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Situational Analysis of the Lobster Fishing Communities of Sainte Luce, Ebakika and Itapera

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Glossary

Anosy – One of the 22 regions of Madagascar in the southeast of the country

Antanosy – The language and people of the region of Anosy

Ariary – Malagasy currency, abbreviated to Ar

Berried female – Egg carrying female lobster

Collecteur – Lobster buyer based in fishing communities that sell lobster to wholesalers in the regional capital Fort Dauphin

Dina – Local law determined and enforced by each *fokontany*

Fokontany – The smallest administrative area in Madagascar defining a community, typically a village, though a larger settlement may consist of several *fokotany*

Hiry – Antanosy word for the travellers palm (*Ravenala madagascariensis*), used for building and for weaving lobster pots

Jarify – coastal gill nets used to fish for turtles and sharks

Laka antanosy – Antanosy word for the small wooden boats used in south east Madagascar

Lakambezo – Word for the fishing boats used in the southwest of Madagascar typically by Vezo fishers

Mahampy – reeds harvested for products such as mats, baskets and hats

Project Oratsimba – SEED Madagascar's fisheries project in Sainte Luce, Ebakika and Itapera, currently entering Phase III

Rabbateur – Typically women who work for collecteurs and buy lobster from fishers on landing beaches

RN12 – Route National 12, one of Madagascar's national roads connecting Fort Dauphin with Fianarantsoa via villages on the South East coast

Tovo – small river fish

Vahipiky – Antanosy word for the whip vine (*Flagellaria indica*) it is the most sought-after material for weaving lobster pots

Vezo - Semi-nomadic coastal fishing people of southern Madagascar

Vovo – Antanosy word for the woven pots used to catch lobsters

Zebu – Otherwise known as indicine cattle or humped cattle, it is a species of domestic cattle originating in the Indian subcontinent and found commonly across Madagascar



Image 1: Sainte Luce, a typical Anosy fishing village showing houses with *ravenala* palm roofs

Introduction

Madagascar is one of the least developed countries in the world, ranking 161/189 on the UNDP Human Development Index 2018. In the remote south-eastern Anosy region, over 80% of the population live below the global poverty line of \$1.25/day¹. Furthermore, rapid population growth of 2.8% per year² is rendering traditional income generation through subsistence agriculture and fishing increasingly inadequate and unsustainable in the face of diminishing natural resources.

Small-scale fisheries play a significant role in food security and poverty alleviation across Madagascar³, and the Anosy region is no exception, where lobster fishing is a specific focus. However, landings from these fisheries are in critical decline⁴. National lobster landings fell by more than 50% between 2006 and 2012, a situation reflected in the Anosy region⁵.

Spiny lobsters (*Panulirus spp.*) account for the majority of regional catch, inhabiting the reefs and rocky seabed along Madagascar's southern coastline. This regional stock is targeted by over 40 fishing communities along the coast of the Anosy and Tandroy regions, between Androke and Manatenina, collectively making up the Fort Dauphin regional lobster fishery⁶. This regional fishery accounts for the majority of national lobster catch and export and is worth 2.4 million USD annually⁷. As a high-value commodity, lobster fishing represents one of the most primary economic activities in the region⁶ and is a vital source of income for approximately 15,000 people⁴.

National regulation of fisheries in Madagascar is the responsibility of the Ministère des Ressources Halieutiques et de la Pêche (MRHP) with the regional arm (Directions Régionales des Ressources Halieutiques et de la Pêche (DRRHP) based in Fort Dauphin. National law relating to lobster fishing includes i) a minimum landing size (MLS) of 20cm, ii) a national closed season (January to March, inclusive), and iii) a prohibition on the landing of berried females.

SEED Madagascar (SEED) has been working in the Anosy region of Madagascar for more than 15 years across health, education, conservation and livelihoods projects. Since 2013, this work has included Project Oratsimba, a community based sustainable fishery management initiative. Project Oratsimba initially focussed on supporting the community of Sainte Luce with the development and subsequent implementation of sustainable fisheries management measures (Phase I, June 2013 – March 2014). Since 2016, Project Oratsimba has also included the neighbouring communities of Ebakika and Itapera (Phase II, October 2014 – July 2016).

This report was designed as part of an interim phase of Project Oratsimba, to provide an in-depth contextual analysis of the Sainte Luce, Ebakika and Itapera communities in order to inform the further development of Project Oratsimba during Phase III (July 2018 to March 2021).

Sainte Luce

Sainte Luce lies 35km northeast of the regional capital of Fort Dauphin and is considered a lobster fishing centre^{6, 8}. Sainte Luce is the largest and oldest lobster fishing community north of Fort Dauphin and is seen as the birthplace of this livelihood by fishers along this section of coastline. The Sainte Luce community is

comprised of three small hamlets (Ambandrika, Ampanasatomboky and Manafiafy) with a current total population of 4,800, with 850 active fishers⁹.

SEED has worked with the Sainte Luce community since 2000 and has an established Conservation Research Camp located in Ambandrika. In 2013, Project Oratsimba supported the establishment of a community-elected fisheries management committee in Sainte Luce, comprising of 15 members (five representatives from each hamlet). Key activities undertaken during Phase I included the establishment of a temporary No-Take Zone (NTZ); attending cross visits with other Locally Managed Marine Areas (LMMAs); and joining MIHARI, Madagascar's LMMA network. Phase II of Project Oratsimba saw the strengthening of LMMA structures in Sainte Luce, including capacity building of the fisheries management committee and development of community governance structures. A programme of stakeholder liaison along with various events and creation of Information Education and Communication (IEC) materials helped to further strengthen the programme in the community.

Phase II also saw the training of a community data collector in Sainte Luce tasked with recording fisheries catch and effort data on the landing beach in Manafiafy. The data collected through this programme was used to create a report analysing catch composition in terms of species and occurrence of berried females along with Catch per Unit Effort (CPUE) and associated effects of the NTZ¹⁰.

The interim phase of Project Oratsimba has seen continued support for the fisheries management committee, continued participatory data collection and the development of this report.

Ebakika

The community of Ebakika is found to the north of Sainte Luce further along the National Road No.12 (RN12) and has a current population of 4,200 and approximately 250 fishers. In Ebakika interviewees explained that local stories tell of how, in the distant past, the inhabitants of Ebakika were farmers, however cultural exchange and migration from Sainte Luce is said to have brought fishing skills and knowledge to the community.

There are five main villages that make up this community, with South Ebakika serving as its administrative centre. Elodrato is a small village that acts as the launch and landing site for fishers, with a number of fishers and their families being permanently based here. Many fishers in Ebakika travel by foot to reach Elodrato for 2 hours each way from their homes in Ebakika and Esohiy.

During the course of Project Oratsimba Phase II, SEED was approached by members of this community asking for support in establishing a fisheries management committee, as well as the mapping and marking of a NTZ. Despite the motivation and the subsequent success seen during the first NTZ opening, the community have not continued to effectively implement their NTZ, further emphasising the importance of SEED's work in Phase III.

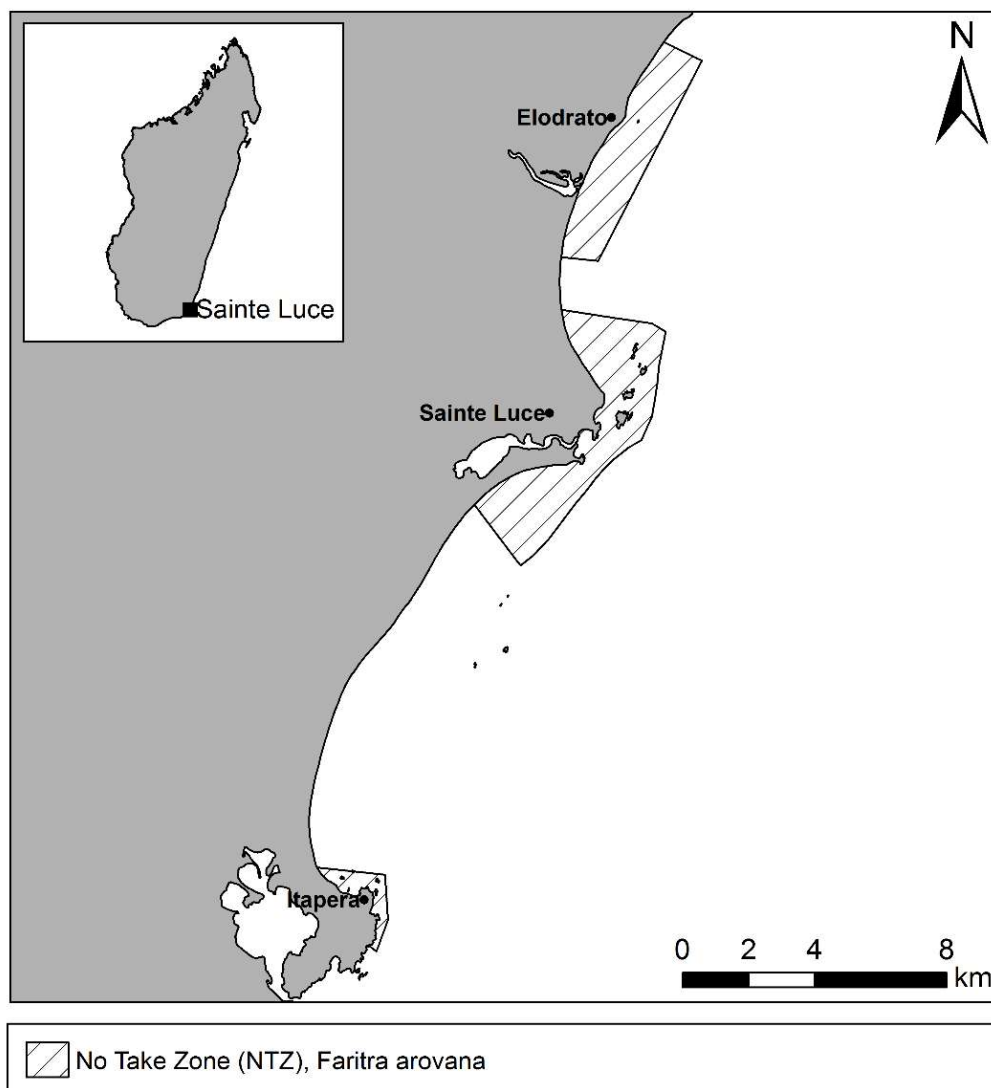
During SEED's interim phase, the project team have focussed on re-engaging community members in the wider aims of Project Oratsimba, as well as the hiring of a participatory fisheries monitoring data collector, who began collecting data in Ebakika in April 2018.

Itapera

Itapera is the smallest of the target communities, with a population of just 1,600 and approximately 100 fishers. Located south of Sainte Luce in the commune of Mandromondromotra, Itapera is smaller and more compact than the other communities, comprising of one large and densely populated village.

Itapera, although closest to Fort Dauphin, is logistically the most isolated of the three communities, being directly accessible only by foot. Reliable statistics related to poverty levels and associated health and development statistics are not currently accessible for this community. However, at face value, it seems visibly less wealthy with fewer solid wooden buildings, concrete foundations or metal roofs than Ebakika or Sainte Luce. It is also widely regarded locally as being more deprived than the other fishing communities discussed.

As with Ebakika, SEED began working in Itapera during Project Oratsimba Phase II. Since July 2017, the interim phase has seen a renewed level of communication with community leaders and fishermen, as well as the hiring of a participatory fisheries monitoring data collector, who, as in Elodrato, began collecting data in April 2018.



Map 1: Location of Ebakika (Elodrato) and Itapera in comparison with Sainte Luce, showing the No Take Zones (NTZs) mapped and marked during Project Oratsimba Phase I and II.

Methodology

The information in this report is the product of a field investigation undertaken by SEED between July 2017 and August 2018. The field study involved a series of semi-structured focus groups and interviews conducted across three target communities, where the topics in this report were broadly discussed.

Two focus groups were held in each *fokontany* consisting of older fishers (more than 20 years' experience) and younger fishers separately. Content from these focus groups then informed the interview template that was used to gather more detailed information included in this report. A minimum of 20 people in each of the target communities were interviewed, spread intentionally across a diverse range of age groups and sexes; both involved in the fishery (i.e. fishers, *rabbateurs*, *collecteurs*) and uninvolved or involved indirectly (i.e. shop keepers, fishers' wives). Fishers and non-fishers were asked the same sets of questions except where those questions were specifically about experiences of fishing, with these questions only being posed to the former. Interviewees (n=71) were selected from fishers, others involved in the fishery and those not directly involved in the fishery, from the communities that make up the Sainte Luce, Ebakika and Itapera *fokotany* (Table 1). The sex ratio of interviewees was 58:13 (male to female).

Community		Interviewees					
Fokotany	Communities within fokotany	Fisher			Non-fisher		Total
		Short term experience (15 years or less)	Medium term experience (16-30 years)	Long term experience (>30 years)	Direct involvement in fishery	Not directly involved in fishery	
Sainte Luce	Manafiafy	2	3	3	4	-	12
	Ambandrika	1	3	-	-	2	6
	Ampanasatomboky	-	1	4	1	1	7
	<i>Sainte Luce Total</i>	3	7	7	5	3	25
Itapera		6	8	3	1	3	21
Ebakika	Ebakika	5	0	3	-	2	10
	Esohihy	3	0	1	-	3	7
	Elodrato	1	4	1	2	-	8
	<i>Ebakika Total</i>	9	4	5	2	5	25
Total		18	19	15	8	11	71

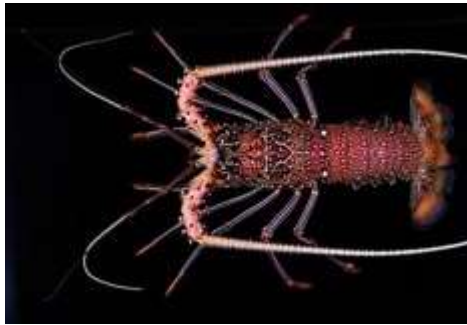
Table 1: Breakdown of interview sample groups by community

In employing this methodology, it is important to first recognise the disadvantages inherent in the use of semi-structured focus groups and interviews for data collection. The main theoretical issue comes in the form of a lack of reliability, due to the unique nature of each semi-structured interview. Whilst this represents a challenge it is also the predominant advantage to this method; the flexibility of an interview allows the researcher to re-assess the importance of different questions as the interview progresses. This is particularly true in group interviews where interactions between respondents can spark conversations into previously unaddressed topics. It should be noted that many of the topics discussed during the focus groups and interviews are dynamic, and therefore represent a picture of the context at a specific moment in time and as such can quickly become outdated.

All research and subsequent evaluation adhered to SEED's Human Research Code of Ethics.

Lobster Stock

The southeast regional lobster fishery is generally dominated by two main target species: Long-legged Spiny Lobster (*Panulirus longipes*) and Scalloped Spiny Lobster (*Panulirus homarus*). Other species from the genus *Panulirus* are also regularly caught including: Tufted Spiny Lobster (*Panulirus Penicillatus*) and Ornate Spiny Lobster (*Panulirus ornatus*). These species are sold without particular preference for any species with size being the most important factor. Slipper lobsters such as the Blunt Slipper Lobster (*Scyllarides squammosus*), Royal Spanish Lobster (*Arctides regalis*) and Sculptured Slipper Lobster (*Parribacus antarcticus*) are also caught on occasion¹¹ although it was reported amongst local fishers that some buyers offer a worse price for slipper lobsters.



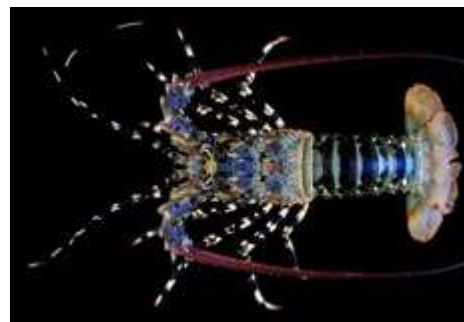
Panulirus longipes known locally as 'Oratsimba'.



Panulirus homarus known locally as 'Oramena'.



Panulirus penicillatus known locally as 'Oramety' or 'Orotronzo'.



Panulirus ornatus known locally as 'Tsitsimbola' or 'Oramanga'.



Parribacus antarcticus known locally as 'Razanora mety'



Scyllarides squammosus also known as 'Razanora mena'



Arctides regalis known locally as 'Razanora mena'

In order to assess the long-term trends in the lobster stocks, interviewers asked fishers to estimate the quantity of lobster caught kg/boat/day when they first started fishing. The start year and the prediction were then recorded. Despite obvious reservations related to the reliability of self-reported data such as this, the results where nonetheless stark, as shown in Figures 1a-d.

Each of the communities reported a statistically significant decline in catch over time, a concerning trend particularly in relation to the widely reported phenomenon of shifting baselines¹². With one generation replacing the next, perceptions of natural abundance / size of species changes in line with what was normal during people’s youth¹³. This suggests that few younger fishermen will appreciate the prior abundance or distribution of marine species now in decline. Such shifts in perception of the natural state of fisheries help to explain tolerance amongst communities to a slow but steady reduction in size and abundance of targeted species. However, there are limitations to this data; as fishers were only asked to report total catch per boat/day, the intensity of fishing effort related to number of pots deployed was not assessed. This measure is a much better indicator of Catch per Unit Effort (CPUE) and is the subject of current fisheries monitoring research carried out by SEED in collaboration with local communities, with the most recent paper on this having been compiled in early 2018¹⁰.

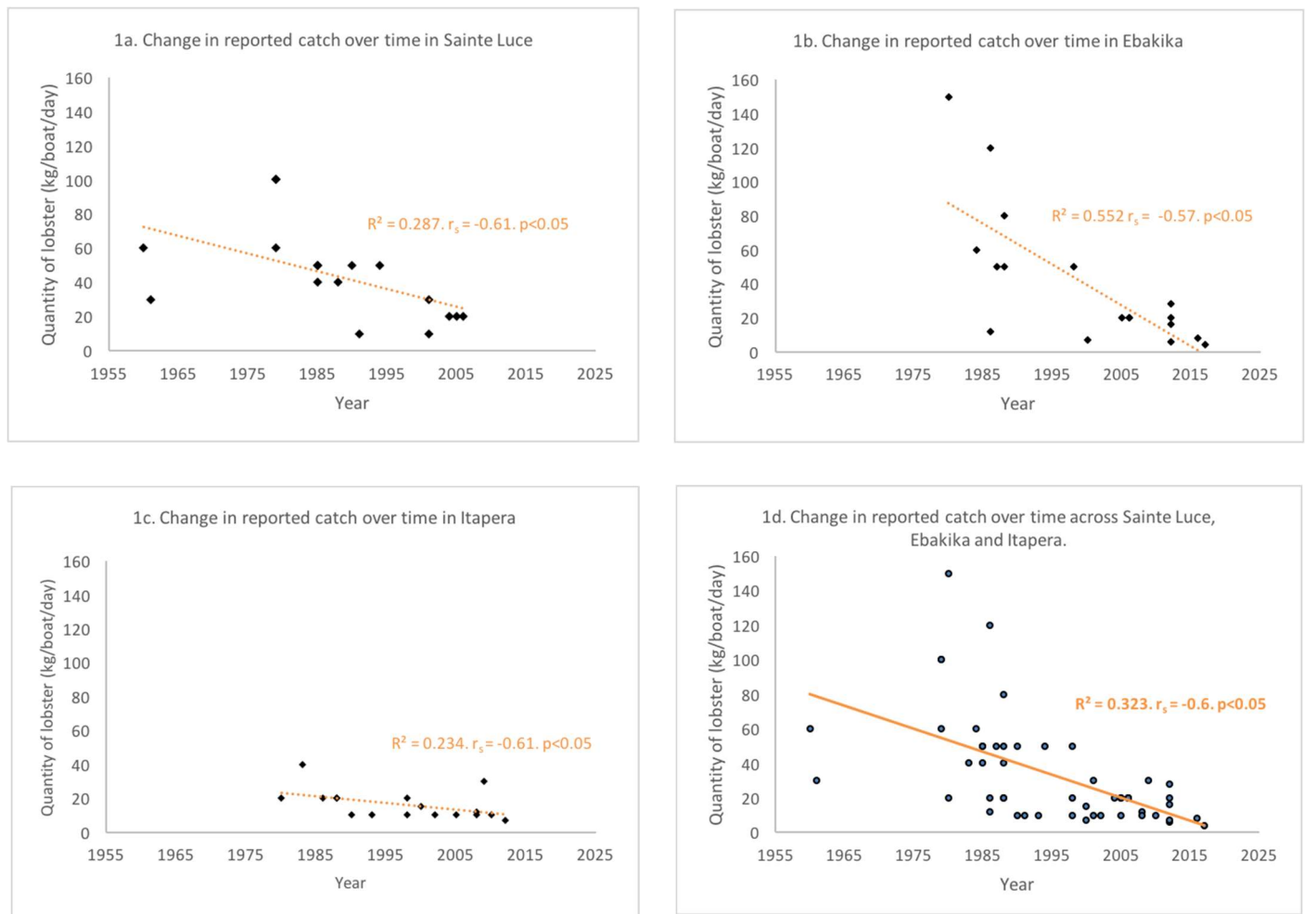


Figure 1a. Scatterplot of Sainte Luce interview respondents estimates of lobster catch per unit effort (kg/boat/day) when they first started fishing (N=17). Figure 1b. Scatterplot of Ebakika interview respondents estimates of lobster catch per unit effort (kg/boat/day) when they first started fishing (N=18). Figure 1c. Scatterplot of Itapera interview respondents estimates of lobster catch per unit effort (kg/boat/day) when they first started fishing (N=17). Figure 1d. Combined scatterplot of Sainte Luce, Ebakika and Itapera interview respondents estimates of lobster catch per unit effort (kg/boat/day) when they first started fishing (N=52).

Across each community there was an almost unanimous perception that lobster stocks have suffered a steep and severe decline within living memory. A single anomaly appeared in the data; one fisher did not report a decline in catch. This may be attributed to experience, as the respondent was a young fisher who had been fishing since 2017. He is not representative of his generation as a whole and perceptions amongst younger fishers surveyed closely mirrored those of the older generation. Amongst the older fishers, there was agreement that stocks remained relatively stable and abundant until the late 90's to early 2000's.

As Figure 2 shows, amongst the three lobster fishing communities visited there are five popularly held views as to the cause of the decline in lobster catch. The most common explanation (46% of total surveyed) was that increased fishing effort, in terms of fishers, boats and pots, was the main cause of the decline in lobster stock. It was also interesting to see that the number of fishers in Sainte Luce identifying this as the driving force behind decreased catch was higher than in either of the other communities (65%).

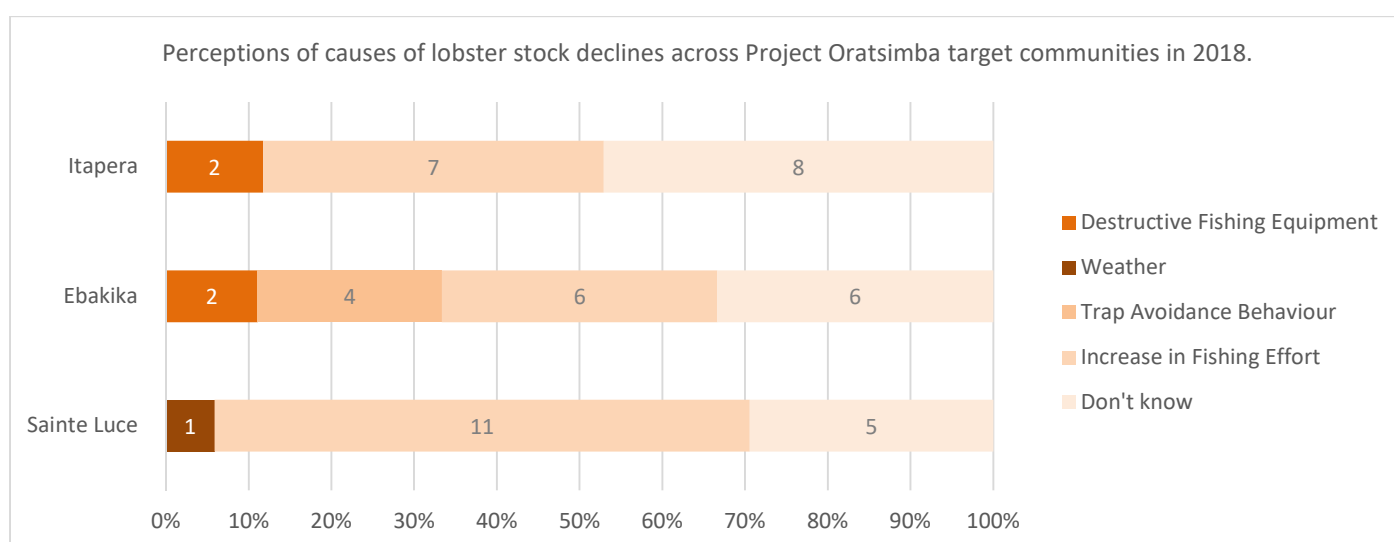


Figure 2: Responses from fishermen from three communities involved in Project Oratsimba (Sainte Luce, Ebakika & Itapera) to the question 'In your opinion, what is causing changes in lobster catch in your fishery?'.

The only community where this was not identified was in Itapera, where it was more common for people to respond 'don't know' than provide any other answer. In Ebakika and Sainte Luce, not being able to give an answer was the second most common response. That such a high proportion of fishers in each community seemed to lack knowledge of the drivers of fishery decline, or a willingness to discuss them, lends support for the need for further community-wide educational activities during Phase III.

In Ebakika, it was more common to hear fishers and non-fishers alike attributing the issue to trap avoidance behaviour. The hypothesis that lobsters have developed a learnt aversion to the pots used by local fishers, in correlation with the increased number of pots deployed on average per boat, is one that does not have support from available scientific literature. Although this claim can also not be discounted without evidence, it is a belief of particular concern if untrue. It deflects responsibility for lobster declines away from over-exploitation, widely understood to be the major driver. Furthermore, this belief could incentivise fishers to turn to alternative, more destructive trapping methods in an attempt to increase catch.

Fishing at night with snorkels and lights is a far more intensive method, which is currently only employed in Itapera, having been introduced by migrant fishers from the South East of the country. It is interesting that this community reported the most depleted stocks compared to the others, where this practice is either prohibited by local *dina* (Sainte Luce) or not currently employed (Ebakika). What is surprising is that despite this difference, during focus groups it became clear that the concept of lobster declines being caused by learnt avoidance of traps is one that is still widespread in Itapera.

'When we used to leave the pots out because of bad weather we would collect them after a few days and find dead lobster inside. Now when we collect the pots there are no lobsters but the bait has still disappeared.'

- Fisher (Itapera-48yo)

Community members also cited changes in the predictability of seasons and erratic weather as another cause of catch declines. Clear and still seas were described as the perfect conditions for lobster fishing and for catching fish. Rough seas make travelling far out to fish in the unstable local pirogues far more dangerous. Traditionally January and February are the height of cyclone season and fishing during these months is difficult. March to May have historically been considered excellent months owing to calmer sea conditions and warmer weather. June to August can also be problematic with higher risk of poor conditions. Towards the end of the year, around October and November, conditions improve once more. However, the research team heard from fishers across all three communities that this was no longer as predictable as it had been. During periods previously thought of as favourable, fishers reported reduced catch due to pot damage following unexpectedly rough seas, as well as an increased likelihood of bringing up dead lobsters in pots in these circumstances. Investigators were also told stories of sea level rise; older fishers in Itapera reported that in the 70's and 80's they would harvest mussels on foot from rocks that are now permanently submerged. Reports like this are of particular concern in light of the fact that Madagascar is considered one of the three most vulnerable countries in the world to the effects of climate change⁴. This is as a direct result of the effects of natural disasters, poverty, reliance on natural resources and a lack of capacity to adapt to these factors¹⁴.

'The seas now are much rougher than they were when I first started fishing in 1958, now you see that pots are more easily damaged as a result.'

- Fisher (Sainte Luce-73yo)

'In Elodrato the tide used to come one week from the north and then one week from the south but it's different now, it comes randomly from different directions.'

- Fisher (Elodrato-61yo)

'The winters now aren't as cold as they used to be, spells of good weather used to last for many weeks but now they are shorter and much more interspersed with poor conditions.'

- Fisher (Itapera-49yo)

Fishing Effort

Attempting to quantify fishing effort can be challenging in artisanal fisheries. Fishers interviewed in this case were asked how many pots they used per boat each day when they first started fishing and how many they are using now. As the graphs below show, the numbers of pots have been increasing steadily over the last 40 to 60 years in each of the three target communities. In Sainte Luce, the older fishermen also explained that younger fishers are fishing with longer ropes than people ever have before, claiming that fishing to 40m is becoming more common, when previously 20m was the norm.

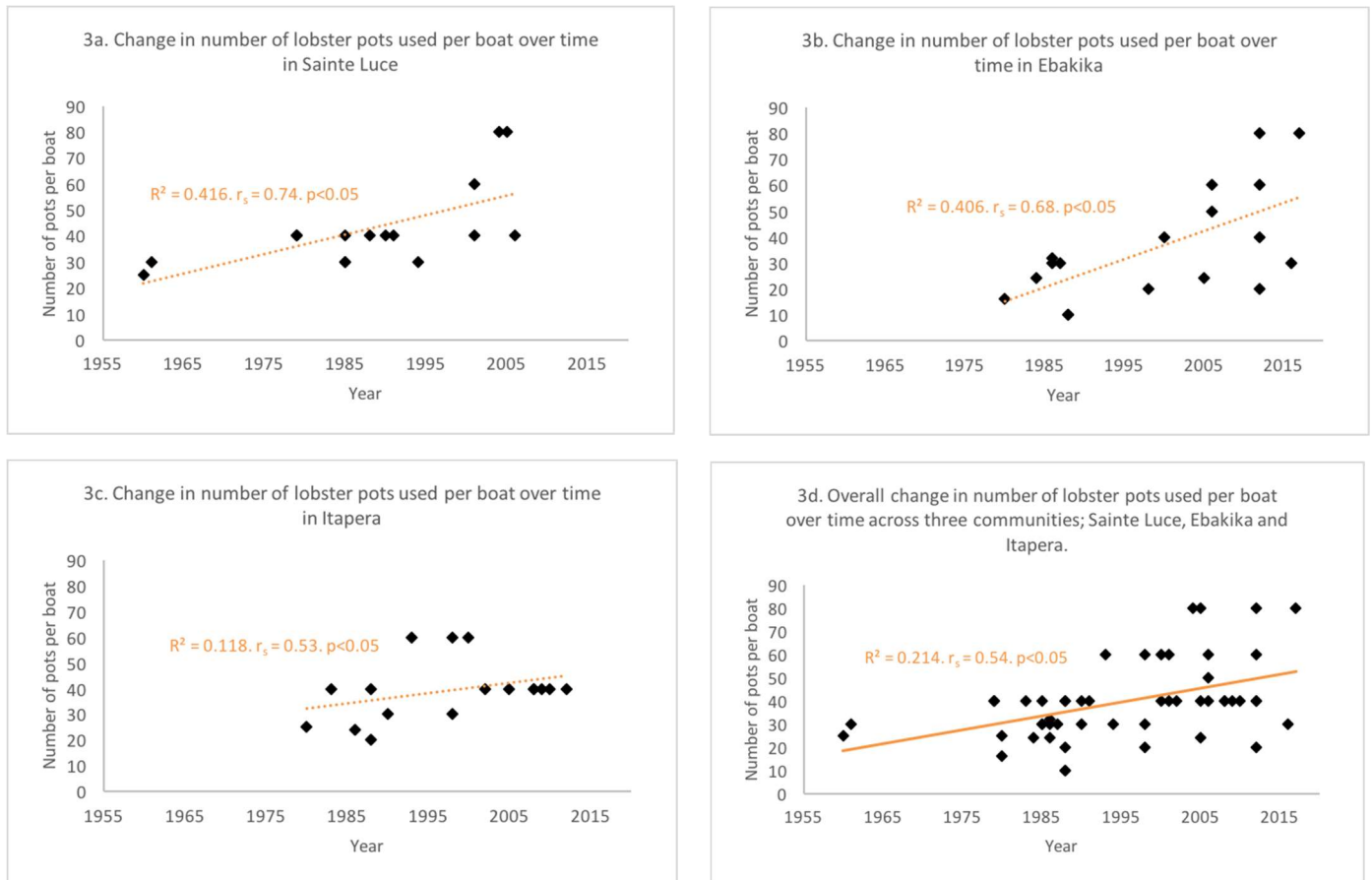


Figure 3a. Scatterplot of Sainte Luce interview respondents estimates of number of lobster pots used per boat when they first started fishing (N=17). Figure 3b. Scatterplot of Ebakika interview respondents estimates of number of lobster pots used per boat when they first started fishing, (N=18). Figure 3c. Scatterplot of Itapera interview respondents estimates of number of lobster pots used per boat when they first started fishing (N=17). Figure 3d. Scatterplot of interview respondents estimates of number of lobster pots used per boat when they first started fishing across Sainte Luce, Ebakika and Itapera, (N=52).

These increases are symptomatic of the associated decline in catch, that as lobsters become less common and more difficult to catch, fishers are required to employ greater effort to maintain catch levels. According to local communities, it is also more common to find dead lobsters washed ashore, having become trapped in discarded pots. This represents a further side effect of an increase in the use of semi-disposable pots, left on the seabed and subsequently causing further damage to populations.

Aside from lobster fishing, other fishing practices are also carried out in the three communities to different degrees and in different forms. In Sainte Luce, fishing for fish species, rather than lobster, is conducted using fishing lines rather than nets, which are prohibited under the local *dina*. This *dina* was originally

developed in 2013 during the first phase of Project Oratsimba and served to codify the existing taboos related to fishing using these methods. Masks and snorkelling equipment are also forbidden here and there is an associated fine for using either of these as well as fishing nets whilst out at sea.

As previously mentioned, lobster fishing with snorkels and night fishing with lights is currently only practised in Itapera. Attempting to catch fish at sea with nets, and lines is also common in this *fokontany*. In Ebakika it is taboo to fish with spear guns or diving equipment like masks and snorkels, although this has not been incorporated into the local *dina*, as it has in Sainte Luce. Fishing with nets is also practiced at sea, although this has only been the case for the past few years.

Fishing with mosquito nets represents an additional concern across all three *fokontany*. During interviews and focus groups, when asked about using mosquito nets, respondents were generally reluctant to discuss the topic. Communities did not seem confident in talking about the use of mosquito nets as fishing gear and clearly knew that it was considered a damaging practice. When people were willing to discuss this issue, they stated that only women are using the mosquito nets to catch small fish (*tovy*) in the river, but mosquito nets are not used to catch fish in the sea. Nets of different sizes are used, with respondents suggesting that the biggest nets are most damaging to fish numbers. However, people are reluctant to use these nets as they easily get caught and damaged by sticks and other obstructions stuck in the river bed.

In Itapera, it was explained that fishing outside of the sea happens only in the nearby saltwater estuary where men and women use mosquito nets predominantly to catch shrimp. Researchers were also told by inhabitants of Itapera that this practice reduces the shrimp population over the course of each year to the point where by November or December there are few shrimp left.



Image 2: A pirogue of fishers return from checking their shrimp nets in Itapera

Fishing Equipment

Fishers in Ebakika, Itapera, and Sainte Luce use traditional wooden pirogues (*laka antanosy*) carved from a single tree trunk and propel these using solid wooden paddles. The gear used for lobster fishing includes lobster pots (*vovo*) woven from fibres derived from a variety of plants. Bait is used to attract lobsters to the pots and most commonly takes the form of locally caught mussels, although pieces of zebu skin are sometimes also used if available. Ropes made of synthetic fibres rather than the vines or natural fibres of the past are attached from these pots to floats used to mark the location of pots. Plastic bottles are now normally used for this purpose in place of more traditional wooden floats. Weights are needed to stabilise the buoyancy of the pots. Stones are most often used with lobster pots. Fishing for fish whilst out at sea also occurs using metal hooks and nylon hand lines, with old batteries being employed as weights in this case.

Lobster Pots

Lobster pots in Sainte Luce, Ebakika and Itapera cost between 1,200Ar (\$0.36) and 2,000Ar (\$0.60) each. Pots are sometimes made by the fishermen themselves or come from a town in the mountains to the west, Andrajato Volobe. They are made from a variety of different materials¹⁵. Locally known as *vahipiky*, the whip vine (*Flagellaria indica*) is the most sought-after material for making pots as it is considered stronger and more durable than the alternatives. However, the harvesting of this vine from inland forests such as the Tsitongambarika forests (25km west of Sainte Luce) is a serious cause for concern for conservationists¹⁶.

Bamboo represents an interesting alternative material that has been the subject of previous local initiatives aiming to reduce reliance on the *vahipiky* vine¹⁷. However, some fishers suggest that bamboo could cause damage to or kill caught lobsters due to its sharp edges and a tendency to splinter.

Hiry is the local name for the Ravenala or Travellers Palm (*Ravenala madagascariensis*), another common material for making lobster pots due to its wide local availability, though the quality of these pots is lower. *Fandriky antany* is another locally available plant material derived from *Smilax anceps*. Pots made from this material are easily broken. Overall life span of a single pot can be anywhere up to a month depending on the type of material used, quality of construction and weather/sea conditions.



Image 3, left: a typical wooden pirogue, right: a typical woven lobster pot

Selling Lobster

Fishers sell their catch directly on the landing beaches in all three communities, most often this will be to *rabbateurs*. Traditionally women, the *rabbateurs* are either low waged employees or paid a small commission by *collecteurs*, private agents who buy and transport lobsters from the coast to Fort Dauphin. Each *collecteur* will have a connection to one or more of the three principle buyers of lobster based in Fort Dauphin: Madapeche (Malagasy owned); Martin Pecheur (French owned); and Chinese companies such as Matata and Samti. At the time of writing, Madapeche and Martin Pechur both offer *collecteurs* 35,000Ar/Kg of lobster, with the Chinese buyers offering 40,000Ar/Kg. According to local sources these companies will also buy lobsters that do not meet national law (i.e MLS) for 30,000Ar/kg, and the Chinese buyers will purchase lobsters of any size at the standard rate.

The perception of price differences is also a point of interest across the three communities. In Sainte Luce and Ebakika it was common to encounter the opinion that the price paid for lobster in the other community was higher despite being identical at the time of the interview. They also recognise the correct assertion that the price in Itapera is consistently higher, perhaps due jointly to its proximity to Fort Dauphin, and the scarcity of this resource in that community.

The team gained no insight during interviews into the causes of fluctuations in lobster price. *Collecteurs* decide on what price will be offered and, although mostly acting as a free market, there have been cases of price fixing, causing real tension between them and fishers.



Image 4: fishers returning to Manafiafy beach, Sainte Luce, with SEED's data collector, Kristan, waiting to record their catch

Pirogue Ownership

Pirogue ownership amongst fishers is associated with a freedom to sell catch without being restricted to a particular buyer. Fishers who own their own pirogues are able to obtain a higher price per kilogram from *collecteurs* and are not restricted to selling their catch exclusively to the owner of their pirogue. Others who fish from pirogues owned directly by *collecteurs* are obliged to sell their catch to that buyer only. When questioned on the issue of pirogue ownership, men and women across all three communities were fairly unanimous in their declaration of its benefits. Figure 4 shows the difference between numbers of pirogues owned by fishers compared to those owned by *collecteurs* in each community. As the graph shows, the majority of pirogues across each of the communities are owned by *collecteurs* rather than fishers.

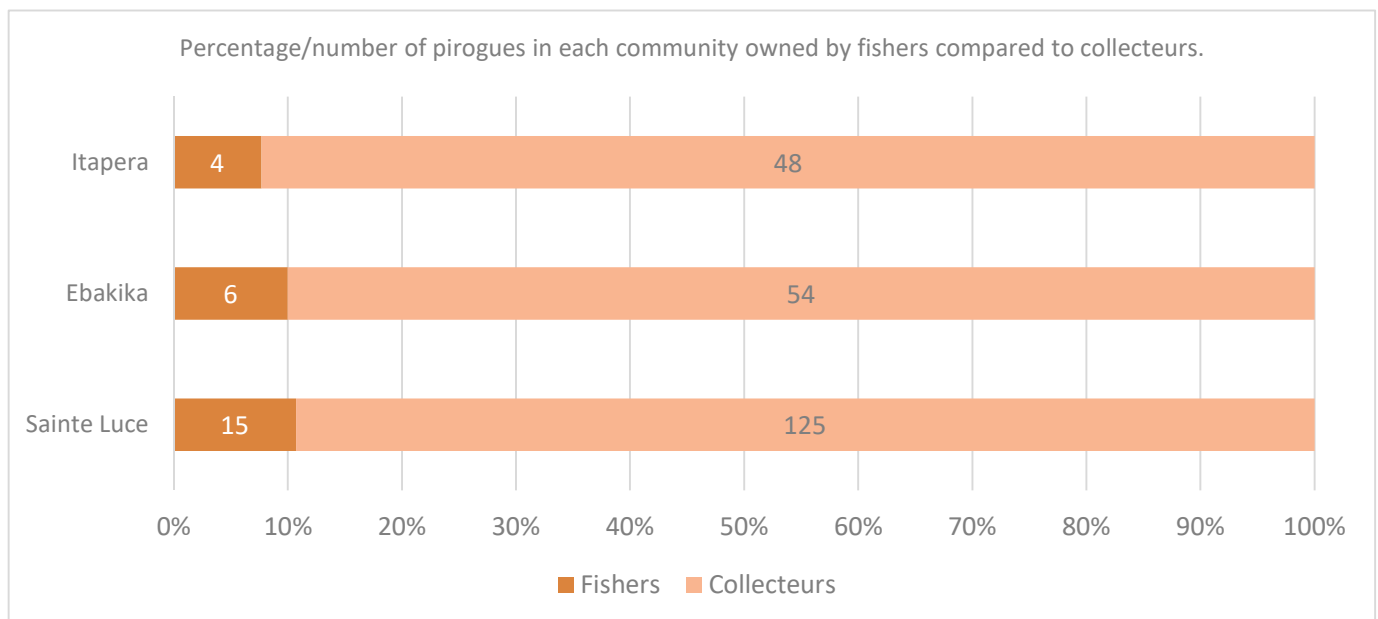


Figure 4. Comparison of pirogue ownership between fishers and *collecteurs* in Sainte Luce, Ebakika and Itapera

In the past, *collecteurs* did not provide pirogues for fishers in any of the three communities. Pirogues began being bought directly by Madapeche and Martin Pecheur in the late 1990's. *Collecteurs* who worked directly for these two companies were originally sent as representatives to buy lobsters direct from fishers on the landing beaches. Over time this has changed and companies no longer provide the pirogues directly to fishers, nor do they send contracted representatives; however, the underlying system persists. *Collecteurs* may work exclusively with one or more buyers, and it is now them who own the pirogues. This system gives fishers a weak bargaining position. They are most often obliged to sell their catch to only one buyer and if they wish to sell to someone else they need to find a space in one of their pirogues. In addition, it is easy for *collecteurs* to artificially manipulate prices, as discussed in the previous scenario in Sainte Luce at the beginning the 2018 fishing season. Previous to the fishing season opening in April 2018 *collecteurs* met and agreed a price/kg for lobster that was 25% lower than the price seen at the end of the 2017 season in the previous December. This caused outrage amongst fishermen, some of whom refused to bring the lobster in, choosing instead to keep them stored at sea in a small number of modern style lobster pots. Other fishers, unable to wait in hope of sufficient payment, undertook an 11-hour trip by sea to defy the *collecteurs* and sell their catch in Itapera. It took nearly one month until *collecteurs* decided to break the deadlock and return to offering a price consistent with that at the end of 2017. This scenario

demonstrates the real impact that market manipulation can have on fisher livelihoods whilst also demonstrating the importance of collective action in resisting this.

Fishers expressing a desire to own pirogues often cited issues around shared ownership as a reason for not doing so. Fishers would normally split the cost of a pirogue equally between the 2-5 members of their team. This would mean that they shared not only the costs of the pirogue and its maintenance but also the associated profits in terms of increased price per kg. For example, at the time of writing, in Sainte Luce lobster is bought at 22,000Ar/kg (\$6.35) from fishers using a pirogue owned by a *collecteur* compared to 25,000Ar/kg (\$7.20) from those who own their own. In order to make a commitment to buying a pirogue, fishers explained the need for their team to be likeminded and confident that they will be able to sustain an ongoing collaborative partnership. Fishers explained that until the 90's it was more common for fishers to stay in the same pirogue, working with the same team for many years but now it was not uncommon for a fisher to change teams as often as once a year due to disagreements and conflict. One fisher in Ebakika explained that each pirogue previously had a head fisher who organised the team and made decisions about where to fish each day, as well as delegate tasks such as making pots and undertaking repairs. This pirogue structure is far less common now and certainly less formalised.

Owning a pirogue also comes with additional costs; should the pirogue require repairs to be made the owner is the one responsible for paying for these. This means that *collecteurs* are responsible for the maintenance of pirogues as a part of their arrangement with fishers. However, it was also reported that this is sometimes not true in practice, with fishers in this position being left to shoulder the cost.

In the past, fishers in Sainte Luce and Ebakika built their pirogues with locally-sourced materials. Large trees with thick trunks are needed to construct a good quality pirogue and it is much harder to find these nearby. Most often, pirogues are sourced from further away, with buyers needing to travel at least 100km to purchase the necessary timber at a minimum price of 500,000Ar (\$145 at the time of writing).

In addition to difficulties in achieving consensus and sourcing new pirogues, fishers who own their own pirogues do not have the facilities to store or transport the lobster they still need to sell quickly to a *collecteur*. As such, this means that they are still subject to the same type of collected effort from *collecteurs* to reduce the price of lobster.

'Fishing for lobster is a job for stupid people. You work long and hard and then you can't decide the price. People dictate the price to us as they own the pirogues and we have to accept it.'

- Fisher (Sainte Luce—25yo)

'Owning a pirogue here is like owning a camera for you it is a big expense but if you can afford it then of course it is worth it. You add the cost of upkeep to the running cost and make sure you have the extra money to cover this. Doing this allows you the freedom to pursue your livelihood in the way that owning a pirogue allows us more freedom to pursue ours.'

- Fisher (Ebakika—64yo)

Livelihoods

Aside from the fishing activities discussed here, the other principal livelihoods are fairly similar across the three communities. The farming of cassava, a staple crop in the area, was almost universally identified as an additional principal livelihood activity amongst men. Similarly, weaving of products made from *mahampy* reeds (*Lepironia mucronata*) was acknowledged as the primary livelihood activity for women.

Seemingly the most agriculturally experienced community is Ebakika, perhaps unsurprising due to its comparatively more inland location and consistent with the local narrative of a traditionally subsistence farming community. A wider variety of crops is reported to be grown in Ebakika, including rice, sweet potatoes, pumpkins, ground nuts and salads. In addition to farming activities, there are also employment opportunities with work on the reconstruction of the RN12. Since 2015 the section of this road that runs from North Ebakika to Manantenina has been of focus for these works and provides employment for hundreds of men and women from the surrounding communities, including Ebakika.

Sainte Luce has minimal agricultural activity beyond cassava and some rice farming. The main alternative livelihoods in this community revolve around the international organisations that operate in the area; livelihoods projects run by SEED, including Project Stitch (a women's embroidery cooperative) and Project Renitantly (a beekeeping training project), directly provide improved livelihood opportunities for over 100 community members¹⁷. SEED's research camp and the high-end Manafiafy Eco-Lodge regularly bring tourists and volunteers to the area and subsequently create a demand for cooks, cleaners, guards and guides.

In Itapera the only other alternatives to the farming, fishing and weaving livelihood activities comes from cutting and selling firewood in villages along the main road connecting Itapera with the RN12.



Image 5: weavers harvesting *mahampy* reeds in swamps surrounding the remaining littoral forest fragments

Household Finances

The system of household financial management in this region of Madagascar is complex. Despite operating within a predominantly patriarchal system, the majority of household finances are controlled centrally by the woman of the house. In essence, it is the man's responsibility to pay his wife enough money from his earnings to buy food, maintain the house and look after the children. Once that money has been given, the man no longer has any control over it. However, any money on top of that, which is given by the man to his wife, belongs to the husband and can be spent as he likes.

In order to gain an alternative insight into the thinking and motivations of local people in relation to financial management, the team asked the following hypothetical question during interviews with fishers, non-fishers and women: *If you were to earn an extra 100,000Ar (\$30) tomorrow how would you spend that money?* This question was then repeated at 500,000Ar (\$145) and 1,000,000Ar (\$290).

Bearing in mind that current average GDP per capita is around 1,400,000Ar (\$400) in Madagascar¹⁸, the various responses received provide an interesting insight into the fisher's financial priorities and, with further development, could provide a useful tool to better understand how communities act during income peaks and troughs. Presented below are examples that demonstrate the range of answers given.

100,000Ar

'70,000Ar on lobster pots and ropes, save the rest for a later date.'

- Fisher (Itapera-30yo)

'I would send my kids to school in Mahatalaky [biggest local town]. If I need money for equipment, then I would spend some on fishing gear.'

- Fisher (Ebakika-32yo)

'Not enough for a zebu, would buy food and a big cooking pot'

- Fisher (Ste Luce-41yo)

'Send the kids to school. School equipment, fees and uniforms. What is left I would use to buy something that I want and that I am envious of.'

- Male shop keeper (Ebakika-44yo)

'Spend the money on food. My kids are big enough to buy their own clothes and I only have a few grandchildren to support.'

- Retired fisher (Ebakika-61yo)

500,000Ar

'Would buy a zebu, this wouldn't be quite enough so would need to advance on some of it and then pay the rest later. Zebu is our bank. Or build a strong house.'

- Fisher (Itapera-28yo)

'If I can get a zebu I will buy one as that is the status symbol. I wouldn't be able to build a house for that.'

- Farmer (Ste Luce-57yo)

'100-200,000Ar on fishing expenses, materials and bait. 10,000 on rice and meat. Shovels for farming and save some for family health expenses. Keep the rest for the bad weather.'

- Fisher (Ebakika-39yo)

'3kg of zebu meat to celebrate, 20,000Ar on rum. Use the rest of the money to buy something you need for the house like wood and then the rest towards a zebu.'

- Fisher (Itapera-46)

500,000Ar (cont'd)

'Fuel for light, 400,000Ar would go towards a zebu. Zebu is like a bank and we need to save this money.'

- Rabbateur (Ste Luce-49yo)

'Spend some on school fees and equipment, then put some towards the costs of household (food and fuel). Then I would buy a big cooking pot and anything left would go towards a zebu.'

- Woman (Ste Luce-26yo)

'Doesn't have any children so would spend the money paying someone to help him with farming.' –

- Farmer (Ebakika-58yo)

1,000,000Ar

'Fishing materials and the rest towards a 'falafa' [Ravenala palm roof for the house]. I want to repair the house as it is leaking.'

- Fisher (Itapera-30yo)

'Have to buy zebu, the rest of the money would go to other things in the house. Would try to keep some money in case one of the family is sick.'

- Fisher (Ste Luce-40yo)

'Pay to build a stronger house, the village is getting more and more developed and a strong house for your family is the most important thing.'

- Mahampy weaver (Ebakika-36yo)

The above question yielded a broad range of responses across different amounts. Whilst the variation in answers is interesting in itself, there were certain recurring themes seen across the communities. The importance of *zebu* ownership is clear with this being taken into consideration in many of the replies. *Zebu* play a central role in Malagasy culture, being a powerful symbol of status and wealth. The idea of *zebu* ownership as a proxy for increased social standing was commonly encountered in interviews. So too was the concept that, in rural communities, *zebu* act as an effective way of storing and protecting acquired wealth for a later date or future expense.

Educational expenses also featured highly in responses, with school fees, uniforms, travel expenses and school supplies all being mentioned regularly by interviewees. Household expenses like food and fuel, along with capital items like a new roof or cooking pot, were also common to hear as was the construction of a new, sturdier house especially when discussing how to use 1 million Ariary.

As well as adding to understanding of the cultural context in which Oratsimba operates this exercise can be used to inform future project activities. Community financial management training planned for the project Phase III should take into account the trends identified through this exercise and aim to appreciate the diversity of financial concerns faced by members of these communities.

Migrant Fishers

It is easy to treat groups of artisanal fishers as homogenous entities; however, they are often separated along a number of lines. In terms of fishing, types of fishing gear, target species or engagement in alternative livelihoods can be sources of division. Identification as a resident or migrant between fishers can also be a source of disunity. Whereas migrants might tend to perceive fishing grounds as open access, residents tend to perceive the seas near their community as community property which should be under the control of community elders²⁰. As such, the prevalence of migration and associated issues were of particular interest to investigators and were discussed in focus groups and through interviews with community members.

The definition and prevalence of migrant fishers varied significantly between Sainte Luce, Ebakika and Itapera. In Sainte Luce and Itapera there are fishers who have arrived from regions of Madagascar beyond Anosy, and people clearly identify these as migrants. In addition, some fishers from other areas of Anosy, near and far, are also considered migrants.

In Ebakika, fishers from the village of Ambanihazo, 3km up the coast, were described as migrants as they travel down the coast in their pirogues towards the seas around Elodrato to fish for lobster. Aside from this, respondents in Ebakika reported no current trend of fisher migration to the area. Reports were repeatedly made that migrant fishers from Tulear used to regularly come to fish from the beach at Elodrato, substantiated by a paper detailing the presence of *Vezo* fishers in Elodrato in 2001²¹. These migrants were not looking for lobster but targeting marine megafauna like sharks and turtles. The migrants were fishing using spears and nets and the local people stated that this caused the local wildlife to become flighty and more difficult to catch. When people were asked about how they felt towards these migrants coming to Ebakika the reaction was generally neutral. Some individuals looked favourably on the presence of these fishers, referring to an abundance of cheap meat at that time.

In Sainte Luce, migrant fishers come from other southern regions including Tandroy, Atsimo-Andrefana and Atsimo-Atsinanana to fish for lobster and fish. The local population generally do not take issue with their presence in Sainte Luce, particularly as many are relatives of fishers already living in the area. However, there were reported cases of migrants using fishing gear that is prohibited under the *dina*. For example, some migrant fishers have been caught fishing at night using torches wrapped inside condoms and snorkelling gear.

The community where migrants seem to be causing the most tension is Itapera. Disunity in this community is characterised by disagreements between residents and migrants in terms of fishing gear used and designation of rights over fishing grounds. Here, *Vezo* fishers coming from the western regions of Ranopiso and Tulear, have been present since at least 2001 and possibly as far back as the 1970's²¹. They brought with them diving equipment (masks, snorkels and spears) and *jarify* (coastal gill nets to fish for turtles and sharks), and have since become involved in lobster fishing.

Fishers' Associations

Fishers' associations can play an integral role in artisanal fisheries, supporting fisher representation and improving fisheries livelihoods. Activities can include supporting community fishers' co-operatives and the supply of inputs such as credits, fishing equipment, and expertise for these groups. Reported as early as 2014, the fishers' associations previously set up in the communities discussed here are often characterised as existing more as legal entities than as functioning community bodies²².

Community members from across all three communities were asked to discuss their understanding of the function of a fishers' association, the history within their villages and for any thoughts on the importance of a formalised membership system. It became clear that in all three communities there was a history of fishers' associations having been set up in the past, often in collaboration with International NGO's. In Ebakika for example, French development organisation Appui au Renforcement des Organisations Professionnelles et aux services Agricoles (AROPA) ran a project to set up such associations, but despite initial efforts did not complete the process. Also of interest is the now inoperative fishers' association set up in the early 2000's in Sainte Luce to claim funding from the World Bank's Programme Sociale de Développement Rural (PSDR)²².

Despite this history, there are currently no active fishers' associations in the three communities. The majority of respondents identified access to material support as the primary benefit of an association. As part of Aropa's work in Ebakika, it was agreed that the cost of fishing materials bought by the association would be matched by the NGO. Community members in Itapera also referred to a fishers' association previously set up in order to apply for funding for fishing gear. As part of this, the community were able to obtain a number of *lakambezo* boats, a larger type of pirogue used in western regions with outriggers for greater stability. Respondents also described associations as a positive influence within the community through providing a source of solidarity for fishers and the community as a whole. It was also reported that through such structures it is possible to save money as a cooperative and use this to buy fishing equipment. Despite these positive reports, membership fees and financial contributions were repeatedly reported as the primary barrier to the success of fishers' associations.

'Being a member of a fishers' association is good for solidarity, it will also help us to access donors and ask for support, then we can get new pirogues and ropes. The problem with joining an association is that they always ask for a contribution. We are too poor to afford to contribute to this.'

- Fisher (Ebakika-22yo)

Support for LMMAs

As Project Oratsimba enters Phase III, the question of ongoing support for the LMMA approach amongst the three target communities is particularly important. As such, people were asked during interviews whether they were for or against the establishment of an LMMA and subsequent NTZ closures (see figure 5). In both Sainte Luce and Ebakika, the areas where LMMA structures have previously been most active, there was majority support from local people for the continuation of this approach. In Itapera however, where these ideas have previously struggled to gain traction, there was a negative outlook.

'The NTZ was really good but jeopardised the relationship between fishers. Some people liked the idea of the NTZ and others didn't. This put family against family and caused tensions.'

- Farmer (Ebakika-55yo)

This analysis provides a definitive insight into the need for a separate approach in Itapera compared with Sainte Luce and Ebakika. Further efforts in this community should aim to provide local people with evidence of the effectiveness of the LMMA approach both in terms of the scientific data and first-hand accounts from those positively affected in other lobster fishing areas and further afield.

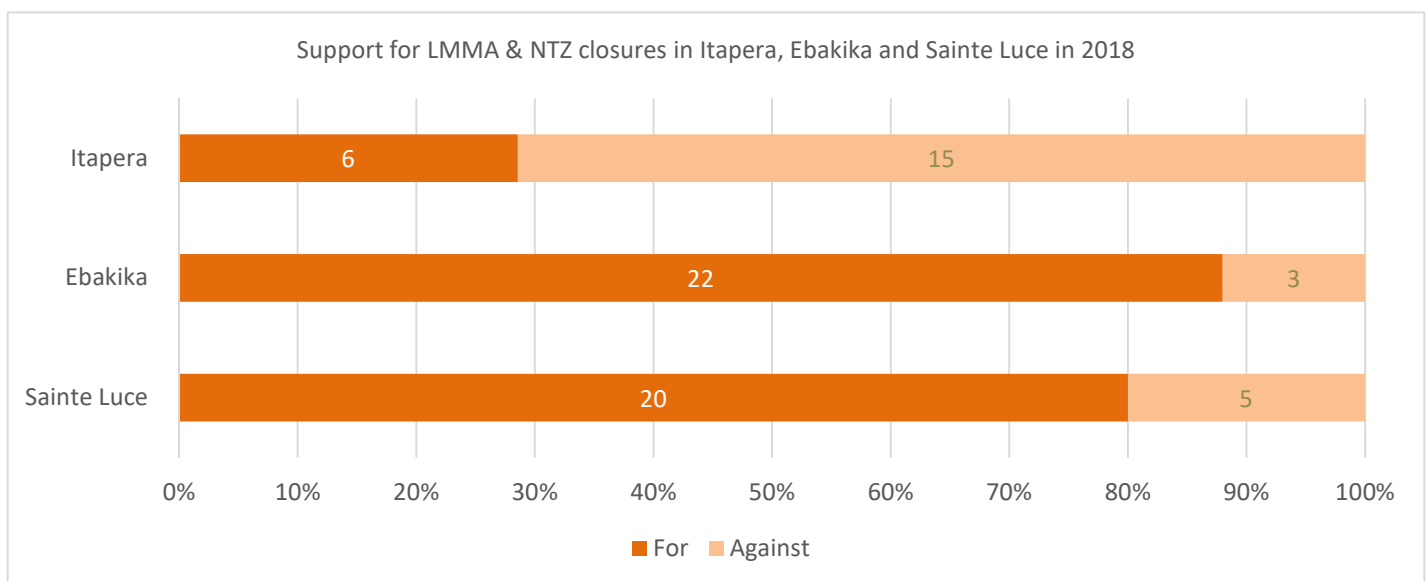


Figure 5. Percentage/number of interviewees who support the LMMA/NTZ amongst interviewees in Sainte Luce, Ebakika and Itapera

Recommendations for Project Oratsimba Phase III

In order to ensure continued support for Project Oratsimba during Phase III, SEED must ensure that available evidence, such as that generated through this report, is used effectively to further develop project planning and implementation. A number of general conclusions along with those specific to individual communities can be drawn from the investigations undertaken in creating this report:

Lobster Stock & Fishing Effort

Fisher perceptions on the decline in lobster stock and increase in fisher/pot numbers in each community form an important contextual foundation for improved fisheries management initiatives. Throughout Phase III, the project team should continue to monitor community-level perceptions, alongside the analysis of data from SEED's ongoing participatory fisheries monitoring programme, now active across all three communities. Analysis of findings should regularly be fed back to fishers and community members, as well as local and regional stakeholders, to ensure a unified approach to informed and effective fisheries management across the region. Contextually-appropriate information dissemination approaches should be a priority for the project team at all times, with particular attention paid to language barriers, illiteracy, innumeracy and accessibility of information.

Fisheries Management & Support for LMMAs

Findings from this report clearly demonstrate the markedly distinct operating context for fishers across the three target communities, in particular: current fisheries management *dina*; usage and prohibition of fishing gear; migrant fishers; perceptions of fishers' associations; and support for periodic NTZs. The project team should ensure a tailored, contextually-specific approach is taken when working within each community, and take care to maintain a community-led, collaborative approach at all times. Phase III activities relating to engagement with MIHARI (Madagascar's LMMA network), fishers cross visit to Blue Ventures' Velondraike project and fisher cross visits between target communities should help support each community to develop the most viable community-led management measures. All three communities face some resistance to LMMA initiatives, in particular in Itapera, which is likely to cause challenges for the development of community-led fisheries management structures. The project team should ensure they remain aware of, and sensitive to, attitudes within each community and continue to prioritise the building of trust and collaborative partnerships to work towards the objectives for Phase III.

The data collected for the preparation of this report touches briefly on fisheries governance systems currently in place, but more information is required to support the project team's work in engaging wider stakeholders in Phase III activities. To this end, from October 2018, SEED will partner with University College London to undertake a Marine Protected Area Governance (MPAG) analysis. This analysis aims to provide a crucial insight into the balance between the varied governance systems in these three communities – crucially, the state (government and regulatory agencies), the market (markets and economic systems) and civil society (people, social networks and related organizations). Alongside this report, the conclusions and recommendations made following the MPAG analysis will further inform the development and implementation of Phase III.

Livelihoods & Financial Management

Additional contextually-specific variations between target communities have become clear through this report, particularly with regards to income-generating activities and financial management systems. Communities differ significantly in access to additional livelihood activities beyond subsistence fishing and *mahampy* weaving. While Sainte Luce has access to the widest range of income generating activities, these are still extremely limited. The serious lack of alternatives for community members in Itapera is particularly concerning, with the unsustainable logging reported as the only real additional activity to fishing. Although not within the prescribed remit of Project Oratsimba, SEED's Sustainable Livelihoods team should consider where other projects can help to build livelihood opportunities in these communities. The team should also ensure they continue to build and maintain relationships with the range of organisations operating in the Anosy region to identify areas for collaboration and/or additional support for target communities.

Financial management training is a key component of Phase III's community-level capacity building sessions. The project team should ensure the contextual complexities of household financial management are both fully understood, and effectively built in to training content.

Community Engagement & Capacity Building

The clear contextual variations between each community must also be taken into account with regards to community engagement and capacity building activities during Phase III. With each community reporting different levels of support for LMMA measures, the project team must ensure a tailored approach is taken in effectively and appropriately disseminating key project messages with the aim of building further support for sustainable fisheries management. Capacity building and education initiatives should cover the range of topics relevant to building the foundation of knowledge needed for informed, community-led decision making. A key example of the importance of a focus on education and knowledge increase can be seen from the perceptions of the cause in decline of lobster catch: respondents in Sainte Luce, where Project Oratsimba has been active for the longest, were significantly more confident and informed in their responses. Implementing a robust monitoring, evaluation and learning framework that incorporates changes in knowledge, attitudes and practices over the project duration will be particularly important for the project team's ability to continually respond to needs on the ground.

Further care must be taken by the project team to ensure SEED takes an equitable approach to community engagement. In both Ebakika and Itapera, where SEED's presence is relatively new, there were reports of community conflict where individuals felt disenfranchised by NGO projects working only with select groups of community members (established committees or community leaders, for example). During Phase III, it will likely be beneficial for the project team to visit communities informally for one-to-one conversations with a range of different community members before big decision-making events.

Value chain development

Further work will also be required to look at the market structures currently in existence in the three communities. The project team should work with fishers to determine contextually-appropriate structures that prevent i) artificially low prices being set ii) provide fishers with more autonomy and iii) ensure equitable benefits for fishers.

Through project activities phase III aims to engage stakeholders throughout the existing value chain. Whilst the MPAG analysis will help determine the attitudes and priorities across a range of private sector actors and government authorities, the project team should work towards bridging the gap between the artisanal fishers at the bottom of the value chain and the export companies at the top. Significant focus should be placed on facilitating site visits and knowledge sharing opportunities with fishers, community leaders, *collecteurs*, *rabbateurs*, export companies and regional government officials.

Conclusion & Acknowledgements

The process of collection and analysing the information gathered for this report has both helped support the development (and subsequent funding of) Project Oratsimba Phase III, the largest Phase of the project to date, and to build vital contextual understanding within the Project Oratsimba team. The clear differences across each community present a unique set of challenges for the project and will require careful consideration for the duration of Phase III. The findings of this report, alongside the MPAG analysis and past project learning, will form the spring-board for project implementation until March 2021, and will contribute significantly to SEED's ability to measure change at a community level during this time.

This report has been produced thanks to the generous support of Blue Ventures. Their ongoing support and collaboration has been vital to the success of SEED's sustainable fisheries management work. Special thanks must also go to the communities of the Anosy region where the Project Oratsimba team has had the privilege of working for over five years.

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