

COMMUNITY-BASED RESOURCE MONITORING

By Lalao Aigrette Ravaoarinorotsihoarana and Shawn Peabody

AUDIENCE: CONSERVATION FIELD AGENTS

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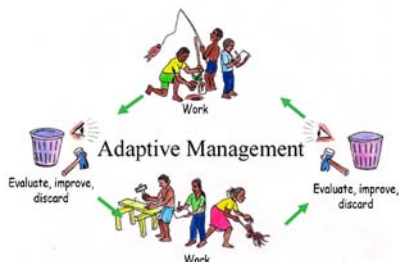






Introduction

Community-based ecological monitoring (CBM) is an effective tool to train communities to manage protected areas and natural resources. CBM is a critical part of the adaptive management process, whereby community resource management actions (e.g. putting in marine reserves, gear restrictions, alternative livelihood activities) are monitored and evaluated regularly by the community in order to improve future management actions.



Most monitoring programs for marine protected areas rely heavily on outside scientific experts and expensive equipment. CBM greatly reduces the need for outside experts and equipment by using simplified methods that are cheap to implement and also more easily understood by local communities. Furthermore, community participation in monitoring efforts builds local enthusiasm and commitment to ongoing management efforts while encouraging local ownership over resource management.

Numerous methods for community-based ecological monitoring are described in the

literature, however, many of these are too difficult for rural villagers who have had little formal education. Methods which are too complicated for local communities will reduce participation and community involvement in monitoring activities and prevent results from being incorporated into resource management activities. While these simplified methods might reduce the scientific validity of the results, the real goal here is to promote a greater understanding of the health of marine resources and the impacts of management.

This guide provides guidelines for appropriate methodology for community-based ecological monitoring of marine resources. The methods developed here are accessible to anyone regardless of education. The approach focuses on the evaluation of natural resources that are most important to local fishers.

The key objectives of community-based ecological monitoring are to:

- Educate the entire community on the urgency of developing a management plan and conserve natural resources;
- Integrate and involve the entire community into the management of marine resources;
- Strengthen local capacity for resource management;
- Provide information necessary to community leaders to make reasonable decisions based on evidence and objectively develop an adaptive approach to management.

Incorporating community-based ecological monitoring into monitoring plans

The process is usually facilitated by an NGO (non-government organisation) or government agency in the beginning. Over time, however communities can be given more and more responsibility until they are capable of carrying out monitoring independently.

The first step in the process is to meet with marine protected area (MPA) or locally managed marine areas (LMMA) community leaders to discuss the development of a community-based ecological monitoring program. The goals of the program should be discussed and input should be sought from all stakeholders in the MPA or LMMA on the design of the program. The frequency of monitoring, the budget, and the distribution of results should be decided on. If there are certain indicators or sites of particular interest to some stakeholders then this may be incorporated into the design.

It is important to remember that participatory monitoring is not a replacement for scientific monitoring, as it is not scientifically rigorous and may not give a complete picture of ecological health, and may not be practical for some species or habitats (for example, deep coral reefs). Rather, participatory monitoring is an important complement to other monitoring efforts and should be incorporated into all MPA and LMMA monitoring and evaluation plans.

Preliminary meeting

The participatory ecological monitoring process begins with a village meeting to select indicator species, monitoring sites, and the monitoring team. Fishers should identify their key resources and any already recognisable indicator species of fishery or marine habitat health.

Monitoring methods in southwest Madagascar

Below are examples of three CBM methods used in the Velondriake LMMA to monitor temporary octopus reserves, permanent fish reserves and permanent mangrove reserves. For all methodologies, three sites are selected for monitoring by each village:

1. within a current reserve,
2. adjacent to the reserve, and
3. a control, of similar habitat but not adjacent to the reserve.

The specific methodology used for the monitoring depends on the target species and the habitat. Training of community volunteers occurs the morning of the study and is conducted by two members of the supporting agencies science team. The accompanying comic is used as a reference as well as providing a number of visual diagrams.

Octopus monitoring

The number of octopus holes are counted along 100 m belt transects (measuring tape) with three replicates completed parallel to the coast at each site. Two observers walk the



length of the transect and record the number of octopus and octopus holes in the area extending 1.5 m on either side of the transect tape, measured using two 1.5 m lengths of bamboo. Monitoring is timed to coincide with spring tides, and should be repeated biannually and can also be carried out before, during and after temporary octopus reserve closures.

Fish monitoring

At the initial village meeting, local community members choose three important target species of fish to be monitored.

Six community members, who have been chosen at the initial meeting as capable swimmers (and at least minimal skill at free diving), conduct a 20 minute random timed swim using snorkel and fins and record the number of target species fish observed. As target species are spotted, they are called out to one of the team members on the pirogue who tallies the sightings on a data sheet in the native language. This person also watches over the swimmers to make sure they are spread out over the zone to avoid double counting.

During the initial capacity building period, it is important to have an NGO / government scientist swim with the community volunteers making sure that they are identifying the correct fish and are swimming in random directions (rather than concentrating on areas with lots of fish).

Mangrove monitoring

For mangrove monitoring, community members assess both the number of crab holes present, as well as the number of cut stumps of mangrove trees. Two mangrove sites are selected by the community at the initial meeting. One should be a site heavily exploited by the community, with the other one being only lightly exploited. For assessment of crab populations, three x 100 m belt transects are completed, with the number of crab holes located within 1.5 m of either side of the transect recorded, using two 1.5 m bamboo sticks. For the assessment of human pressure on mangrove trees, two villagers record the number of cut stumps and the species of mangrove observed in three 10 m x 10 m quadrats. These data are recorded on a data sheet in the native language.

Peer-to peer education

After data gathering is completed, the entire team tabulates the results from the data sheet. Indicators (target fish, octopus holes, crab holes) are totalled for each site and compared. Importantly, averages and percentages are not used as many people do not understand these terms. The results are discussed in a participatory effort, guided by the scientist and preliminary conclusions are drawn about the data. If previous data exist, this is compared with the data from that days' activities and trends are discussed. The summary data, trends and conclusions are then copied by each community volunteer into a small notebook for future reference





during peer education. The study participants are then trained to be peer educators and to go back to the village and tell everyone about the results of the study. The participants are encouraged to spread the message for a competition that will be held the following day where villagers will be broken up into competing teams to answer questions about the study. The study participants will not be able to participate but will instead get a prize based on whose team scores the most points in the competition. In this way, participants are motivated to tell as many people in their section of the village as possible in order to maximize their chances of winning a good prize (e.g. t-shirt).

Dissemination of results (village competition)

The purpose of the competition is to encourage and evaluate the success of the study participants in spreading knowledge about the monitoring. The event also provides a fun, public forum for debate, discussion, and reflection of the results. It can also be a forum for spreading other related messages to a receptive and captivated audience.

Questions are posed to the teams over a two hour competition. Volunteers are taken one at a time from each team in rotation and asked a question. Simple prizes such as soap, pens and exercise books are given for correct answers. Incorrect responses allow for someone from another team to “steal” the point by answering correctly. If the other teams do not get the correct answer, the

facilitator reads it aloud. Top prizes for the study participants with the winning team are presented at the end of the ceremony.

Integration of results in management activities

Although data collected during monitoring are insufficient to conclusively prove trends, evidence from a year and a half of monitoring in the Velondriake LMMA of southwestern Madagascar shows that results can suggest overall trends and provide important information to resource managers in a manner which can easily be understood. Furthermore, when paired with results from professional scientific monitoring, community monitoring results improve community understanding of all monitoring activities. Moreover, post activity surveys have shown that CBM activities are easily recalled by community members with a high rate of retention for key messages and results delivered at competitions.

Further development of CBM

Through the focused transfer of project leadership and management to community leaders and after a few completed cycles through the CBM process, communities should become relatively self-sufficient in resource monitoring, and result distribution. Ideally, each village in a region should gather data and feed it to a central database managed either by an NGO or the government. This agency will communicate these results to the relevant actors in the area, feeding this into regional resource

management planning, while also providing continued technical support to communities (such as occasional monitoring by outside experts for purposes of results verification). Intervillage competitions with prizes for best monitoring programme are one way to promote the continuation of monitoring past the initial capacity building period.

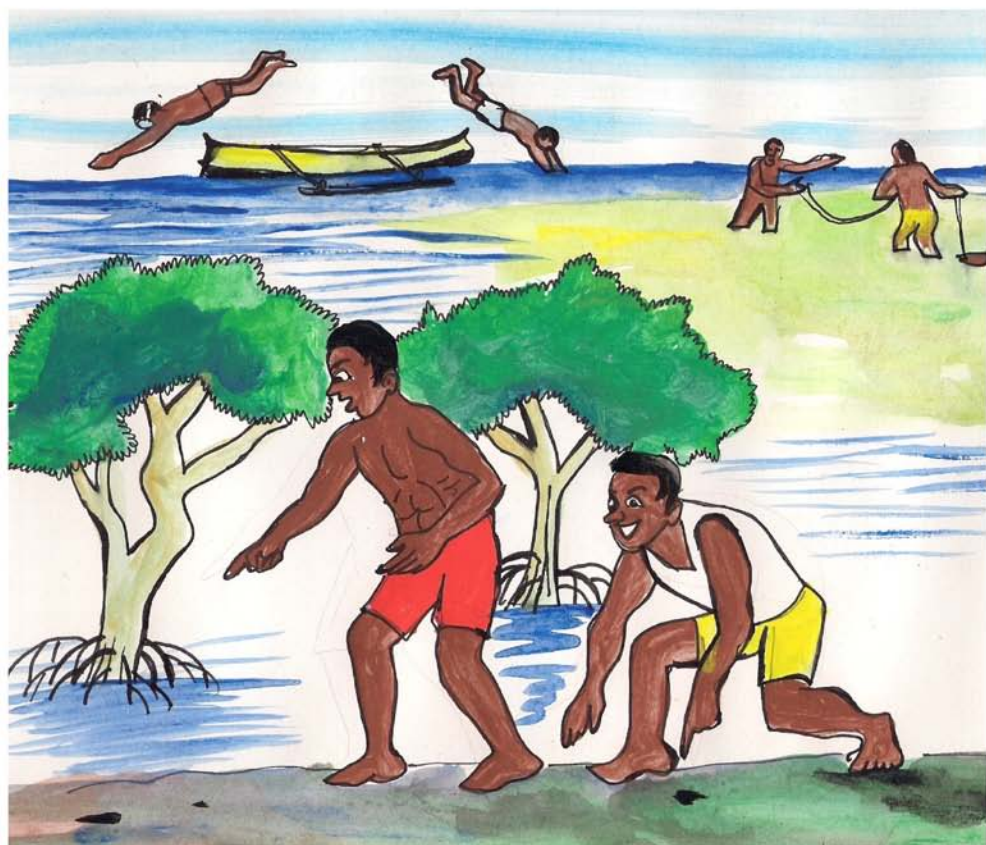
Conclusion

The sustainability of any method of community ecological monitoring depends on its usefulness to stakeholders, their capacity to implement it and its cost. The methods described in this handbook have proven successful on all three of these factors for the Velondriake LMMA. Communities in other areas will need to adapt these methodologies and procedures to their particular ecological and social contexts. However, in general, community-based monitoring offers a number of important advantages over professional scientific monitoring in terms of cost, and community understanding of monitoring results. It should be noted however that when possible, it is preferable to combine minimal professional monitoring and community monitoring to ensure that community results are scientifically valid so as to avoid misinforming management efforts.

PARTICIPATORY SCIENTIFIC MONITORING

INDIAN OCEAN COMMUNITY CONSERVATION HANDBOOK 8
COMMUNITY-BASED RESOURCE MONITORING
BY LALAO RAVAORINOROTSIHOARANA, SHAWN PEABODY

AUDIENCE: STUDENTS, COMMUNITY MEMBERS
ARTWORK: NADY RATSIMBAZAFY

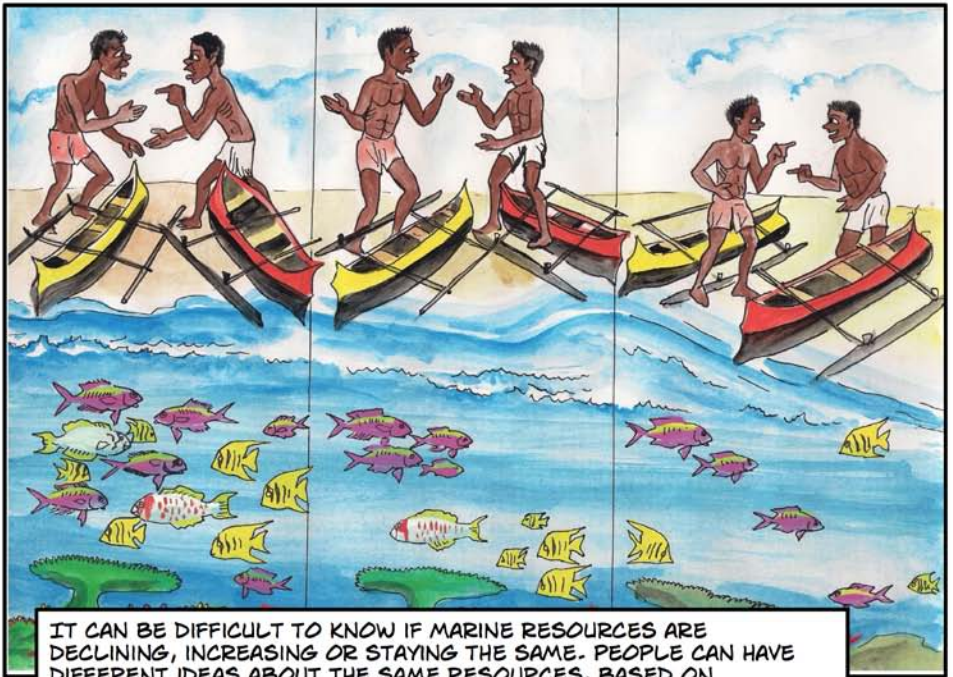


blue ventures
discovery through research

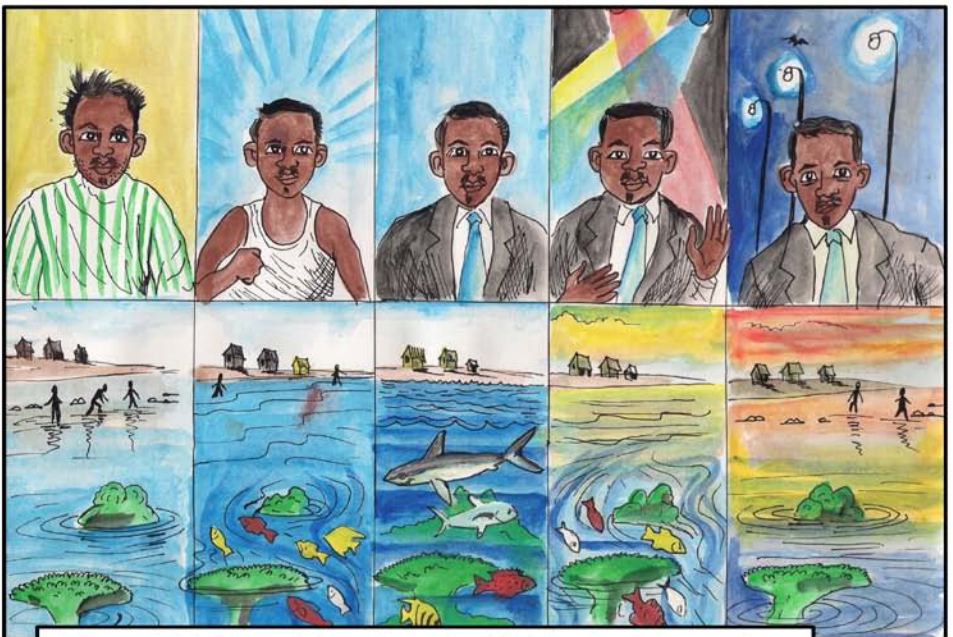
MacArthur
Foundation

 Sida

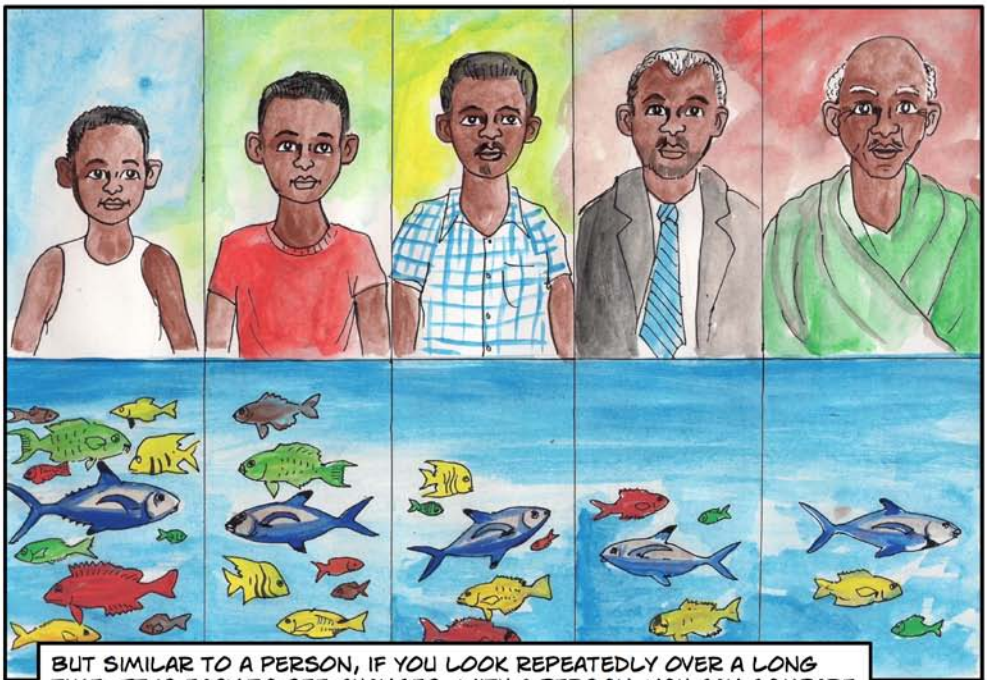




IT CAN BE DIFFICULT TO KNOW IF MARINE RESOURCES ARE DECLINING, INCREASING OR STAYING THE SAME. PEOPLE CAN HAVE DIFFERENT IDEAS ABOUT THE SAME RESOURCES, BASED ON DIFFERENT EXPERIENCES AND PERCEPTIONS.



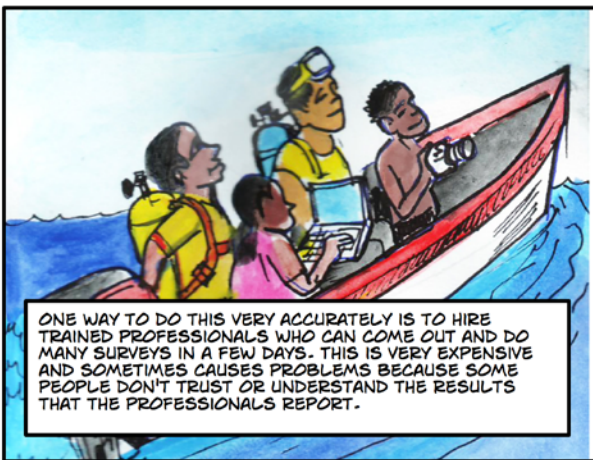
ONE REASON WHY IT IS DIFFICULT TO KNOW IS THAT THE MARINE ENVIRONMENT CHANGES A LOT, EVEN IN ONE DAY. SIMILAR TO HOW A PERSON'S APPEARANCE CHANGES IN ONE DAY.



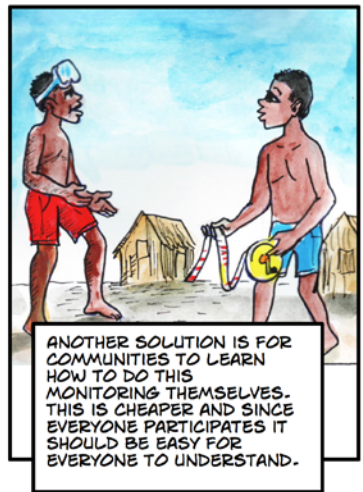
BUT SIMILAR TO A PERSON, IF YOU LOOK REPEATEDLY OVER A LONG TIME, IT IS EASY TO SEE CHANGES. WITH A PERSON, YOU CAN COMPARE DIFFERENT TIMES BY TAKING MULTIPLE PICTURES. WITH THE MARINE RESOURCES, YOU CAN'T TAKE PICTURES OF IT ALL, SO YOU HAVE TO USE ANOTHER METHOD.



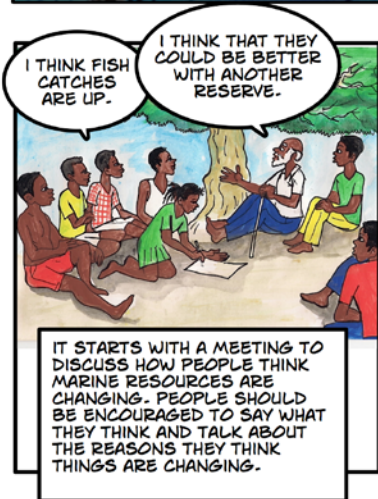
SURVEYING IS LIKE TAKING A PICTURE OF MARINE RESOURCES. SURVEYING IS WHEN A TEAM OF PEOPLE GO OUT AND MEASURE THE RESOURCES IN AN AREA. THESE COULD BE FISH, OCTOPUS, MANGROVES, OR CRABS. BY REPEATEDLY SURVEYING AN AREA OVER MONTHS AND YEARS, YOU CAN GET AN ACCURATE IDEA OF CHANGES OCCURRING WITH MARINE RESOURCES. YOU CAN SEE IF THERE ARE, FOR EXAMPLE, MORE FISH THAN BEFORE, OR LESS, OR IF THINGS AREN'T CHANGING MUCH.



ONE WAY TO DO THIS VERY ACCURATELY IS TO HIRE TRAINED PROFESSIONALS WHO CAN COME OUT AND DO MANY SURVEYS IN A FEW DAYS. THIS IS VERY EXPENSIVE AND SOMETIMES CAUSES PROBLEMS BECAUSE SOME PEOPLE DON'T TRUST OR UNDERSTAND THE RESULTS THAT THE PROFESSIONALS REPORT.



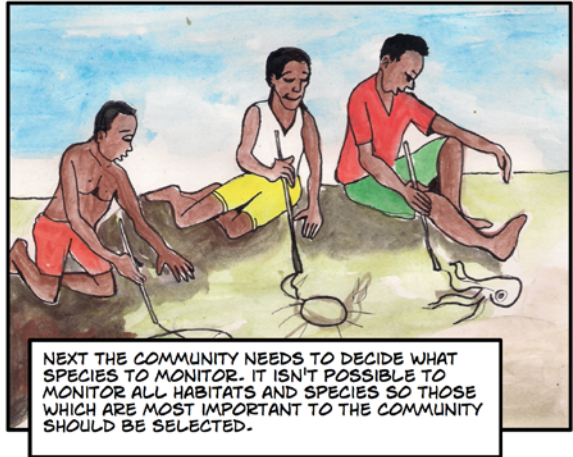
ANOTHER SOLUTION IS FOR COMMUNITIES TO LEARN HOW TO DO THIS MONITORING THEMSELVES. THIS IS CHEAPER AND SINCE EVERYONE PARTICIPATES IT SHOULD BE EASY FOR EVERYONE TO UNDERSTAND.



I THINK FISH CATCHES ARE UP.

I THINK THAT THEY COULD BE BETTER WITH ANOTHER RESERVE.

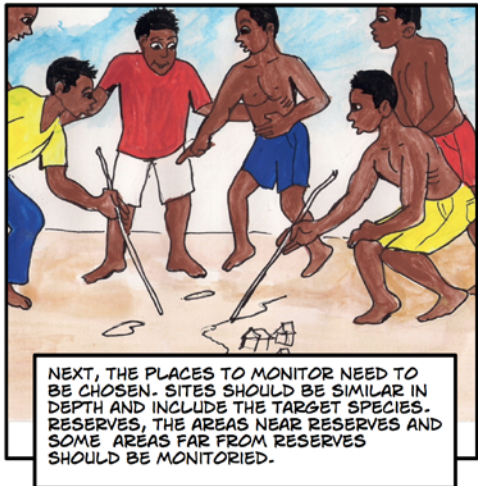
IT STARTS WITH A MEETING TO DISCUSS HOW PEOPLE THINK MARINE RESOURCES ARE CHANGING. PEOPLE SHOULD BE ENCOURAGED TO SAY WHAT THEY THINK AND TALK ABOUT THE REASONS THEY THINK THINGS ARE CHANGING.



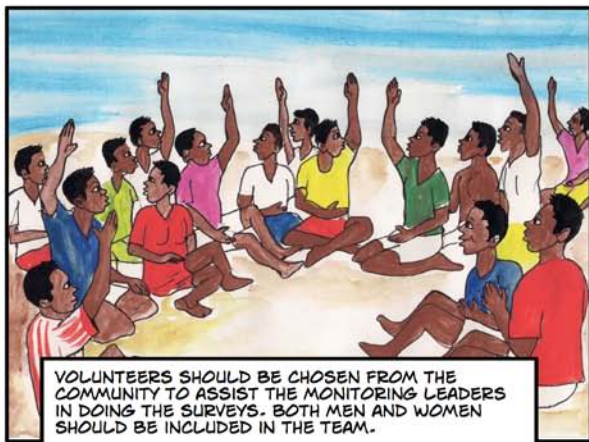
NEXT THE COMMUNITY NEEDS TO DECIDE WHAT SPECIES TO MONITOR. IT ISN'T POSSIBLE TO MONITOR ALL HABITATS AND SPECIES SO THOSE WHICH ARE MOST IMPORTANT TO THE COMMUNITY SHOULD BE SELECTED.



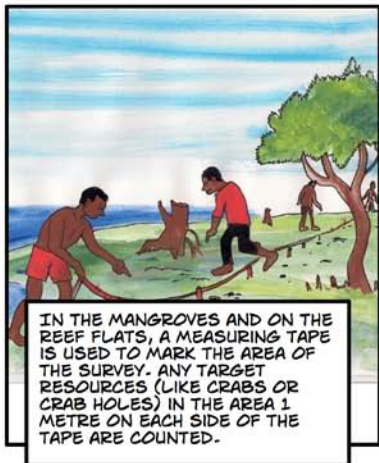
THE COMMUNITY SHOULD BE AS SPECIFIC AS POSSIBLE. IF FISH ARE CHOSEN, WHICH SPECIES ARE MOST IMPORTANT. THE TOP 3 SPECIES FOR EACH RESOURCE SHOULD BE IDENTIFIED.



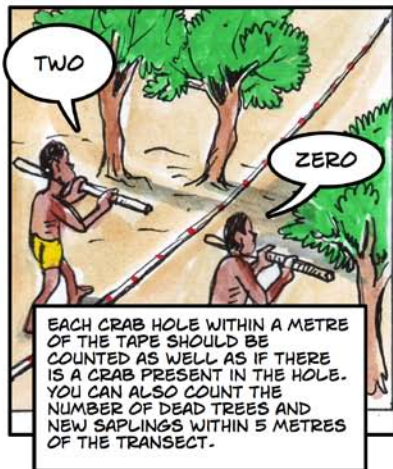
NEXT, THE PLACES TO MONITOR NEED TO BE CHOSEN. SITES SHOULD BE SIMILAR IN DEPTH AND INCLUDE THE TARGET SPECIES. RESERVES, THE AREAS NEAR RESERVES AND SOME AREAS FAR FROM RESERVES SHOULD BE MONITORED.



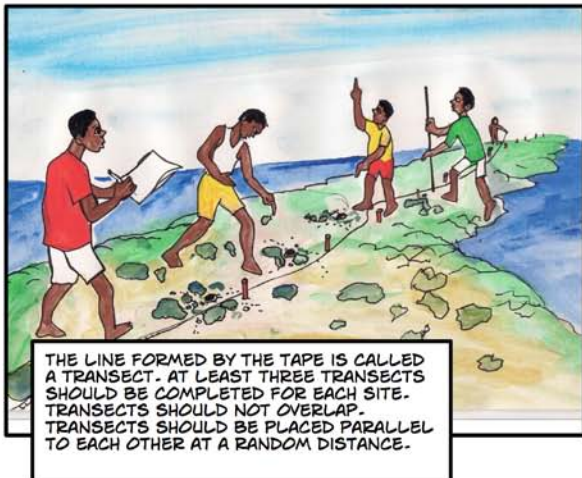
VOLUNTEERS SHOULD BE CHOSEN FROM THE COMMUNITY TO ASSIST THE MONITORING LEADERS IN DOING THE SURVEYS. BOTH MEN AND WOMEN SHOULD BE INCLUDED IN THE TEAM.



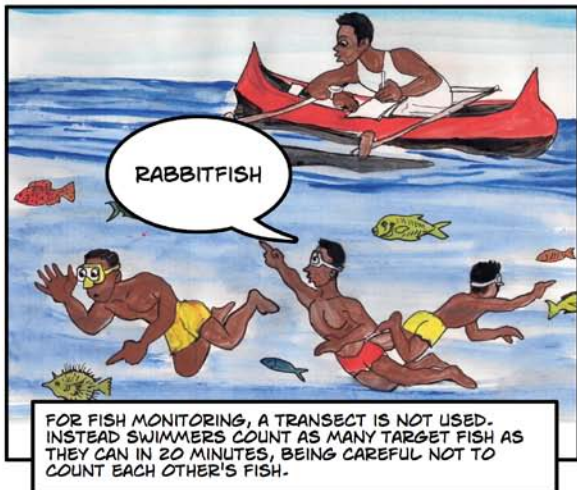
IN THE MANGROVES AND ON THE REEF FLATS, A MEASURING TAPE IS USED TO MARK THE AREA OF THE SURVEY. ANY TARGET RESOURCES (LIKE CRABS OR CRAB HOLES) IN THE AREA 1 METRE ON EACH SIDE OF THE TAPE ARE COUNTED.



EACH CRAB HOLE WITHIN A METRE OF THE TAPE SHOULD BE COUNTED AS WELL AS IF THERE IS A CRAB PRESENT IN THE HOLE. YOU CAN ALSO COUNT THE NUMBER OF DEAD TREES AND NEW SAPPLINGS WITHIN 5 METRES OF THE TRANSECT.



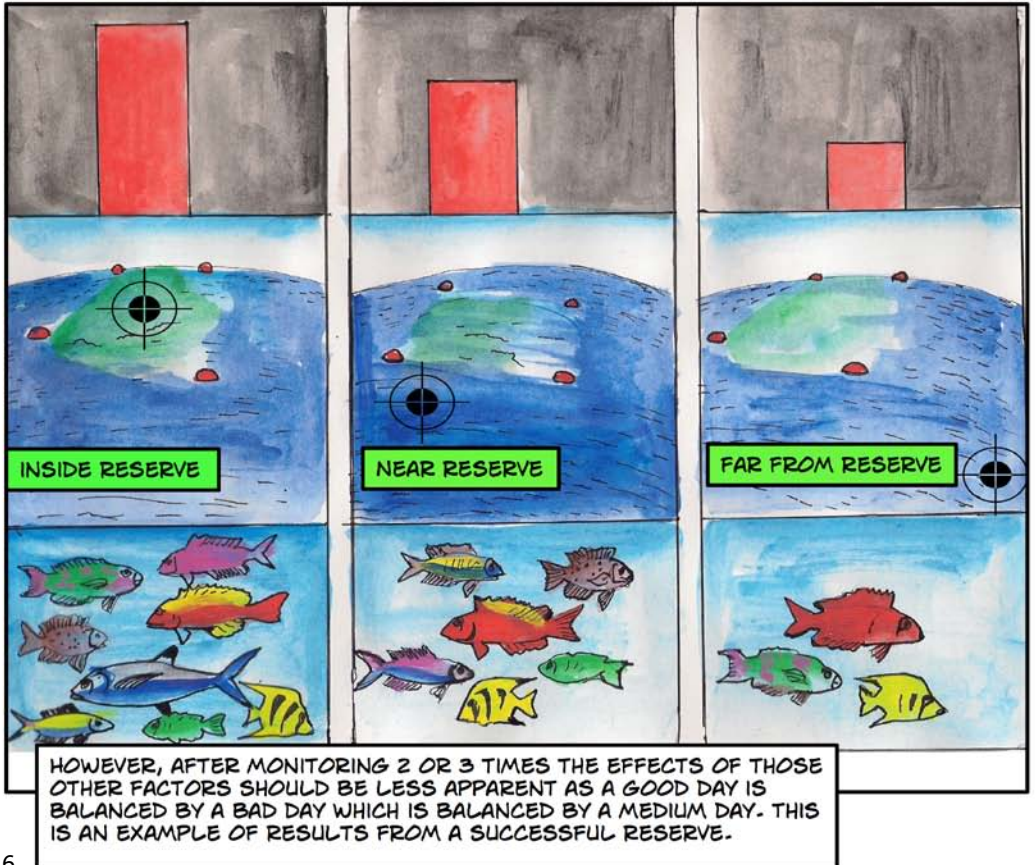
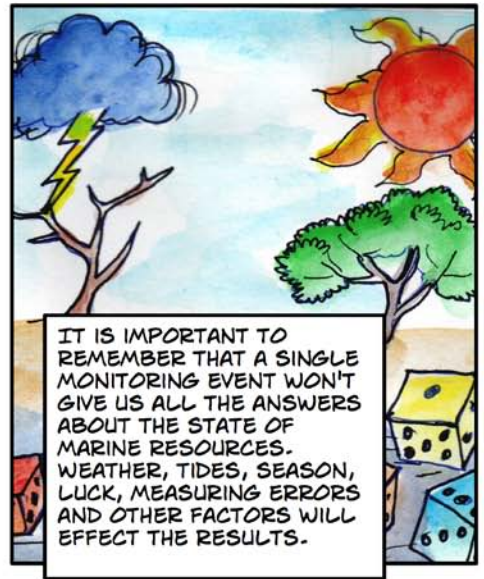
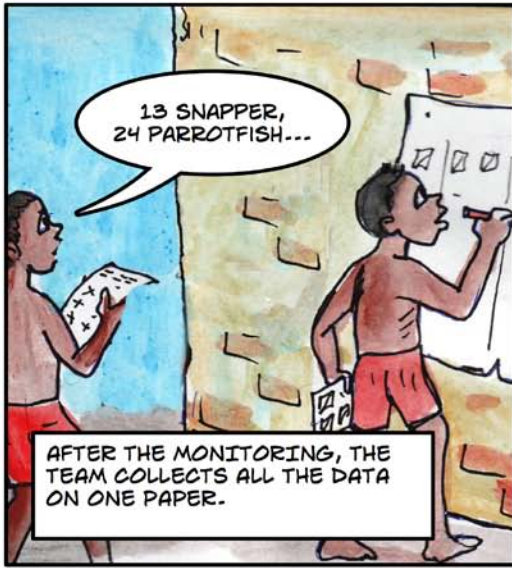
THE LINE FORMED BY THE TAPE IS CALLED A TRANSECT. AT LEAST THREE TRANSECTS SHOULD BE COMPLETED FOR EACH SITE. TRANSECTS SHOULD NOT OVERLAP. TRANSECTS SHOULD BE PLACED PARALLEL TO EACH OTHER AT A RANDOM DISTANCE.

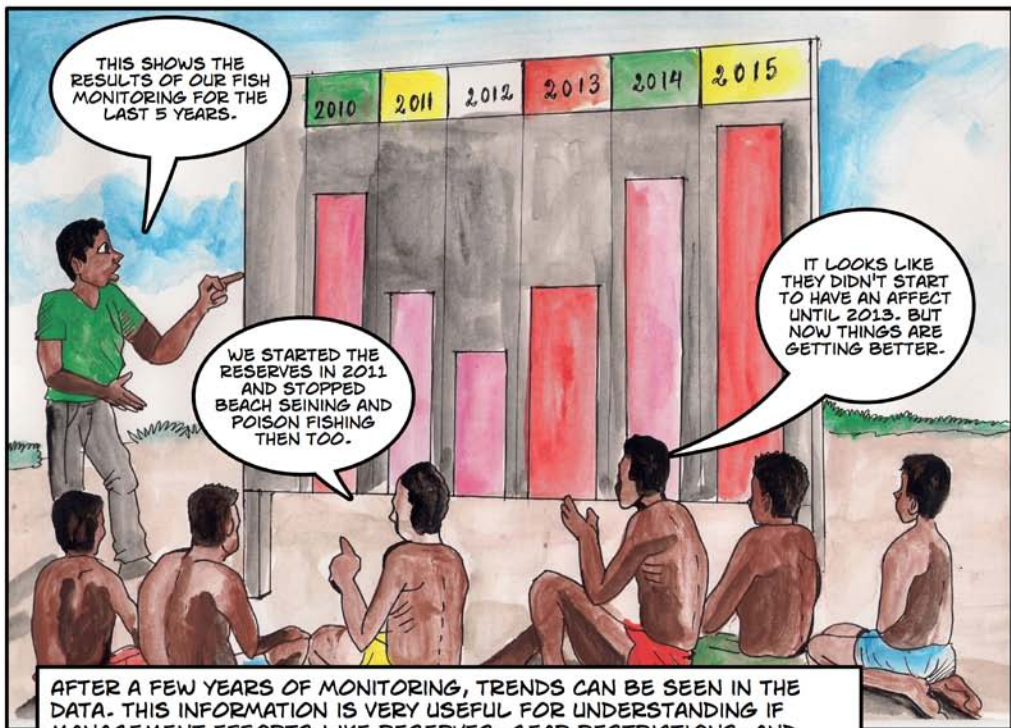


FOR FISH MONITORING, A TRANSECT IS NOT USED. INSTEAD SWIMMERS COUNT AS MANY TARGET FISH AS THEY CAN IN 20 MINUTES, BEING CAREFUL NOT TO COUNT EACH OTHER'S FISH.



SWIMMERS NEED TO STAY SPACED FROM EACH OTHER SO AS TO AVOID COUNTING THE SAME FISH. SWIMMERS SHOULDN'T RETURN TO THE BOAT UNTIL THEY HEAR THE WHISTLE.





AFTER A FEW YEARS OF MONITORING, TRENDS CAN BE SEEN IN THE DATA. THIS INFORMATION IS VERY USEFUL FOR UNDERSTANDING IF MANAGEMENT EFFORTS LIKE RESERVES, GEAR RESTRICTIONS, AND ALTERNATIVE LIVELIHOODS ARE WORKING.



END

THE MOST IMPORTANT THING IS FOR PEOPLE TO TALK AND THINK ABOUT THE RESULTS, TO SHARE IDEAS SO THAT EVERYONE HAS THE INFORMATION NEEDED TO MAKE INFORMED GROUP DECISIONS ABOUT THE SHARED MARINE RESOURCES.

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