fished in the reserve area – the fishers said that everyone at Baie du Nord fishes in both the Passe Demi and Grand Basins reserves. They also said that people from Anse Goeland, Anse Nicholas and Pistache fish in those areas and estimated that means 200-300 people fish there using lines, traps and seine nets as well as catching octopus. The fishers at the meeting all fished using traps and lines and caught octopus; 2 people also collected sea cucumbers.

JR asked if their catches had decline in recent years. One man said that there are more fish and octopus now then before, but that there are more fishers – young people leave school and can't get a job so they fish to earn money. Others agreed that fishing is fine and there are plenty of fish. Another fisher said that he didn't agree with the reserves and that they need to earn money to live. He said that fishers should be given compensation if the reserves are declared. He said that last year he'd asked for 8,000Rs and if he was given this, then he would stop fishing in the reserves. The fishers also didn't think that it was fair that tourists would be able to dive and snorkel in the reserve, but JR explained that the money from their permits was needed to pay for maintenance and enforcement of the reserves. Another fisher said that he wasn't a registered fisher, so what would happen to him. JR asked what else could be done to protect the lagoon. One man suggested only using iron bars to catch octopus instead of the harpoons (la fourine) as this would cause less damage to the coral; another suggested stopping everyone fishing and paying them all compensation; another suggested stopping sea cucumber collection (others said that the permit should be given to Rodriguan fishers and not to Mauritians) and 1 fisher suggested a closed season for octopus, although others said this was not a good idea.

JR asked if they couldn't fish what other jobs would they be prepared to do. Two fishers asked for compensation and another fisher said that there is no other work they can do – they're too old and only know fishing. JR suggested off-lagoon fishing but they didn't like this idea; some were interested in the idea of aquaculture, but no-one liked the idea of planting vegetables. They all thought that re-forestation (planting endemic species) was a good idea as was beach cleaning. Some were interested in working as rangers in the reserves, but 1 fisher said that boats should not be allowed to pass through the reserve at all because it would be impossible to stop them fishing then. They didn't like the idea of taking tourists out snorkelling and said that they wouldn't be able to do as they'd need money for a boat and for a pleasure craft licence. JR suggested starting their own businesses. They didn't like the idea of selling piment, but 1 fisher was keen to raise pigs. They all said that they'd need capital in order to set-up a new business.

JR asked if they had any questions. One man said that representatives from the RRA should come to the village to talk to them and answer their questions. There were no other questions so JR thanked everyone for coming and closed the meeting.