Community-based management and conservation

Marshall Islands surveys to support a national effort towards reef conservation

by Dr Silvia Pinca[1]

The Marine Science Program (MSP) at College of the Marshall Islands (CMI) is working on marine resources together with Marshall Islands Marine Resources Authority (MIMRA), the Ministry of Internal Affairs (IA) and Environmental Protection Authority (RMI-Epa) under the umbrella of the newly formed "MIEC Working Group". The MIEC group was established in fall 2002 through the coordination of the Secretariat of the Pacific Community to help each atoll population prepare their individual Fish Management Plans. The idea is to delegate responsibility for coastal resource management to the local communities and government councils and help them manage fishing and other activities related to marine resources. The multi-agency-driven plan supports the local governments with underwater marine resources surveys and active involvement of local communities through workshops. The community workshops are directed by MIMRA representatives, conducted in Marshallese, and aimed at both women and men's groups in the outer islands. MSP-CMI is engaging in the underwater surveys to assess the health of reefs and the fishing potential of the atolls of RMI with the purpose of conserving particularly rich or threatened zones, which is one of the goals expressed by the Biodiversity Strategy and Action Plan issued by the central government in 2000.

The first pilot project undertaken by MSP-CMI in 2001 in Likiep, was already part of this project even before the formation of MIEC, and took shape by a request from MIMRA that needed to understand "what resources are available and abundant and what resources need to be conserved". It was the first step towards the preparation of the Fish Management Plans. This study in Likiep was successful in both training local students — now local experts working as intern at MIMRA — and in data acquisition on the state of reefs and food fish resources in the atoll as well in issuing recommendations on best sites for possible conservation practices. After this first 2001-Likiep experience, more surveys followed at Rongelap and Bikini, in summer 2002 by the Natural Resources Assessment Surveys team (NRAS). At the MSP-CMI, I put together NRAs for those expeditions in 2002 to match up local marine survey expertise with that of scientists from different countries all around the world. The team of 14 science divers included previously and newly trained local graduates as well as invited external scientists from UK, US and Australia. This time the study included not only commercial food-fish and general coral reef assessment but also a higher detailed study on the health and richness of coral reefs and their associated fauna, as well as a biodiversity qualitative assessment of all the species of shelf and slope reef fish and hard corals. This last effort was made possible by the presence of two specialists from Australia. In June and July 2003 the NRAS team was composed of scientists and students from nine different countries (RMI, Australia, Brazil, Canada, Italy, Germany, the Philippines, UK, and USA) who worked together in the remote atolls of Mili, Rongelap and Ailininae.

Methods used

Local students from the College of the Marshall Islands received long-term training on coral reef taxonomy, species identification and survey methodology. The trainees had participated in previous expeditions (Likiep, Jaluit, Bikini) and are now the national experts in coral reef surveying and species identification.

The survey methodology applied in the 2002 and 2003 surveys (NRAS, 2002) was fine-tuned after the experience of the pilot project in Likiep (2001). Four transects, parallel to the shoreline, are laid at four different depths (20, 15, 10 and 5 m). Divers on

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each transect record substrate type, coverage, abundance of target species of corals, percentage coverage of coral life forms, abundance and size of target species of about 120 species of fish and fish families, seaweed coverage and genera, and commercial invertebrates abundance, in a volume of water of 1250 m^3 (50 x 5 x 5 m). In addition, the 15 m transect is replicated three times to give an indication of the variability at that depth. Sites are selected on both ocean and lagoon sides of the atolls, including pinnacles and patch reefs. In addition to the transects, two taxonomists record biodiversity of fish and corals during 60-minute timed-swims. Collection of a species of damselfish, *Chrysiptera tracey*, has been added to the plan during this last expedition to obtain a genetic analysis to detect possible different populations of the fish and their connectivity, which then gives an indication of larval dispersal. Measurements of currents have been made through the deployment of flow meters at all the major passes and through in situ measurements at all sites to model a pattern of current flow around the atoll that will help the determination of larval dispersal mechanism. These two pieces of information will be used for a more accurate selection of sites for MPAs.

Major results

New range extensions (where a species of fish or coral is found in this area — or in the Pacific region — for the first time) for several species of corals and fish were detected during the 2002 and 2003 expeditions. New species of corals and fish are under description.

Recommendations for MPAs to be established — as it is the general wish of the local populations and of MIMRA — at Likiep and Rongelap-Rongelap were presented at the end of the two 2001 and 2002 expeditions. New ones for Mili and Rongelap atolls will be ready soon. The first trip to the uninhabited atoll of Rongelap, limited to the main island of Rongelap-Rongelap, where a new tourism activity is taking the first steps towards development, resulted in recommendations for the institutionalisation of an MPA or sanctuary at the south tip of the island at Jaboan point. A very high diversity and extreme richness of fauna, together with perfect health of reef were recorded in this particular area. Coastal managers and marine biologists worked together to recommend this site to be preserved in its current state of pristine health and high biodiversity. The 2003-expedition surveyed the entire atoll. The 15 participants explored reefs from inside the wide lagoon of Rongelap and on the outside walls and passes to find pristine reefs and particularly large fish, and overall a specially rich and diverse fauna. Data are still in the process of being analysed and more recommendations for new MPA sites will be issued soon.

On the atoll of Mili, the team is cooperating directly with local land-owners and government to support the declaration of a marine sanctuary and other protected zones. Land-owners agreed to dedicate a few islands to the conservation of the natural richness of a region in the northeast corner of the atoll. Beaked whales, spinner dolphins, sharks and large-size fish were found in this area, which is also very diverse in habitats. The area includes ocean walls, passes, pinnacles and lagoonal reef habitats. It is the desire of the inhabitants of Mili to have a marine laboratory located in this area for both students from CMI and visiting scientists.

Discussion

The actions towards the preservation of Marshallese marine resources answer both a precautionary effort to conserve pristine reefs and a direct demand from local users who complain of the loss of target preys of both commercial and local use. Lower abundance of clams, fish, lobsters and cowrie shells have been reported by local populations from different outer atolls. There is still a long way to go before marine reserves or other management measures are firmly established, but several atolls (Jaluit, Likiep, Mili and Rongelap) are spearheading this effort. The scientific help in the selection of conservation sites and

School of rainbow runners (*Elegatis bipinnulata*) and black jacks (*Caranx lugubris*) off the north wall in Rongelap.

Coral diversity in Rongelap atoll.

Surveyors and gray reef shark (*Carcharhinus amblyrhynchos*) on Rongelap Atoll.

practices is based on biological information of coral reef communities, biodiversity, current measurements and conservation theories. Ecological observations such as the ones collected by NRAS can indicate on where the healthy and productive ecosystems are, where conservation is more urgent and more efficient for repopulation of scarce species, and where the recruitment of important species takes place, since it is important to protect both nursing grounds and spawning sites. It is on these scientifically based recommendations that the working group will help the local atoll governments plan their conservation resolutions together with the opinions and desires of local communities. In this way, the establishment of marine protected areas will be the result of community consultations, expectations and requests, as well as of the outcome of the research conducted by local and external scientists.

Conservation will hopefully also help protect fishing grounds from illegal fishing operations. With outstanding diversity and coral cover, Rongelap and Mili atolls provide refugee for a suite of marine organisms. Because of their remote location, these atolls and other atolls such as Ailinginae, Bikini and Jaluit, still lay prey for illegal fisherman.

The community-based marine protected areas (CB-MPA) will be adopted as the modernised version of the traditional Marshallese *mo* or tabu area. When such small reserves are established in RMI, local people will be engaged in the patrolling of the protected areas, become tour guides for nature visitors, be in charge of monitoring the condition and health of the ecosystem, as well as managing research stations that should gravitate around such protected sites.

These CB-MPAs will be funded through community-managed activities based on tourism and aquaculture. The management plans will have to include programmes for economic exploitation of MPAs: tourist entrance fees to the park for snorkeling access, anchoring fees at mooring buoys, interpretative material and souvenir sales at the park, guided tours. New aquaculture enterprises (giant clams, corals, pearls) coupled with MPAs as sources of seedlings and as protection of the in situ farming site, could support the programme through the dedication of part of the profit (sales to aquaria and souvenir shops) to the park management expenses. The income generated by such kind of activities would sponsor the park rangers salaries and the patrolling expenses.

Training local personnel in management and monitoring is essential to the success of any community-based solution to conservation and sustainable development. Plans for training local people are being developed at CMI, and some punctual assistance from external institutions has been given in the past (University of Rhode Island – Coastal Resource Center for community-based management; University of Hawaii-Hilo for locally-based aquaculture; University of Alaska for market and economic studies on aquaculture and fisheries). Projects for more workshops and training are being prepared for the specific case of MPAs management and monitoring, but complementary financial support is needed. Local inhabitants are already showing interest in being park rangers or controllers and asking for training. Local community awareness is organised by MIMRA through community meetings and workshops in the outer island. The Likiep community already received this part of the training. For marine park rangers, a more specific education will take place at CMI, where basic instruction on reef ecology and monitoring techniques will be offered. MPAs locations are selected to be nearby villages in order to facilitate the patrolling and monitoring of the sites.

An extremely important and difficult task that is still in need of support will be the assistance for enforcement of new regulations that control MPAs: legal and financial assistance is searched for in order to achieve a correct use of MPAs. Without enforcement of regulations any other efforts in the preparation and setting up of MPAs would be useless and the ending result would be doomed to failure.

It is our hope that the combined work of NRAS, local stakeholders and governments will ensure the long-term protection and sustainable use of the natural resources of these islands as well as the preservation of the richness of these reefs for the benefit of future generations.

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