

Women fishers in Fiji launch a mud crab management plan for their fishery

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Background

Mud crabs (*Scylla serrata*), known locally in Fiji as *qari*, are an important food source for subsistence and livelihoods, and are caught mainly by women in Fiji's coastal communities (Mangubhai et al. 2017; Lee et al. 2018). In Fiji's Bua Province, mud crab harvesting is largely undertaken by women in mangroves, intertidal flats and rivers within their traditional fishing grounds (*goliqoli*) (Mangubhai et al. 2017). Locally, mud crabs are highly prized due to their high meat yield for household consumption and their ability to be harvested and sold without the need for ice or refrigeration. They are increasingly being sourced locally as an alternative to finfish during seasonal bans on target fish species (e.g. groupers) and moratoria on other marine species (e.g. sea cucumbers).

Commercially, mud crabs command high prices by resorts and hotels as a desired seafood commodity for guests. Due to this rising demand of mud crabs and the commercialisation of the fishery, prices of mud crabs have increased nationally (Lee et al. 2018), particularly after tropical Cyclone Winston in 2016 (Thomas et al. 2018a, b). Higher prices has driven some fishers to conduct unsustainable fishing practices, such as catching and trading undersized mud crabs or egg-carrying females. At the same time, the mud crab fishery nationally is threatened by continued mangrove habitat loss or degradation from a range of human-induced pressures, such as timber harvesting and firewood collecting, land reclamation for development, pollution and climate change (Mangubhai et al. 2019).

Despite women's involvement in the mud crab fishery, and the important contribution women make to household and village protein requirements (Kronen and Vunisea 2009), they are often poorly represented in fisheries planning and management decision-making processes in Fiji and the wider Pacific (Vunisea 2008; Mangubhai et al. 2018). The inclusion of women in developing local fisheries management plans is an important step toward gender inclusiveness in fisheries management in the Pacific.

Designing a management plan

To address the social, economic and ecological issues associated with the harvesting and handling of mud crabs, Waitabu and Tacilevu villages, collectively referred to as 'Navunievu community', have developed a three-year (2018-2020) mud crab management plan with the support of the Fiji Ministry of Fisheries and the Wildlife Conservation Society. The Navunievu Community Mud Crab Management Plan was designed by mud crab fishers, and emphasizes the role of women in the monitoring and enforcement of management regulations.

The management plan was developed from a series of consultations with fishers and the wider community they are part of in order to identify key threats to the fishery, and possible management strategies to address them. To identify key issues in the mud crab fishery and develop appropriate management strategies for the management plan, consultation meetings were held between December 2016 and June 2018 with Navunievu community members. While the mud crab fishery is women-dominated, a gender-sensitive and inclusive process was used so that no fisher was left out, and the wider

community was also kept informed. The key issues identified by the community included:

- a lack of consistency in prices for mud crabs;
- distance to markets to sell mud crabs;
- increased effort needed to collect enough mud crabs to sell;
- lack of knowledge regarding mud crab post-harvest handling techniques to ensure quality; and
- lack of knowledge of market prices to ensure fair prices to fishers.

During community consultations, the Navunievu community's traditional leaders and women's and men's groups agreed to three objectives for their management plan:

1. ensuring the mud crab fishery in Navunievu is sustainable;
2. maximising economic returns from the fishery; and
3. ensuring the community of Navunievu complies with the plan.

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Because all customary fishing grounds fall under traditional authorities, the community obtained the endorsement and support of the *Bose Vanua* (Bua District Council) and the paramount chief, Tui Bua.

To ensure the mud crab fishery in Navunievu remains sustainable, everyone in the community agreed to comply with the legal minimum size limit of 125 mm, and to prohibit the catching of female crabs, carrying eggs, with any accidental catches released back into the wild. A *tabu* area (temporal fishing closure) was designated in the mangrove area with a surrounding buffer zone, with only members of the 'Navunievu Mud Crab Fisheries Committee' able to access the closed area to place mud crabs inside cages for fattening.

To maximise economic returns from the fishery training on mud crab fattening and post-harvesting handling was provided by the Crab Company of Fiji (a private crab farming company on Viti Levu) with support from the Wildlife Conservation Society (WCS) and the Fiji Locally-Managed Marine Areas (FLMMA) network. By improving the post-harvest handling of crabs, the community hopes to reduce the number of discarded individuals and wastage in the fishery. Under the plan, all thin and molting mud crabs larger than the minimum size limit of 125 mm that are caught will be placed into cages inside the *tabu* area for fattening – the greater the weight, the greater the profits. Crabs are fattened with discarded household waste such as chicken and fish discards. Fishers want to reduce fishing pressure by obtaining greater income from fewer but heavier crabs. WCS and the Ministry of Fisheries are assisting mud crab fishers

(who are mainly women) to consistently engage long-term buyers to purchase high-quality crabs. In the past, poor road conditions during rains or light showers greatly discouraged buyers from visiting Navunievu, but with better roads there is increasing opportunity to connect to buyers.

Lastly, to ensure the community of Navunievu complies with the objectives, actions and rules in the management plan they have established the Navunievu Mud Crab Fishers' Committee, with members who have been trained in proper mud crab fattening and post-harvesting techniques to maintain the quality of crabs coming from the village. Eventually, fish warden training will be provided by the Ministry of Fisheries to patrol *tabu* areas, with community funds allocated specifically for enforcement. The community hopes that fisheries management rules will be added as a condition of fishing licenses in villages across Bua District by the Ministry of Fisheries to protect the local rules they have in place to wisely manage their fisheries.

Catch per unit effort

Concurrent to the planning process, catch per unit effort data were collected by mud crab fishers to assess the state of their stocks. All but one data collector were female. Fishers recorded the number of crabs they harvested on one day per week, from June 2017 to July 2018. Information on the timing of trips (i.e. tides, moon phases), distance to sites, time spent fishing, gear types, and the fate of the mud crabs (i.e. eaten, sold or traded) was also recorded. For each individual crab, data were collected on: i) sex, distinguished by the

Fisherwomen complete training on catch monitoring for mud crabs CPUE - ©Margaret Fox (WCS)



shape and width of the abdominal flap; ii) carapace width (to the nearest mm); and the iii) absence or presence of eggs. The data showed that the majority of crabs caught were sold for income (76.8%) while the remainder were eaten (14.7%) or traded with others in the village (8.5%). The average size of both female and male crabs were 136.6 mm and 147.2 mm, respectively, which is above the legal size limit of 125 mm carapace width. However, male–female ratios of crabs were slightly, suggesting that there was overharvesting of males, likely due to their larger size and weight, or due to the reproductive patterns of mud crabs, which go offshore to spawn while males remain in estuarine and mangrove areas. With the launch of the management plan in late 2018, the community hopes that the measures put in place will ensure the long-term sustainability of their fishery.

Significance of the plan

Throughout the Pacific, women in fisheries often suffer from a ‘culture of silence’, where they are constrained in their participation in management discussions that directly affect their livelihoods (Vunisea 2008). Through the Navunievu Community Mud Crab Management Plan, women fishers are playing a key role in managing their own fisheries. This plan contributes to a broader shift toward more gender-inclusive fisheries management in the Pacific (see SPC 2018). Women are central to mud crab fisheries in the region and their knowledge and experience provides a great starting point to begin discussions on sustainable fisheries management. Actively engaging women in management plan formulation allows for the influence on actions by those who will ultimately be affected by them. Women’s involvement in decision-making processes can also

promote greater community support and compliance of the management plan. By enhancing women’s roles and influence in management decisions, the Navunievu Community Mud Crab Management Plan is helping shift the status of women in fisheries from users to shapers and makers (Cornwall and Gaventa 2001). It is important to understand the role of culture in shaping gender relationships that may differ between cultures and places. Women from Navunievu have a strong traditional belief in the spiritual power of the chief and his role in decisions related to land and sea resources.

In comparison to men, the food and economic gains generated from women’s fisheries catches is largely filtered back to their families (Chapman 1987; Harper et al. 2013; Kronen and Vunisea 2009; SPC 2018). Increasing women’s participation in management activities can result in a number of broader community benefits, including increased social and financial capital (Harper et al. 2013). As such, it is important that women receive adequate training and support, are given opportunities to participate in management consultations, and are provided with the capacity to influence the health and sustainability of their fisheries. The Navunievu Community Mud Crab Management Plan provides an example of how women fishers can participate more actively in the management of their fisheries within the cultural and social contexts they live in. By adopting experiences from the plan, communities can give fisherwomen the same platform as fisherman to manage their livelihoods and food resources.

Building mud crab fattening pens in Navunievu community - ©WCS



References

- Chapman M.D. 1987. Women's fishing in Oceania. *Human Ecology* 15(3):267-288.
- Cornwall A. and Gaventa J. 2001. From users and choosers to makers and shapers: Repositioning participation in social policy. Institute of Development Studies Working Paper 127. Institute of Development Studies: Brighton, England.
- Harper S., Zeller D., Hauzer M., Pauly D. and Rashif U. 2013. Women and fisheries: Contribution to food security and local economies. *Marine Policy* 39:56-63.
- Kronen M. and Vunisea A. 2009. Fishing impact and food security – Gender differences in fin fisheries across Pacific Island countries and cultural groups. *SPC Women in Fisheries Information Bulletin* 19:3-10.
- Lee S., Lewis A., Gillett R., Fox M., Tuqiri N., Sadvoy Y., Batibasaga A., Lalavanua W. and Lovell E. 2018. Fiji Fishery Resource Profiles. Information for management on 44 of the most important species groups. Gillett, Preston and Associates and the Wildlife Conservation Society: Suva, Fiji. 240 p.
- Mangubhai S., Fox M. and Nand Y. 2017. Value chain analysis of the wild caught mud crab fishery in Fiji. Report No. 02/17. Wildlife Conservation Society: Suva, Fiji. 100 p.
- Mangubhai S., Tabunakawai-Vakalalabure M., Fox M., Leweniqila L., Meo I., Naleba M. and Thomas A. 2018. Fiji's Northern Division hosts its first 'Women in Fisheries Forum'. *SPC Women in Fisheries Information Bulletin* 28:17-18.
- Mangubhai S., Sykes H., Lovell E., Brodie G., Jupiter S., Lal R., Lee S., Loganimoce E.M., Morris C., Nand Y., Qauqau I. and Rashni B. 2019. Fiji: Coastal and marine ecosystems. p. 765–792. In: Sheppard C. (ed). *World seas: An environmental evaluation, volume II: The Indian Ocean to the Pacific*. Elsevier.
- Thomas A.S., Vandervord C., Fox M., Nand Y., Nalasi U. and Mangubhai S. 2018a. Impact of Tropical Cyclone Winston on mud crab fishers in Fiji. *SPC Women in Fisheries Information Bulletin* 28:3–7.
- Thomas A.S., Mangubhai S., Vandervord C., Fox M. and Nand Y. 2018b. Impact of Tropical Cyclone Winston on women mud crab fishers in Fiji. *Climate and Development*. DOI:10.1080/17565529.2018.1547677
- SPC (the Pacific Community). 2018. Gender analysis of the fisheries sector: Solomon Islands. Pacific Community: Noumea, New Caledonia. 72 p.
- Vunisea A. 2008. The 'culture of silence' and fisheries management. *Women in Fisheries Information Bulletin* 18:42-43.

Mud crabs ready for sale at a market in Fiji - ©Rebecca Weeks



Strings of mud crabs being sold in local markets in Fiji - © S.Mangubhai(WCS)

