Dugongs for Life: Incentivising Malagasy Communities for Marine Ecosystem Stewardship

Final Report 2017
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6. Names of any institutions involved in organising the project or participating
   - Madagascar National Parks Nosy Hara
   - University of Antsiranana

7. The Project Overall Aim : **Local communities incentivised to sustainably use marine resources and conserve endangered species in Nosy Hara Marine Park**

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Section 1:

Summary

The overall goal of this project was for ‘effective marine protected area management in Madagascar embracing ongoing community involvement secured in the long-term’ and this has certainly been achieved in Nosy Hara Marine Park. The purpose of the project was more specifically to incentivize local communities to sustainably use marine resources and conserve endangered marine species in Nosy Hara Marine Park and we can confidently say that there has been a shift in attitude and behaviour towards sustainable management following heightened understanding, involvement and empowerment of the communities we work with. At 100% of our surveys sites we have now found no infractions of marine park regulations including no use of illegal fishing methods, no dugong or sea turtle bycatch or hunting and no shark finning. In terms of livelihoods, there are now two duck farms, an ecotourism restaurant and a poultry farm all run by community associations. This has led to the first introduced alternative means of income generation for families previously dependent on fisheries. More importantly our environmental stewardship model, pioneered during this project is being promoted throughout Madagascar where it will extend to three additional key biodiversity areas from 2017 and our model is being promoted globally via the GEF Dugong and Seagrass Project).

Introduction

Our team has been working permanently in the Nosy Hara Marine Park since the completion of our CLP-funded Dugongs Without Borders project in 2010. We have an intimate knowledge of the challenges faced by the communities and Madagascar National Parks in reaching an agreeable balance between resource exploitation, endangered species conservation and improvement in people’s everyday lives. This project built on five years of research and conservation activities and used an innovative incentivised approach to ensure marine biodiversity was safeguarded whilst simultaneously improving people’s quality of life.

Located in north-west Madagascar, the incredible Nosy Hara archipelago, of international conservation significance, consists of nearly 20 small coral islands inhabited by various unique birds, reptiles, plants and insects and providing critical sea turtle nesting habitat. Dugongs frequent the area to feed and reproduce. The Park’s diverse coastal habitats include coral reefs, rocky shores, beaches, mangroves and seagrass beds which support vital fisheries and internationally significant biodiversity and endangered species.

This project has ensured the protection of endangered species including the dugong, *Dugong dugon*, which is listed as Vulnerable to extinction worldwide but is critically endangered in the western Indian Ocean (the largest known population numbering only 200-300 individuals in Mozambique). The project has also protected nesting beaches and foraging habitats and eliminated poaching of sea turtles; the Green turtle (*Chelonia mydas*) EN, Hawksbill Turtle (*Eretmochelys imbricata*) CR, Loggerhead turtle (*Caretta caretta*) EN, Leatherback turtle (*Dermochelys coriacea*) CR and the Olive Ridley Turtle (*Lepidochelys olivacea*) VU.
Furthermore various fish species, including the Scalloped Hammerhead (*Sphyrna lewini*) EN, Great White Shark (*Carcharodon carcharias*) VU, Tawny Nurse Shark (*Nebrius ferrugineus*) VU and Whale Shark (*Rhincodon typus*) VU have all benefited from the awareness raising and fisheries monitoring components of this project.

Our main partners in implementing the project have been (in order of importance):

- **Madagascar National Parks** – in charge of Park management and coordinates all ongoing research, conservation, monitoring and management activities within its boundaries. (we have a signed MoU)
- **Women's associations** – involved in livelihood development and management
- **Local Community Steering committees** (*Comite Local de Pilotage*) – this committee comprises community members from each of the 20 villages situated within the Park. C3 also stands on the committee as does MNP. The committee represents the views of the communities and acts as a means of communication between the Park authorities, NGOs and other external entitites and the local populations.
- **University of Antsiranana** – please add their roles on the project for all listed in yellow
  - Development of research projects, training materials, supervision and field placement options for first-cycle and third cycle students. The training is part of the collaboration between C3 and the University of Antsiranana in order to strengthen students’ ability to conserve marine and coastal biodiversity, formally known as the ‘Coastal Academy’.
- **CISCO** – We also have a MoU with CISCO which is the national educational authority of the Ministry of Education. Our MoU includes a commitment to development of the youth environmental education materials and teacher capacity building (Junior Ecoguard Manuel, Implementation of 50 Juniors Ecogardes on 2015 and Teacher Training convention on 2016)
- **DREN the regional educational authority for Diana province** - Facilitate the signature of MOU with Ministry of Environment and C3,
- **Ministry of Environment**: The MEEF was mandated to maintain the integrity of Madagascar’s unique and rich biodiversity when the National Strategy for Sustainable Management of Biodiversity was adopted. The Ministry of the Environment is the national focal point for the CMS (Convention on Migratory Species) in Madagascar. The CMS focal point will be assisted by two experts; the CMS, working with C3, led the partners to the protection of migratory species in Madagascar. An agreement of collaboration was established between the three main cooperating institutions Department of Environment (MEEF), the NH-MNP and the C3 at the beginning of the project, conservation of Turtles. The Ministry of environment is in charge of the delivery of Research permit for the Ecological Survey within the Parks.
- **Ministry of Education** our work within schools and training of teachers is formally approved by the government under an MoU
- **Ministry of Fisheries**: Government entity in charge of management of halieutic resources and fisheries, The project collaborated with the Department of Fisheries to manage fishing activities in the park, particularly with the migration of traditional fishers
Figure 1: Map showing the boundaries of Nosy Hara Marine Park, northwest Madagascar
Project members

**Team leader : Ms. Lalarisoa Rakotoarimino (38)** – Masters degree in Environmental Management, 4 years working as Programme Coordinator for C3 Madagascar, Ten years work experience in the NGO sector in Madagascar. Lala coordinated the team from our Antanananrivo (capital) office

**Team member : Tahiry Randrianjafimanana (30)** – Bachelors degree in Marine Ecology, 4 years work experience as Programme Officer with C3 Madagascar, one year experience in aquaculture business. Tahiry managed all aspects of the field team.

**Team member : Anwar Salimo Benjoma (32)** – Bachelor of Environmental Science. Has worked as a Programme Officer for 4 years for C3 Madagascar and assisted on the Dugongs Without Borders project. Anwar is from the locality and is the key communications and outreach person for the communities.

**Team member (part-time) Anatoli Velondia Altobelli (28)** – 3 years undergraduate studies in Science (not yet graduated) and assisted with the Dugongs without Borders project. Focused on fisheries monitoring.

**Team member (part-time) Antonio Harilala (27)** – participated in Dugongs without Borders. Bachelors degree in Environmental Science. Was trained in fisheries monitoring and conducted it for over 4 months previously in Nosy Hara with C3. From the region.

**Technical advisor Patricia Davis (39)** – was involved since Dugongs without Borders in 2009 in coordinating research on dugongs and sea turtles in Nosy Hara Marine Park. Expertise in all aspects of project management.

**Technical advisor Chris Poonian (39)** - Sociocultural evaluations of natural resources Small-scale tropical fisheries evaluation and management. Coral reef damage assessment and valuation Marine habitat survey and mapping
Section 2:

Aim and objectives

The aim of the project was to achieve the following outcome: 
*Local communities incentivized to sustainably use marine resources and conserve endangered marine species in Nosy Hara Marine Park*

These were the main objectives:

1. Collect ecological data (20 sites) and socioeconomic data (100 households) on marine ecosystems and resources in Nosy Hara and update and implement the management plan
2. To build capacity for marine resource management amongst local communities (10 Conservation Ambassadors), management bodies (6 MNP rangers) and higher education (10 University students)
3. To train a team of 50 Junior Ecoguards, hold quarterly awareness events and produce and informative video about Nosy Hara Marine Park and its valuable marine resources
4. Develop 3 alternative livelihood cooperatives and provide services (schooling, healthcare and sanitation) with provision of benefits tied to good environmental stewardship

Methodology

The first step was to identify indicators for our project to check that we achieved what we set out to do. This took some time for the team to decide on at the start as they had to be SMART and in fact we could not settle on 10 but chose 11.

INDICATORS

- Maintenance or increase in live coral cover
- Maintenance or increase in seagrass cover
- Reduction to zero of mangrove exploitation at selected sites
- Reduction to zero of dugong mortality at selected sites
- Reduction to zero of sea turtle mortality at selected sites
- Reduction to zero of sharkfinning at selected sites.
- Reduction to zero of use of gillnets
- More than 5% of population using marine resources offered an alternative non-marine based livelihood
- 100% of population in main town and surrounding area of the Park able to access fresh drinking water
- 100% of schools provided with environmental teaching resources and 40 teachers trained in environmental education
1. **Ecological & socio-economic data methods** –

1.1 **Seagrass surveys** – in key dugong habitat identified by previous questionnaire surveys in Dugongs without Borders, long-term monitoring sites were selected which were easily accessible on foot at low tide so that community members could participate and long-term costs minimised. Permanent monitoring stations were set up close to the villages of Lakandaka, Vahilava and Ironona where beds could be accessed on foot at low tide to facilitate ease of community monitoring. SeagrassWatch methodology was used to record species presence, abundance and diversity (can be downloaded at [http://www.seagrasswatch.org/manuals.html](http://www.seagrasswatch.org/manuals.html)).

Eight surveyors, C3 Staff, Conservation Ambassadors and Madagascar National Parks staff were trained and surveys were arranged based on low tides in the dry season. We had to translate the data sheet in Malagasy version to facilitate the task and filling the monitoring data spreadsheet.

1.2 **Mangrove surveys** – permanent monitoring stations were established at accessible mangrove forests in Ampasindava and Andranomavo where exploitation was known to occur were selected for easy long-term monitoring. Those site was selected due its high mangrove cover. There are two monitoring site in Ampasindava and Andranomavo. To achieves and facilitate the task, we have arranged by groups: 2 persons took the GBH measure, 2 persons in the axis X and y for looked the coordinate of the tree, 1 person took the note of the GBH measured and the coordinates. 2 conservation Ambassadors, MNP Agent and C3 staff were the surveyors for this mangrove monitoring. Methods were based on the Australian Institute of Marine Science (AIMS) Survey Manual for Tropical Marine Resources (can be downloaded at [http://www.aims.gov.au/documents/30301/23122/Survey+Manual-sm01.pdf](http://www.aims.gov.au/documents/30301/23122/Survey+Manual-sm01.pdf/3b521f46-efad-4253-a5ef-67bd049d1835)).
1.3 Coral reef surveys – nearshore reefs with easy accessibility by snorkel at low tide were identified and long-term monitoring stations established at Sandoz, Ilandaka, Nosy Vaha and Nosy Hao. Methods were based on ReefCheck (methods manual available here http://www.reefbase.org/pacific/pub_E0000006134.aspx) as it had been used before, our staff were official trainers and we found it a simple and effective tool for community members to become familiar with.

1.4 Fisheries surveys – landing site data was collected from 8 landing sites across the park on a monthly basis, namely Ampasindava, Ilandaka, Ankingameloka, Andranomavo, Vahilava, Befotaka, Anjiamaloto, Antsako. In addition a fishers database was set up with identification cards to assist with fisheries monitoring and counteract the issue of migrant unregistered fishers exploiting park resources. Community members were trained in basic fisheries monitoring; species identification, weighing and filling out data sheets. Observation of bycatch at Nosy Hara in the villages of Ilandaka, Ampasindava and Vahilava starting March 2016. The monitoring was aligned with a regional project to ensure ease of data sharing and long-term analysis. http://www.wiomsa.org/ongoing-project/by-catch-assessment-and-mitigation-in-western-indian-ocean-fisheries-bycam/ and http://bycamwio.weebly.com/assessments.html
1.5 Marine Park infractions monitoring – this was not systematically monitored prior to the project so the team worked with Madagascar National Parks and the local park management committees to ensure that any cases of illegal fishing or hunting were reported regularly and recorded on datasheets. We created new data sheets, then C3 collected data from CLP (Local Committee of the Park) every month and sent an annual report to the Madagascar National Parks which is consolidated with Madagascar National Parks database.

Identity cards for active fishermen were prepared to regulate the fishing activities in the Nosy Hara Marine Park. The theory is that any fishers not carrying ID cards will be asked to move out of the fishing grounds, thereby removing the threat to local resources from migrant fishers who often move in for a few months to heavily exploit resources and then depart back to their home villages on the north-east coast. The local communities in the Park were previously helpless to act despite recognizing vessels as from other regions of Madagascar. The ID system empowers them to approach and apprehend any illegal fishers even if the Park authorities are not available at the time. Given the instructions given by the Ministry of Fisheries and the manager’s effort to keep the resources of this PA in a rational way, card production for all fishermen in Nosy Hara is a priority.

1.6 Socio-economic data collection – 100 household surveys were completed in 6 villages (Lalandaka, Antsako, Ampasindava, Ironona, Andranomavo and Anjiamaloto) across the park by the team and MNP rangers methods n September 2016 which mirrored those used back in 2012 by C3 so that comparison was possible. This data was gathered post-livelihood establishment with a view to analysing positive change from implementation a year later (2017). Methods were based on the SocMOon Manual available for download here: http://www.socmon.org/regions.aspx?region=Western_Indian_Ocean&centerpoint=-10.0,35.0&zoomlevel=3
1.7 Dugong monitoring – the sighting system was set up through the Committees and our Conservation Ambassadors with C3 passing to collect data sheets every month. We used a simple sighting form that we had used previously for fisher interviews and a map where each sighting could be marked. We evaluated our system after six months of data collection and made some changes, including a small incentives system, with project t-shirts being provided to regular reporters. As the population is sparse and elusive it is only fishers that general observe these animals when out fishing, particularly around the small islands of Nosy Hara.

1.8 Sea turtle monitoring -. The monitoring was held during 67 days starting from 14 November 2015 to 01 February 2016 (Table 1) which had previously been identified from our studies as a peak of Hawsbill sea turtle nesting. We cancelled the monitoring during the month of February because of the tropical storms hitting the northern coast of Madagascar; furthermore, we could only conduct seven days of nest monitoring in Nosy Vaha in January 2016 because it is taboo to stay longer in the islet (>4 days). We dedicated seven days for monitoring the hatchling emergence in Nosy Hara site.
We planned the monitoring between November 2015 and March 2016 based on available information; the nesting period of marine turtle spans from September to March in Nosy Hara Marine Park (Metcalf et al. 1997). The staffs of Community Centered Conservation (C3) and Madagascar National Parks (MNP) Nosy Hara and ten students from the University of Antsiranana (UNA) were involved in the nest monitoring. Prior to the nest monitoring, the students received theoretical and practical trainings respectively in Antsiranana and the nesting site of Nosy Hao. These trainings were a collaborative project with WWF that ensured the monitoring of the nests in the northern islet of the park (Nosy Hao) and we followed standard IUCN protocols. Representatives of the Local Communities of the Park (CLP) from the nearest coastal villages of the nesting areas assisted the team during the monitoring. Patrols were usually conducted twice a day with the first at approximately at 5:00am – 09:00am and the second at 17:00pm – 22:00pm. The patrol varied in duration depending on the numbers of turtles and tracks encountered. Encounters were defined as both direct turtle sighting and direct evidence of recent nesting tracks. A sighting refers only to interception of turtles. Nesting turtles: for both turtle and track encounters, the date and time the turtle or track was found and the beach locations were recorded. The width of the tracks that can be used to differentiate species was measured using tape measures. Standard carapace lengths (Curved Carapace Length – CCL) and width (Curved Carapace Width – CCW) were measured using calipers. When turtles were found, we checked the presence of tag on their flippers. If turtles had not been previously tagged, tags were applied on their flippers.

The data collected was used to study the movement of individual nesting turtles and to calculate their size. Nests and hatchlings: for each emergence, the number of nesting attempts made by the turtle was recorded together with whether eggs were laid. Nest sites were marked by date, identity number and GPS coordinates; these identifications were done to avoid repeating recording. The diameter and depth of body pits that are craters c. 0.5 m deep, excavated by turtles while nesting were measured. The clutch size, egg size including diameter and weight were also recorded. The distance of the nests from the high water mark was measured using tape measure. Temperature data loggers were deployed in the two nesting sites to record the ambient beach temperature and inside incubating nests. Dates of hatchling
emergence and the incubation duration were recorded; the nests were excavated to hold the
inventory of the nest contents. Samples of life in the camping site and activities held during the
monitoring are: beach profile, identification, temperature measurement, track pit, carapace
measurement, hatchlings.

Nosy Vaha

Figure 2: Locations of the nesting islets in the Nosy Hara Marine Park (C: Source Metcalf et al. 1997)

2. Capacity building methods –
A corps of 10 Conservation Ambassadors (adults from Park communities) and 80 Junior
Ecoguards (youth between 11 and 18 years) were recruited from Antsako, Ilandaka, vahilava, Ampasindava, bobatolagna, Andranomavo, Ambararata, Anjiamaloto, Ironona
and Ilomotra and from schools of Mangaoka and Andranovondronina.

Selection was by contacting the chiefs of the villages or schoolteachers respectively and
organising a meeting where information was given on the programme. At the schools a
competition was held, with a quiz or task allocated following a species information
session and youth with the highest marks/best quality outputs were selected to become
members of the Junior Ecoguard network. Although it would be nice to include all kids it
isn’t logistically or financially possible so the most motivated needed to be selected for
involvement long-term. Motivated adults were identified at community meetings and selected. T-shirts with ‘Junior Ecoguard’ or ‘Conservation Ambassador’ and the project logo were issued and members were called up and involved in all future outreach event planning and execution.

A series of trainings, meetings and consultations were conducted in the whole duration of the project implementation. Basic marine ecological training about endangered species, marine habitats, threats, conservation regulation, mangrove monitoring, technical fishing survey, data collect and identification of marine species with CAs and JEs were conducted. This was to build their capacity for stewardship on marine resource management and for them to become effective partners in the conservation of the marine resources in the region. CAs were also trained on first-aid and emergency response in able them to assist in time of emergency and accidents.

We selected 10 University students to train on data collection on turtle nesting sites, 2 students were preparing their Bachelor Thesis and one their Masters Thesis. Thes students were also trained and able to conduct Socmon surveys.

MNP’s Sector Chief and 2 Agents were trained and able to conduct ecological surveys (turtle monitoring, seagrass watch, mangrove watch)

3. Outreach methods – an annual outreach plan was made by the team using the CLP-recommended guide (https://www.amazon.com/Conservation-Education-Outreach-Techniques-Ecology/dp/0198716699) to ensure that any planning of events considered national environmental days and other regional gatherings so that cost-effectiveness was assured by integrating our team into larger pre-planned events in the locality. Events included travelling theatre, art competitions, presentations on marine species, Park regulations and climate change. Appropriate IEC materials were chosen, designed and disseminated at relevant sites. A short promotional film about C3 Madagascar and the environmental stewardship approach was produced in 2016 in both Malagasy and English as it was decided that film was a great medium for communication and the DVD could be included in the Junior Ecoguard toolkits.
4. **Alternative livelihood development methods** – firstly research was done into livelihoods that had been a success in other parts of Madgascar in coastal communities; this was a challenge as little is formally documented. This involved contacting NGOs over email and phone, online research for published articles and reports which could be trusted. Second, the Director of Nosy Hara Marine Park (MNP staff) was consulted about previous livelihood projects in the Park and those that had succeeded and failed. Third, community consultations were held to gather ideas from inhabitants as to what would work for them and what they were interested in. It was made clear the team were only gathering ideas and opinions and much research would be required into logistical, financial and human capacity to implement and run such businesses before final decisions were made. A shortlist of 5 livelihoods was made (goatfarming, duck farming, chicken farming, a tourist restaurant and handicrafts enterprise) and a feasibility report compiled for each including a projected financial plan. Where possible inkind contributions from the community were expected, e.g. building of housing for poultry or designation of land for building construction, to ensure their ‘buy in’ and sustainability.
5. Identification of key health, education and sanitation needs – the team organised community consultations, meetings with MNP, teachers and health and education authorities to determine the key services that the project could offer in these areas in return for the heightened local environmental stewardship. Sites were critical, with a focus on remote fishing communities whose impoverished inhabitants couldn’t usually travel far to access healthcare for example. We also researched previous attempts for installation of wells, etc to see why they hadn’t worked and ensure the same mistakes were not made again. This often involved contacting other NGOs and/or technical experts such as engineers. Once the activities were decided on we presented the plan to the stakeholders and asked for their opinions and approval as well as feasible timing for implementation. We sought quotes to get the most cost-effective services/materials, which sometimes involved much negotiation! Payment plans were drafted, holding back a significant amount of pay until the job was completed to avoid delays.

Outputs and Results

The project has yielded a number of ongoing monitoring programmes for both endangered species and habitats. The data is available in the form of databases but analysis is yet to be completed given the large datasets and the preparation of such information in the format of academic papers in 2017/8.

DUGONG SURVEYS - For Dugong, surveys were based on number of sighting, fishermen reported observation of 32 live dugongs since June 2014 until June 2016 in different location and zero mortality. Two of the sightings included a mother and calf pair and one group of four dugongs spotted. The fishermen shared the clear hotspot where dugongs are being seen on a very regular basis and data continues to be collected. Intentionally, these were communities where alternative livelihoods were also delivered. The monitoring programme continues at low cost and is being promoted throughout Madagascar via the MIHARI network.

SEA TURTLE SURVEYS
The staffs of Community Centered Conservation and Madagascar National Parks Nosy Hara and 10 students from the University of Antsiranana conducted nest monitoring between November – December 2015 and March 2016 in four islets, Nosy Hara, Nosy Fotsy, Nosy Hao and Nosy Vaha. Representatives of the Local Communities of the Park from the nearest coastal villages of the nesting areas assisted the scientific team during the research activities. Assessment of seagrass and coral reefs habitats was conducted to provide key information on coral reefs and seagrass habitats status in Nosy Hara. Furthermore, community-based control and surveillance were conducted in three coastal villages, Lalandaka, Ampasindava and Anjiamaloto to evaluate anthropogenic pressures on marine turtle particularly intentional captures, incidental catches in fisheries.

A total of 43 confirmed hawksbill nests and eight green turtles nests were monitored during 67 days in Nosy Hara Marine Park. Our results confirmed the importance of Nosy Hara Marine Park as nesting site of hawksbill and green turtles. Nosy Hara was the most active nesting site of the four islets where
nesting activity was important during December and January. Seven individual hawksbills were tagged. During the control and surveillance, no records of intentional catches and harvest of eggs were reported. However, events of by-catch in fishing gears were recorded by CLPs in the Nosy Hara Marine Park; a total of 26 by-catch events of hawksbills and 38 of green turtles were reported in the northern zone; fortunately, given the high level of conservation awareness and buy-in, all of the turtles were released alive in the waters.

<table>
<thead>
<tr>
<th>Nesting female</th>
<th>Carapace measurement</th>
<th>Hatchling emergence</th>
<th>Track measurement</th>
</tr>
</thead>
</table>

SEAGRASS MONITORING for key dugong and green sea turtle habitat in Nosy Hara Marine Park, community monitoring programme (annual) in place and databases. Funding secured in 2015 for continuance of seagrass monitoring and protection.
In total, eight species of seagrass are observed in the three sites where monitoring was conducted in the Nosy Hara Marine Park: *Thalassia hemprichii*, *Halodule wrightii*, *Syringodium isotifolium*, *Halophila ovalis*, *Halodule uninervis*, *Cymodocea rotunda*, *Cymodocea serrulata* and *Enhalus acoroides* (Fig 10).
In the overall, the seagrasses of the northern areas were healthy and presented high number of species. Lalandaka and Vahilava shared seven species and *Enhalus acoroides* was only observed in Lalandaka. Seagrass beds were particularly dense in Lalandaka and Vahilava. The surveys revealed that the seagrass beds were sparse and presented low seagrass coverage in Ironona; three species: *Halodule uninervis*, *Halodule wrightii*, *Cymodocea rotundac*omposed the seagrass beds in this site.
Figure 3: Seagrass composition and coverage percentage in the three monitoring sites
MANGROVE MONITORING for key forests in the Nosy Hara Marine Park and annual monitoring programme in place. Funding secured in 2016 for mangrove reforestation in the Park.

<table>
<thead>
<tr>
<th>Species encountered</th>
<th>Andranomavo</th>
<th>Ampasindava</th>
<th>Vahilava</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceryops tagal</td>
<td>Rhizophora micronata</td>
<td>Ceryops tagal</td>
<td>Rhizophora micronata</td>
</tr>
<tr>
<td>Rhizophora micronata</td>
<td>Ceryops tagal</td>
<td>Rhizophora micronata</td>
<td>Ceryops tagal</td>
</tr>
</tbody>
</table>

Fréquency (%)

| Ceryops tagal       | 6,02% | 58,33 | 7,14 |
| Rhizophora micronata | 91,57% | 36,9 | 73,6 |

Average and relative density (ind/m2)

| 0,28 | 0,14 | 0,30 |

Average diameter (ind/m2)

| 25,98cm | 26,15cm | 35,75cm |

Natural regeneration rate (%)

| 601,2 | 2434,5 | 354,9 |

Types of threats and pressures

| None recorded | Existence of deforestation. It is due to the capture of crabs and also a part for the timber. | None recorded |

The mangrove monitoring using the Australian Institute Marine Science (AIM) method in Ampasindava, Andranomavo, revealed the dominance of *Rhizophora micronata* and *Ceryops tagal*. Compared to 2013, a slight increase was noted in term of abundance and Diameter Girth Height. This is due to the increase in size of some saplings. Also we found a trace of deforestation, the target species are *Ceriops Tagal*. This deforestation is caused by the capture of crab and the use of timber for house construction and fence.

CORAL REEF MONITORING for key inshore reefs in Nosy Hara Marine Park and annual monitoring programme in place

In the overall, the reef of northern area of Nosy Hara Marine Park appeared to be healthy and showed great coral cover and few bleached colonies during the course of the project. The dominant substrates cover observed on surveys were hard coral (HC). The results showed that Sandoz has the highest level of hard coral cover (83 %) compared to Lakandava (77%), Nosy Vaha (71%) and Nosy Hao (60%). In general, the percentage of recently killed coral was low so does Nutrient Indicator Algae (NIA). Nosy Hao had the highest soft coral coverage (16%) compared to Nosy Vaha (10%), Sandoz (11%) and Lakandava (13%). It appears that the sponge cover was low around the sites at the northern areas; the results showed that...
Nosy Vaha and Lakandava have the higher level of sponge covers (6%), followed by Nosy Hao (4%) and Sandoz (2%). Sand represents respectively (11%) of the substrate in Nosy Hao, (7%) in Nosy Vaha and (1%) both at Lakandava and Sandoz.

The reefs of Nosy Vaha appeared to be the healthiest coral reefs with no coral bleaching and disease recorded. However, coral populations were found to be affected by coral bleaching at 10% and 15% respectively at Lakandava and Nosy Hao. The surveys showed that the general bleached parts within coral colonies had an average of about 12%. Only, about 5% of corals of the reefs of Nosy Hao were found to be affected by disease. The most common disease observed in the area is “white band and black band”.

![Mean Percent Cover Of Substrate For Nosy Vaha, 2m and 12/04/2016](image)

![Mean Percent Cover Of Substrate For Nosy Hao, 2.5m and 12/04/2016](image)
**Figure 1**: Coverage of substrates in the four monitoring sites

**FISHERIES MONITORING** database with monthly landing site data on species and quantities landed.

Marine fisheries provide vital revenue and sustenance for the Nosy Harra community. 5 fishermen were trained and conducted fishery surveys under C3 team supervision. Fishermen use different gears and vessels. Gillnet and line were the most common gear types employed. Combined use of gillnet and handline were the most efficient gear types in terms of catch. The target species were Scombridae and Carangidae: longline and jarifa for sharks, rays and pelagics; net for reef fish, such as Lutjanidae, Siganidae, Acanthuridae, Scaridae; handline for reef fish (Lutjanidae, Serranidae), wooden harpoon for octopus and diving for holothurians. The species encountered during landing are often scalloped hammerhead, zebra sharks. On 2016, we obtained for Sharks: 87 sharks all species included, 74 Rays.

Moreover, a poster titled “Artisanal fisheries of Nosy Harra marine park and current management systems was presented by C3 Senior Programme officer during the 9th Western Indian Ocean Marine Science symposium in South Africa and the first fisherman project workshop in Mahajanga, Madagascar.
INFRACCTION MONITORING system in place involving communities with data reported on a monthly basis, Our Conservation Ambassadors and Committee members use data sheets issued by MNP staff to report on any illegal activities in the Park and can call C3 directly or discuss the matter in Committee meetings.

Identity cards for active fishermen were prepared to regulate the fishing activities in the Nosy Hara Marine Park. The theory is that any fishers not carrying ID cards will be asked to move out of the fishing grounds, thereby removing the threat to local resources from migrant fishers who often move in for a few months to heavily exploit resources and then depart back to their home villages on the north-east coast.

The local communities in the Park were previously helpless to act despite recognizing vessels as from other regions of Madagascar. The ID system empowers them to approach and apprehend any illegal fishers even if the Park authorities are not available at the time Given the instructions given by the Ministry of Fisheries and the manager's effort to keep the resources of this PA in a rational way, card production for all fishermen in Nosy Hara is a priority. Thanks to the support of WWF and C3, 430 cards are in production.

The distribution of the fishermen's card was done on July 2016 and 336 Local Committee of the Nosy Hara Marine Parks benefited of this and other 94 fisherman living in the Municipalities surrounding the Marine Protected Area Nosy Hara.

SOCIOECONOMIC DATA from 90 households and key informants from the Park (2016) using comparable methods as 2012.

20 in Ampasindava, 14 in Antsako, 16 in Lalandaka, 20 in Anjiamaloto, and 20 in Andranomavo
Number of site investigated: 5 sites, Lalandaka, Antsako, Ampasindava, Andranomavo Irohona, and Anjiamaloto.

Number key informant: 4 based within the villages Ampasindava, Lalandaka, Anjiamaloto and Andranomavo.
These surveys evaluated and understood in general the attitudes of the population on the park management and also the activities carried out during the project; In general the participation in the various management process has increased, comparing in 2013. However it is well marked in the decision making. The perception of the state of resources appear to be evolved, the state of mangrove, coral reef and fish are good while the sea cucumbers were bad condition. The results of survey revealed 3 major problems that the community faces: healthcare, water and education. Knowledge of the population on the Park regulations has greatly increased since 2013. Thus, we can say that the population knows well the existence and details of the laws in the Nosy Hara.

Concerning the fishery regulations, most people revealed again the knowledge of the rules. Compliance of the population in the park regulations has positively changed over time. This change is due to the awareness and training undertaken since 2014

CAPACITY BUILDING IN THE COMMUNITY - 10 trained Conservation Ambassadors and 80 trained Junior Ecoguards able to conduct habitat and species surveys, outreach and livelihood monitoring.

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<thead>
<tr>
<th>STEP</th>
<th>TOPIC</th>
<th>DATE &amp; RENTAL</th>
<th>OUTPUT</th>
<th>IMPACT</th>
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<tbody>
<tr>
<td>YEARLY AGREEMENT REMIND</td>
<td>Review of the agreement with the director of college in Diego 2.</td>
<td>February 2016 Mangaoka</td>
<td>Agreement reviewed by the director of school.</td>
<td>Cisco provided a classroom and Friday afternoon for the training. C3 can participate during scholar sport event.</td>
</tr>
<tr>
<td>SELECTION</td>
<td>Selection 37 Junior Ecoguards Mangaoka from school, entre les class of T5 to T8</td>
<td>02 + May 2016 Mangaoka college</td>
<td>JES 37 selected from Mangaoka school in total there were 80 Junior ecoguards selected.</td>
<td>The number of JES are added</td>
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<tr>
<td>TRAINING</td>
<td>The Concept on the fishing closure and awareness event is</td>
<td>0 − 6th May 2016</td>
<td>JES 37 news know confidant with the fishing closure date and confidants on</td>
<td>The junior ecoguards with the fishing closure on</td>
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<tr>
<td>Event Type</td>
<td>Details</td>
<td>Location</td>
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<tr>
<td>Awareness event, skit about turtle live and the presentation of endangered species protection</td>
<td>The junior ecoguards understand the importance of the Dugong and sea grass conservation</td>
<td>Nosy Hara Region</td>
<td></td>
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<tr>
<td>Endangered species life (habitats, foods and reproduction)</td>
<td>They can introduce the species in the hearings</td>
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<tr>
<td>Dugong and sea grass conservation importance.</td>
<td>JEs listed the list of the awareness materials on environment.</td>
<td></td>
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<tr>
<td>Awareness Materials: The Different List of the Awareness Materials</td>
<td>JEs know confidant with the dugong, sharks, turtles life.</td>
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<tr>
<td>Mareco kits using</td>
<td>The junior ecoguards understand the objective of the Mareco kits and know who to play the game (go to reefs) Number of pupils. 09 pupils</td>
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<tr>
<td>The sketch on the Dugong and Seagrass protection.</td>
<td>The networks of the junior Ecoguards in DIANA region</td>
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<tr>
<td>Teacher training from DIANA on environmental education (Guide of environmental education)</td>
<td>34 teacher from DIANA region able to teach the junior Ecoguards on the environmental education</td>
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<tr>
<td>Toolkits delivery for the Junior ecoguards in 06 school in the area Diana</td>
<td>The toolkits are Delivered to the destination and the members of the junior ecoguards are Established in Each college at the three district DIANA Region</td>
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<tr>
<td>AWARENESS EVENT</td>
<td>Regional reforestation</td>
<td>220 plants are reforested by the JEs. Each JEs reforest 10 plant</td>
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<tr>
<td>Event Description</td>
<td>Date/Location</td>
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<tr>
<td>Endangered species presentation (Dugong, Sharks &amp; Turtles, Octopus, Shrimps, and other species)</td>
<td>March 2016 in Ivovona and ambavarano</td>
<td>The communities in Ivovona and ambavarano understood the importance of the species protection.</td>
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<tr>
<td>Participation on the carnival of the WED celebration</td>
<td>05 - 06 June 2016 in Diego Suarez</td>
<td>08 junior ecoguard Fighting against the illicit trade of our wild species</td>
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<tr>
<td>Endangered species presentation (Dugong, Sharks &amp; Turtles, Octopus, Shrimps, and other species. The importance of the seagrass and dugong conservation.)</td>
<td>12th June 2016 in Lalandaka</td>
<td>32 junior ecoguards raise the awareness of the 60 Communities in Lalandaka about the protection of the endangered species in Nosy-hara region.</td>
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<tr>
<td>Dugong and seagrass conservation importance</td>
<td>12 - July 2016 in Ampasindava</td>
<td>35 junior ecoguards raise the awareness of the 100 communities in Madagascar during the regional forum with MIHARI networks.</td>
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<td>Sharks &amp; Turtles, Octopus, Shrimps, and other species. The importance of the seagrass and dugong conservation.</td>
<td>12th July 2016 in Ampasindava</td>
<td>32 junior ecoguards raise the awareness of the 60 Communities in Ampasindava about the protection of the endangered species in Nosy-hara region.</td>
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<tr>
<td>Dugong and seagrass conservation importance</td>
<td>October 2016 in Berafia sahamalza</td>
<td>08 junior ecoguards raise awareness of the Communities in sahamalza during the first Dugong Festival with MIHARI network.</td>
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<td></td>
<td>2nd December 2016 in Ankingameloka</td>
<td>25 junior ecoguards raise the awareness of the communities in ankingameloka on the importance of the marine species protection and the presentation of the endangered species</td>
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Source: Activity reports, Nosy Hara Management Plan & Marine Education Trust.
IEC EVENTS AND MATERIALS: Sea turtle festival in Ampasindava and Antsiranana, (5th December 2015) regional mangrove reforestation (10,000 samplings planted in Mangoaka in February 2016), 3-day carnival for World Environment Day in Antsiranana (3-5th June 2016), travelling theatre with sketches on Dugongs, Sea turtle, Sharks, Shrimps, fish, Octopus, Dugong, Sea grass, Coral reef, Sea cucumber and Park regulations.

To increase local perception and awareness of the communities about the need of the protection and conservation of the marine resources in their area different awareness raising and promotions were done during the project implementation.

Community outreach events with JE were organized in different villages of Nosy Hara and throughout Diana Region: Andranomavo, Mangaoka, Antsako, Ampasindava, Ibonona, Ambavarano, Lalandaka and other villages and communities. Series of presentation were focused on the importance of mangrove, fishing regulation, Park regulation and development of knowledge about marine endangered species and habitats and conservation (Dugong, Sea turtle, Sharks, Shrimps, fish, Octopus, Dugong, Sea grass, Coral reef, Sea cucumber).

Animation and sketch production, tool kit for awareness that compose of poster, flyers, books, guide, post card, t-shirt were produced and distributed to communities, partners and general public. A TV broadcasting events were developed during youth events.

With Junior Ecoguards, they participated to the carnival of the World Environment Day celebration in Diego Suarez (on 3rd, 4th and 5th June, 2016) to protect wild and endangered species from illegal traffic with the theme “Fight against illicit trade of our wild species”. Sketches about sea turtles were conducted and performed in every related events. An American filmmaker specialized in conservation documentaries to make a promotional and educational film about the Nosy Hara and C3 activities, started in July 2016 and was completed on November 2016.
Materials produced included:
Graphical information panels for the Park on endangered species in local dialect (sea turtle, dugong, shark). These have been placed in the following locations Ampasindava, Antsakao, Befotaka.
• Events banner
• Postcards with key facts (dugongs, sea turtles)

• T-shirts for Junior Ecoguards and volunteers, Poloshirts for teachers
Special edition *Love the Dugong* t-shirts with the clothes company Baobab Clothing Inc.

**LIVELIHOODS** - There were 2 livelihoods funded and established, a community ecotourism restaurant and a poultry farm in Ampasindava Commune Mangoaka Antsiranana 2, both run by women Association named FIVEPANOHA (Fikambanan’ny Vehivavy ny Parka Nosy Hara) and co-funding was obtained for these from a local source which has allowed continued support into 2017 as well as the addition of a vegetable garden associated with the restaurant.

They breed 60 poultry and had 56 clients at the restaurant in 2016 which although it may seem low, is 11% of all recorded visitors to the Nosy Hara Marine Park. They earn 1,530,000 MGA and expanded the operation 1,004,500 MGA which give benefit last year 525,000 MGA. Partnerships were made with the Tourism office in Diego and private tour companies e.g. Diego Raid to attract clients to Ampasindava village and use the new facilities.

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<td>visitors</td>
<td>384</td>
<td>277</td>
<td>362</td>
<td>378</td>
<td>485</td>
<td>478</td>
<td>437</td>
<td>510</td>
<td>552</td>
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</table>

7% of the population has been now involved in alternative non-marine resource based livelihoods – 45 households involved in two enterprises: ecotourism enterprise and poultry farm. The number of population in Nosy Hara is 16,900. But the community involved directly on the marine ecosystem is around 3800. (MNP 2016).
HEALTHCARE- It was decided that a monthly midwife visit should be implemented for 100% of the population of 3 remote communities, representing 30% of the population that use marine resources of Nosy Hara Marine Park. The system, based on evaluations, was later reviewed in 2016 and changed to a midwife and general practitioner visiting which was deemed to be of more use to a wider populous. The communities are very remote and require taxi brousse followed by half a day’s walking and they are unaccessible in the wet season. (Anjiamaloto Commune of Mahalina, Andranomavo, Commune of Mangoaka, Lalandaka Commune of Andranovondronina and consist of populations of about 1200 people. Dysentery with dehydration, Cough or cold, Hypertension, acute ear infections, Bronchitis, Parasitosis, sexually transmitted disease, vaccination, prenatal consultation, are diseases usually treated during these visits and it has been well-received by the communities, who could not afford to reach Doctor because of transport cost and money. The Doctor also provides medicines at low cost.
• **EDUCATION** a schools scholarship programme with bursaries for secondary education of the highest-achieving students was proposed but reviewed when it was revealed the national government had similar plans. Instead the teacher training convention was conducted as planned in July 2016, covering marine biodiversity and conservation issues for the Diana region and how to teach theory and practical components in schools. 40 schoolteachers were trained and 17 toolkits delivered to remote schools across the Diana region.

• One school benefited of one wardrobe, and books (French, geography, Common Knowledge, Malagasy) for their class Primary School Andranomavov. In total 66 books were offered for the school. Another got roof repairs and guttering to prevent inundation in the rainy season.

• 20 schools were provided with environmental teaching resources (including books, films, t-shirts, posters, brochures, art materials and a Reference Manual) and 40 teacher trained on the use of the environmental resources.

• Co-funding from Tusk has allowed us in 2017 to expand to other regions.
SANITATION - A well was built by contracting a local NGO with technical expertise in the village of Ampasindava where existing wells failed to serve the population by drying up in the dry season and becoming inundated with sediment in the wet season. Water supply for community in Ampasindava including women association. 100% increase in access to clean drinking water for 7% of the population, about 4000 people is directly concerned on the management of Nosy Hara Marine Park, if 16900 people is inhabitant of the four Municipalities surrounding the protected area (Mangoaka, Andranovondronina, Andranofanjava, Mahalina)
**FINAL WORKSHOP**

C3 has organised a Final workshop report to present the results of the project: “Dugongs for Life: Incentivizing Malagasy communities for marine ecosystem stewardship” and took also this opportunity to Consult the partners on Community incentive mechanism and means of alternative substance implemented within Marine Protected Area in Madagascar on 30th March 2017 within WCS country Office Madagascar based in Antananarivo.

The participants was feeling very impressive on C3 achievements with the funding available and give some recommendation to publicise the research result and continue the efforts. 3 Institutions gave examples of their use of incentives for communities:

- Madagascar National Parks: Donation of boat, support on farming, materials for fishing,
- MIHARI Network: sea cucumber farming, seaweed, ecotourism, exchange visit between Locally Managed Marine Area
- Madagascar Voakajy: Local product processing, Baobab fruit transformation and Community capacity building to manage locally their area and promote ecotourism provide accommodation and food for tourists and visitors.

**UPDATED MANAGEMENT PLAN FOR NHMP** - our data and recommendations have been provided to MNP and now the plan is being finalised and endorsed at the national level. We anticipate it will be completed and officially launched by end of 2017.
Achievements and Impacts

Perhaps the most important achievement of this project is the creation of a successful model in environmental stewardship linked to community service provision that could be applied to other remote and impoverished coastal communities in Madagascar with minimal funding. The second important achievement is that of co-funding and sustainable financing into the future.

There was a risk, as in most conservation projects, that the funds would just last for two years and then impetus would be lost as funding dried up. However, thanks to the team’s voracious networking and fundraising drive we secured GEF Dugong and Seagrass funding which came online just over a year into the project, in September 2015 and this funds continuance of the Conservation Ambassadors, Junior Ecoguards, seagrass monitoring and dugong awareness and monitoring activities through to September 2018.

We continue to receive small funding annual from Tusk Trust to assist in continuance of the Junior Ecoguard network activities and extension of our teacher training into other provinces of Madagascar. Furthermore, we secured funding to assist with marine sea turtle research in the north of Madagascar from USFWS in 2015 and we are at the final stages of negotiating support from CEPF to extend sea turtle and dugong conservation through our environmental stewardship model in 3 further Key Biodiversity Areas in northern Madagascar. We receive small top-up funding for existing community enterprises in Nosy Hara Marine Park from Finistere and we hope to build on this component of our work with some larger grants anticipated in 2017-2018.

In addition a positive partnership was struck up with the business ‘Baobab Clothing Ltd’ which creates novel and nature-focused clothing in the western Indian Ocean region. A limitation was the ability to sell these t-shirts which are very specialist, in Madagascar and avenues are being explored with the GEF Seagrass and Dugong Conservation project now to see if these could be included with other global dugong paraphernalia in the portfolio of an online conservation/ethical shop. However, it was a step in the right direction, getting a company interested in support for such an elusive marine species as the dugong!

The fact that there have been no infractions of Marine Park regulations and no incidences of dead dugongs or sea turtles since the start of the project has really been an outcome to celebrate. Communities really understand the issues at stake now thanks to a heavy and continuous outreach campaign and they see the benefits the project is bringing them with increased knowledge, skills, business opportunities and basic health and sanitation provisions, something that the government and other entities have failed to do successfully in the past. Rather than feeling oppressed by the Park management they truly feel a part of it, thanks to funding which has enabled regular committee meetings to ease communications between Park authorities, community members and NGOs. The successes of this project have really helped to legitimize this small and fairly new NGO’s reputation at the national government level and we enjoy close relationships now with National Focal points for endangered species, all relevant Ministries and larger NGOs, who perhaps before were unaware or disinterested in our work in Nosy Hara Marine Park. Our recommendations have been put forward for inclusion in a revised Management Plan for Nosy Hara Marine Park which is currently being drafted, the final version being anticipated by the end of 2017.
Monitoring a small and elusive dugong population is near impossible in terms of traditional scientific methods applied to marine mammal monitoring. However if we can be sure that mortality due to anthropogenic causes is eliminated we can be confident the current small population has a chance of recovery. Benefits have been shared for sea turtle populations and fish and sharks.

In terms of fisheries management, the fisher ID database means that all licensed fishers in the Marine Park can be identified, making the process of identifying illegal fishers much easier. It also helps the Park monitor how many active fishers there are at any one time operating in the Park and their relative distribution. Furthermore, a monthly monitoring system at landing sites enables us to ensure that any illegal fishing is identified, such as sharkfinning and unusual or endangered species (e.g. sawfish). This data is now contributing to a wider western Indian Ocean bycatch reduction project.

With this grant the team has managed to truly highlight Madagascar’s dugongs at the international scale and with the launch of the GEF project in September 2015, Madagascar was chosen as one of 8 focal countries to receive funding for dugong and seagrass conservation. There are currently six national projects underway across the country and this can only be a positive for the future of dugongs and their habitat. Furthermore the Executive Project Steering Committee (EPSC) of the GEF Global Dugong and Seagrass Project has chosen Madagascar as the location of their next meeting in 2017. The EPSC comprises 15 people, including the National Facilitators/ Dugong Focal Points of all Project Countries, the Task Manager for our project on behalf of the donor, the GEF and UN Environment, the Head of the CMS Dugong MoU Programme in Abu Dhabi, representative of Supporting Partners, such as the Australian Government, UN Environment ROWA, Environment Agency of Abu Dhabi, UAE and CMS Dugong Technical Advisors. It is a great opportunity for Madagascar to highlight its efforts to conserve dugongs and seagrasses and it will afford specific technical training to all 6 project partners across the country, resulting in invaluable capacity building.

Lala highlighted our endangered sea turtle research and conservation efforts at the ACCB conference in Morocco in September 2016 with a poster presentation detailing our confirmation of key Hawksbill nesting sites for the region and she will also be hopefully also be attending and presenting a poster about this project and its achievements at the CMS 3rd Signatory State Meeting in Abu Dhabi in March 2017. The latter also includes a technical meeting for all the participating partners in the GEF Global Dugong and Seagrass Project.
Our team has trained conservation professionals and delivered outreach campaigns in Sahamalaza National Park and Nosy Be, important dugong sites further south from Nosy Hara Marine Park. We helped run Madagascar’s first ever Dugong Festival at Sahamalaza in October 2016. Furthermore we have heavily assisted and capacity-built staff and members of the MIHARI network [https://mihari-network.org](https://mihari-network.org). a forum to share information across Madagascar’s community run marine protected areas, in understanding key dugong and seagrass conservation issues. They have adopted our outreach materials and data collection methods and are able to transfer these to more than 10 NGOs supporting community conservation initiatives across the country.

The intervention appears to bear fruits in so far as local communities are now more involved and participate actively in conservation programs and help in decision making both men and women. Activities, especially training and community outreach accompanied by livelihood support constitute good approaches to incite local communities to protect environment and develop resources sustainably. As result, local communities increase their knowledge of marine species, threats, and to the existing legislation in fisheries management like fishery closure/ fishery started, unauthorized fishery, and other important laws to help conserve and protect the marine resources. Habitat health improvement is also observed, mangrove cutting activity is decreasing. No dugong mortalities have been reported and even turtle meat observed in the market.

An updated of site conditions and socio-economic survey were carried out monitoring of ecosystem key factors helped to facilitate the restructuration of the management plan of marine resources and its implementation.

**Section 3: Conclusion**

We can conclude that the project went largely as planned and resulted in well-engaged communities, more aware of marine conservation issues and with more options open to them in terms of sustainable fisheries and alternative livelihoods. Ecotourism remains a challenge in an area where many tourists remain offshore in yachts and fail to come to visit the communities on the mainland. However, we have started to engage with marine sports companies and the Tourism Office in Diego to try to change this situation. Further work is needed in engaging with the high end tourists using the islets of Nosy Hara and appreciating their beauty, who could benefit communities in the Park by visiting the mainland or making donations to ongoing conservation efforts.

The enterprises remain small scale and once proven to be successful in their 3rd or 4th year of operation they could be injected with further cash to expand them into larger operations or to introduce these opportunities to other communities in the Park. Gauging success of livelihood case studies remains a difficult task as the literature published is sparse and sometimes not reflective of the current situation on the ground.

In terms of long-term monitoring systems and community and ranger capacity, everything is now in place to ensure ease of data collection and comparison of trends over the years. With regards to dugongs, given their small and elusive population, actual monitoring of numbers is impossible and all efforts should instead be focused on maintaining zero mortality and conserving seagrass beds on which they depend.
Fisheries are better regulated and fishers are now well aware of rules and regulations pertaining to various species and gear types. The reduction of sea turtle and dugong mortality to zero was a great achievement for the project and largely thanks to community engagement and heightened awareness of the value of these species to the wider ecosystem.

We were particularly proud of our Junior Ecoguard network and the certificate of recognition given to the team for its efforts in furthering education in Madagascar. The programme is now legitimised nationally and will hopefully spread to all coastal regions in the near future. It is our Junior Ecoguards who have had a great influence in challenging behaviours such as poaching sea turtles in their own communities and they represent the hope for these species in the future.

**Problems encountered and lessons learnt**

**Problem encountered:**
Originally, our project ends on 30th April, but our fieldwork was completed on September 2016. Cyclones and heavy rain persisted through January to April 2016 which prevented our team completing fieldwork as planned since roads were impassable and risks deemed too high. There was an unexpected 3 month delay in obtaining a research permit for our field activities in September 2015 and it was finally issued in December 2016 (when the wet season had begun). In addition we planned installation of a well but were informed we would need to wait until the end of the wet season to arrange this and in May when installation could start, we decided to change supplier, finding and extend the project duration until end of September 2016, a company more experienced in the technicalities and with a proven track record in the region. Negotiations were made with this NGO, which agreed to install in August 2016 due to their other commitments.

**Lessons learned through the project –**
The stakeholders active involved in the implementation of the project, partnership, co-funding of several donors contributed to the achievements of the objectives of this project. The project integrated the enhancement of policy and law enforcement (COAP law: Marine Protected Area) in the conservation of target species. In addition, education initiatives were simultaneously conducted in all adjacent coastal communities of the Nosy Hara Marine Park, Incentives, and development of new livelihood enterprise, facilitate the ecosystem stewardship of Nosy Hara marine Park. The synergy of action within this site was also the strength which strengthen the involvement and participation of men and women in the conservation programme and decision making toward the management of this marine ecosystem.

**In the future**

In the future we plan to maintain current support to the communities of Nosy Hara Marine Park both in terms of ongoing socioeconomic and ecological monitoring but also in assisting them in growing their enterprises. We are also launching two further initiatives with our GEF project, focusing on duck farming. An ambitious plan, hopefully to be funded mid-2017 is a two year project focusing on extending this successful model to 3 further Key Biodiversity Areas; Complexe Bay de Rigny, Ambodivahibe Bay, Ampmbofofo also in northern Madagascar in conjunction with CEPF, CI, GIZ and other partners. We are also extending our Junior Ecoguard network to two further provinces in
northern Madagascar in 2017 and plan to continue its expansion until e cover the whole of Madagascar’s 4000km or more of coast!

Further support is needed to maintain sea turtle patrols and monitoring on the islets of Nosy Hara as this is costly in terms of both human and financial resources but could be achieved at minimum with a budget of 7,500 Euros per season.

Dugongs are likely to be critically endangered throughout Madagascar so the further we can spread community-centred conservation efforts, the better. Given natural disasters such as cyclones and flooding, seagrass beds are extremely sensitive and vast areas can disappear within a matter of days. It is therefore critical that seagrasses are considered as important as coral reefs when planning marine protected areas and where possible those frequented by dugongs are included since they likely sustain green sea turtle populations too.

We hope that the spotlight has now been shone on Madagascar as one of the remaining states where dugongs need urgent conservation and that the GEF project will further accelerate small-scale community action which can be replicated rapidly through Madagascar’s existing network of Locally Managed Marine Areas, which have historically focused almost exclusively on preserving coral reefs and fish or invertebrate stocks.

Press releases pertaining to our project

Turtles:
Release in Taratra Malagasy version


http://www.ioseaturtles.org/pom_detail.php?id=169
Tortues marines : Festival international à Antsiranana - Midi ...
www.midi-madagasikara.mg/.../tortues-marines-festival-international-a-antsiranana/
Junior Ecoguard:

Junior Ecogardes : Un concept à développer pour préserver l’Environnement

Dugong :
http://www.newsmada.com/2016/04/26/parc-marin-de-nosy-hara-le-dugong-menace-dextinction/
Nosy Hara, Havre de paix des ressources marines in L’hebdo du vendredi 15 au 21 mai 2015 n 0535
Ressources naturelles : La corruption décourage la communauté locale in Les Nouvelles 27 Aout 2014
Ressources naturelles : La corruption anéantit la participation de la communauté à la protection in l’Observateur Lundi 25 Aout 2014 n1163
Junior ecogardes :Un concept a developper pour preserver l’Environnement in L’Observateur

Junior Ecoguard Manual :
Partnership with Ministry of Education
http://lecitoyen.mg/?p=6031
http://www.tresorpublic.mg/?revue-de-presse=education-environnementale-le-men-et-long-c3-ciblent-les-eleves

Livelihoods - Add press release links pls
C3 Madagascar - Evaluation of Women’s ecotourism training ... - Vimeo
Video for ecotourisme a Nosy Hara
https://vimeo.com › Community Centred Conservation › Videos
Mar 12, 2014
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6. RAPID ASSESSMENT OF DUGONGS AND THEIR SEAGRASS HABITAT IN NORTHERN Northen MG 2009-2010
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Ecological survey

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40. MAEP; 2004. Filière aviculture traditionnelle, fiche n°207 ; 7 pages
42. http://agriculture-madagascar.net/content/fiompiana-akoho-gasy
44. Université d'Antananarivo, Faculté de Droit, d'Economie, de Gestion et de Sociologie (D.E.G.S) Département Economie, Mémoire en vue de l'obtention du Diplôme d'Etudes Supérieures Spécialisées en : « Analyse et Politique Environnementales » ETUDE DE LA MISE EN PLACE D’UN ECOTOURISME COMMUNAUTAIRE cas DE LA COMMUNE RURALE DE SAINT AUGUSTIN (Toliara)
APPENDICES:

Address list and web links:

www.conservationleadershipprogramme.org/
www.conservationleadershipprogramme.org/.../dugongs-for-life-

Our fourth conservation leadership award! | Community Centred ...

c-3.org.uk/c3-madagascar-fourth-conservation-leadership-award/

http://www.tusk.org/c3-madagascar
http://www.dugongconservation.org/project/using-incentivized-environmental-stewardship-conserve-
dugongs-seagrass-habitat-identified-national-hotspot-mg3/

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PROJECT OUTPUTS

- Poster ACCB
- Turtle postcard
- JE Manual
- Site database
- CA,JE criteria
- Junior Ecoguard criteria
- Dugong sighting database
- Documentation for fisher ID and registration system in Nosy Hara Marine Park
- Film C3 Madagascar approches
- Suivi de la capture accidentelle de mégafaune marine dans le cadre du projet BYCAM de WIOMSA Ampasindava, Lalandaka Janvier 2016 à mars 2017
- Suivi annuel herbiers marins (4 sites hotspot )et observations de Dugongs 2016-2018 Nosy Hara, Lalandaka, Vahilava, Iironona 2016-2018
- Suivi écologiques de mangrove, herbiers et récifs coralliens : rapport de suivi écologiques 2015-2016
PUBLICATIONS AND COMMUNICATIONS

- Rapport final du Project Enhancing the Conservation of Threatened Sea Turtles through Integrated Approaches in Nosy Hara Marine Park in North West Madagascar.
- Plan de conservation locale, Rapport de suivi des sites de ponte. Rapport interne Nosy Hara, Nosy Fotsy, Nosy Hao, Nosy Vaha 2015-2016
- ARTISANAL FISHERIES OF NOSY HARA MARINE PARK AND CURRENT MANAGEMENT SYSTEMS.
- Poster communication : Conférence sur la Pêche a Majunga septembre 2015, Symposium WIOMSA 2015 en Afrique du Sud Nosy Hara 2015
- Confirmation of an important nesting site for the critically endangered hawksbill turtle in northern Madagascar.

DISTRIBUTION LIST
1. MNP Nosy Hara,
2. Conservation International
3. MNP Central : DG, Directeur des Operation PAGE GIZ,
4. Direction Generale de l’environnement
5. WWF,
6. CNRE,
7. CNRO,
8. DREN et CISCO Region Diana,
9. Directeurs Ecoles Region,
10. Direction de la Conservation et Système d’Aires Protegees : Point Focal CMS
11. Universite d’Antsiranana,
12. Universite d’Antananarivo
13. SCB Madagascar Chapter
14. Region Diana
15. DREEF Diana
16. GEF
17. GEF SGP
18. Fondation Tany Meva
19. Point Focal Dugong
20. Point Focal CMS
21. DGE Ministere de l’Environnement
22. WCS
23. Réseau MIHARI,
24. Television Malagasy Antananarivo
25. Television Malagasy Antsiranana
26. La Tribune de Diego
27. PNUD,
28. UNICEF,
29. Fondation Tany Meva
30. French Embassy,  
31. UK Embassy,  
32. Canada Consulate,  
33. Swiss Embassy,  
34. German Embassy,  
35. Monaco Consulate  
36. CEPF,  
37. Secretariat Chargée de la Mer,  
38. DRPH Diana, SAVA, SOAFIA, Boeny  
39. Alliance Française  
40. Region Diana  
41. REPC  
42. Conseil départemental du Finistere  
43. FIVEPANOHA  
44. Member of COSAP Nosy Hara, Sahamalaza  
45. MNP Sahamalaza  
46. MNP Marojejy  
47. MNP Masoala
Using incentives mechanism to Conserve Dugong and Seagrass

Main Activities

1. 30 community schools take part in educational activities to spread awareness about dugong and seagrass conservation
2. 300 students have taken part in community awareness activities
3. 3000 people have been reached through community awareness activities
4. 30 local communities join conservation efforts
5. 30 dugong conservation initiatives are launched in 30 communities

Results

1. 20 community schools have integrated dugong conservation into their curriculum
2. 20 community leaders have volunteered to support dugong conservation initiatives
3. 20 community members have joined dugong conservation groups
4. 20 community schools have established dugong conservation clubs
5. 20 community leaders have organized dugong conservation events

Next Steps & Lessons Learned

1. Continued support to community schools for dugong conservation activities
2. Continued support to community leaders for dugong conservation activities
3. Continued support to community organizations for dugong conservation activities
4. Continued support to community members for dugong conservation activities

About Our Organization

Community Conservation Group "C3" was established in 2002 to work on dugong and seagrass conservation in 30 communities. The group focuses on community-based conservation activities, including education, research, and conservation initiatives. The group has worked with local communities, schools, and organizations to raise awareness and promote dugong and seagrass conservation. The group has also worked with government agencies and international organizations to develop and implement conservation strategies. The group is committed to continuing its efforts to conserve dugong and seagrass in the region and to involve local communities in the conservation process.