Key findings from Palau's gender and marine resources assessment: Women and men both important for use, management and youth empowerment

Ann Singeo,[1] Caroline E. Ferguson,[2] Iseko Willyander,[3] Reid Endress,[4] Surech Bells,[5] and Bryan A. Endress[4]*

Uncovering women's and men's roles in fisheries in Palau

Both women and men regularly harvest marine resources in Palau for food, custom, recreation, and income. Yet narrow definitions of "fishing" that exclude gleaning have masked women's important contributions in the sector (Kleiber et al. 2014). The "invisible, ignored, and unrecognized" nature of women's fishing activities (Thomas et al. 2021), particularly to outside researchers and funders, can lead to their exclusion from decision-making and support programmes intended to uplift all fishers (Reklai 2020), resulting in women's loss of benefits from fisheries (Ferguson 2021).

We conducted a nationwide survey to better understand how women and men use marine resources, how women's and men's roles in fisheries management are perceived, and how women and men share knowledge intergenerationally in Palau (ref. Singeo et al. 2020 for the full report). We found that women and men tend to use marine resources differently, producing gendered knowledge of the marine environment. Thus, both women and men are essential for comprehensively informed fisheries management. We found broad support among women and men in Palau for including both women and men in fisheries management and stewardship. Finally, we share a Palauan youth perspective on the future of marine resource use and management in Palau.

Methodology

To uncover how women and men use and manage marine resources in Palau, we conducted a nationwide survey of 365 women and 382 men in 12 of Palau's 16 states (not including outer islands), randomly sampled and stratified by gender and state. We achieved a confidence interval of 95% with a 10% margin of error, meaning our results are generalisable; however, we caution that relations to the marine environment vary by state and may be significantly different in the outer islands where we did not survey. We asked a series of general questions to every respondent, then asked each individual to select up to two natural resources activities that were significant to them. Individuals then answered a series of more detailed questions about

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[1] Ebiil Society, Ollei, Republic of Palau
[2] Stanford University, Stanford, California, USA
[3] Mindszenty High School, Koror, Republic of Palau
[4] Oregon State University, Corvallis, Oregon, USA
[5] Republic of Palau
[*] corresponding author (cefergus@stanford.edu)

Figure 1. Gleaning is dominated by women in Palau. Both women and men are highly engaged in harvesting marine resources. © George Stoyle

those two sectors. "Fishing for finfish" was selected by 444 participants (59%) and "gleaning for invertebrates" was selected by 67 participants (9%). Here, we report a subset of our findings most relevant to fisheries management in Palau and with implications for the broader Pacific region.

Palau's gender division of marine resources

Among those who self-identified as fishers or gleaners, 67% of fishers (n = 444) were men and 85% of gleaners (n = 67) were women. This reflects a gendered division of marine resource use with a long history in Palau (Figs 1 and 8). Yet the vast majority of the fisheries literature in Palau has focused on finfish (Matthews, 1991 is a notable exception), meaning women's roles in fisheries have been widely underreported. Gleaning is significant to Palauan women not only for food and income, but also for cultural and social practices (Box 1).

Prevalence of fishing and gleaning

Fishing is an important and popular activity in Palau, with the majority of people regularly engaging in fishing for subsistence, income, recreation, and/or cultural practices. Across the entire sample (n = 766), we found that 70% of people in Palau had done some kind of fishing in the past year, including gleaning. Men were more likely to have participated in fishing activities, though both women and men were highly engaged, with 84% of men and 56% of women reporting some kind of fishing in the past year.

Among finfish fishers (Fig. 2), the most popular fishing method for both women and men was bottom line fishing

Box 1.

Gleaning is an intergenerational practice that brings women and girls to the sea together, creating a social learning space. Women fish in groups as a way to reconnect and to share food and stories. Keeping track of the lunar cycle, women determine the best days for gleaning particular species: for brown curryfish, the harvest is during low tides in the morning; for sandfish and blackfish, when the tide is incoming; for mliml (sea cucumber eggs), when high tide is late in the afternoon; and so on. The girls collect the targeted species and the women process them for immediate consumption. When women travel to sea, one always carries lemon, salt, taro, and kilkuld (a fern), laid out in their basket to keep the cheled (sea cucumber) from falling out of the basket and as a meat tenderiser for the species whose flesh is eaten. The phrase used by women to call on one another for a fishing trip is "Let's go eat out at sea." This is how the biodiversity and ecological knowledge of the habitat and species are passed on and maintained. Included in the teaching are sustainable practices, such as taking only enough to consume at the time, bringing a little home to the elder women who no longer can go to sea, being mindful of smaller species, and avoiding collecting the breeding size. However, this important cultural practice has experienced drastic changes in recent decades with marketisation of the Palauan economy, threatening the future of gleaning and of gleaned resources.

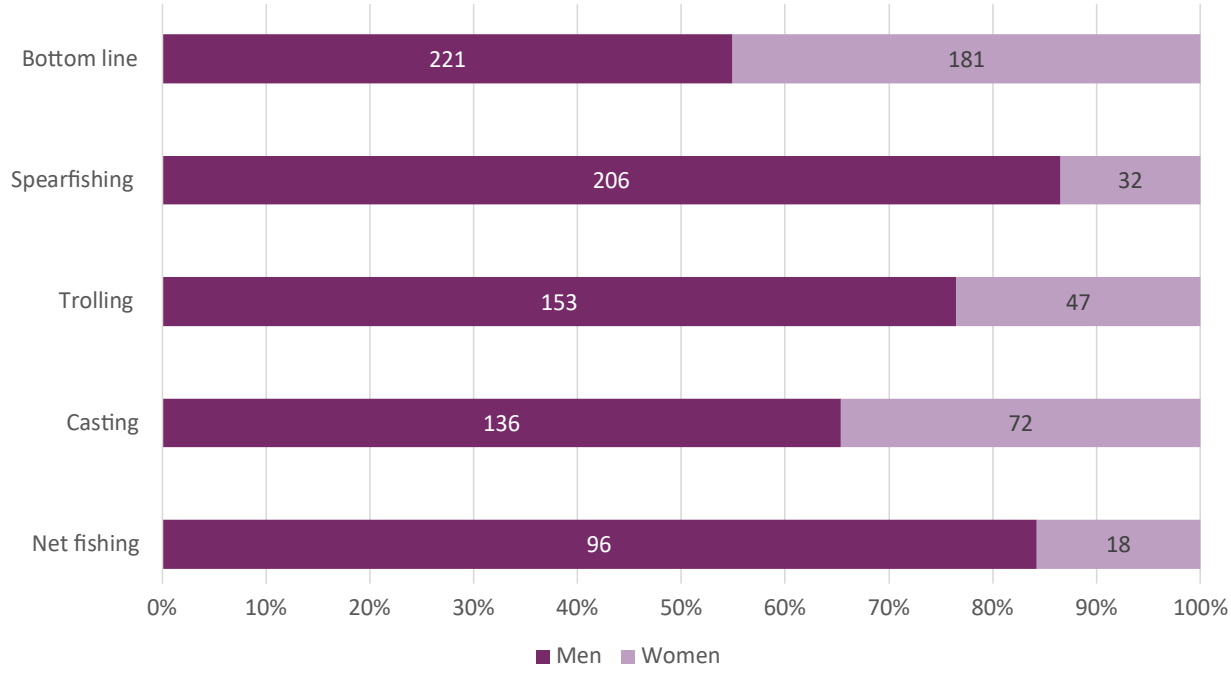

Figure 2. Both women and men fish in Palau, using many different methods. Men dominate finfish fishing, especially spearfishing and net fishing.

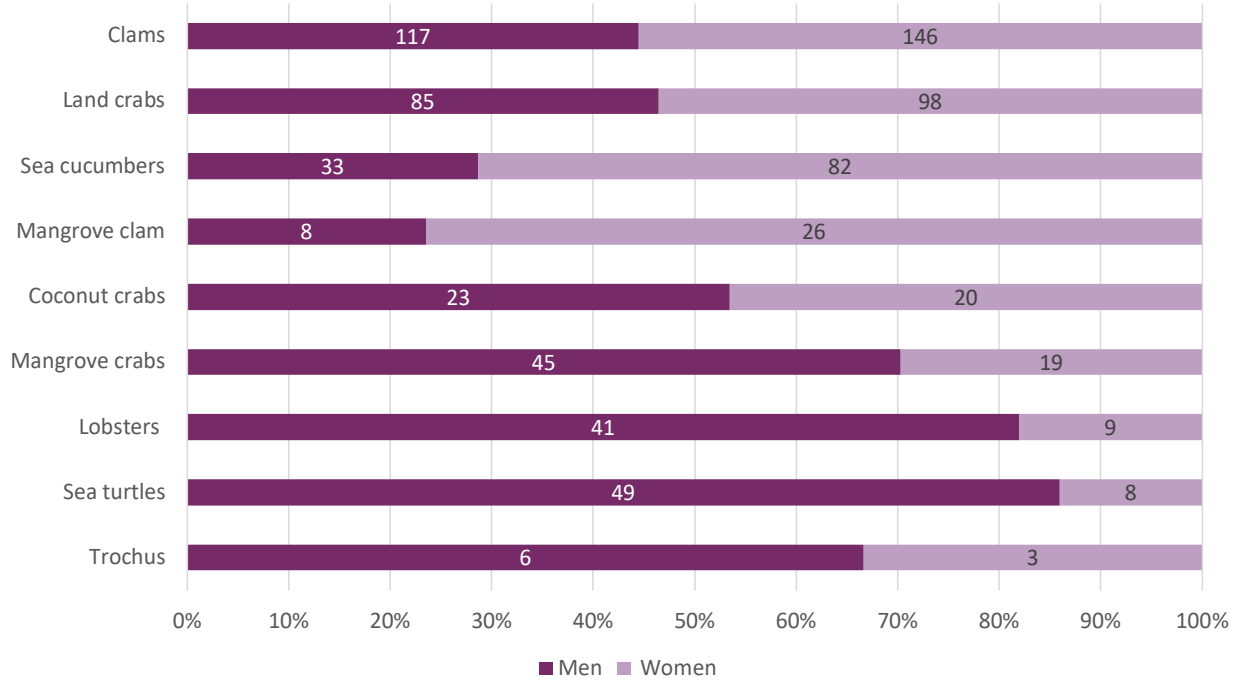

Figure 3. Both women and men target non-fish marine species in Palau, and they tend to target different species.

Figure 4. A gleaner processes sea cucumbers at the fishing ground. © George Stoyle

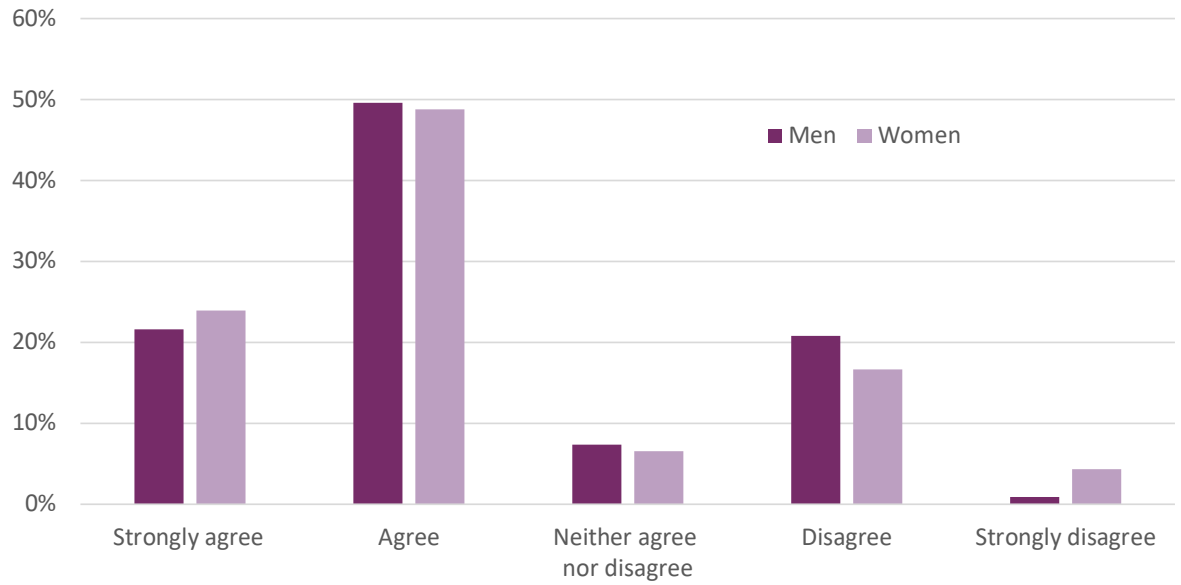

Figure 5. 72% of respondents agreed (49%) or strongly agreed (23%) that women and men use marine resources differently (n = 748).

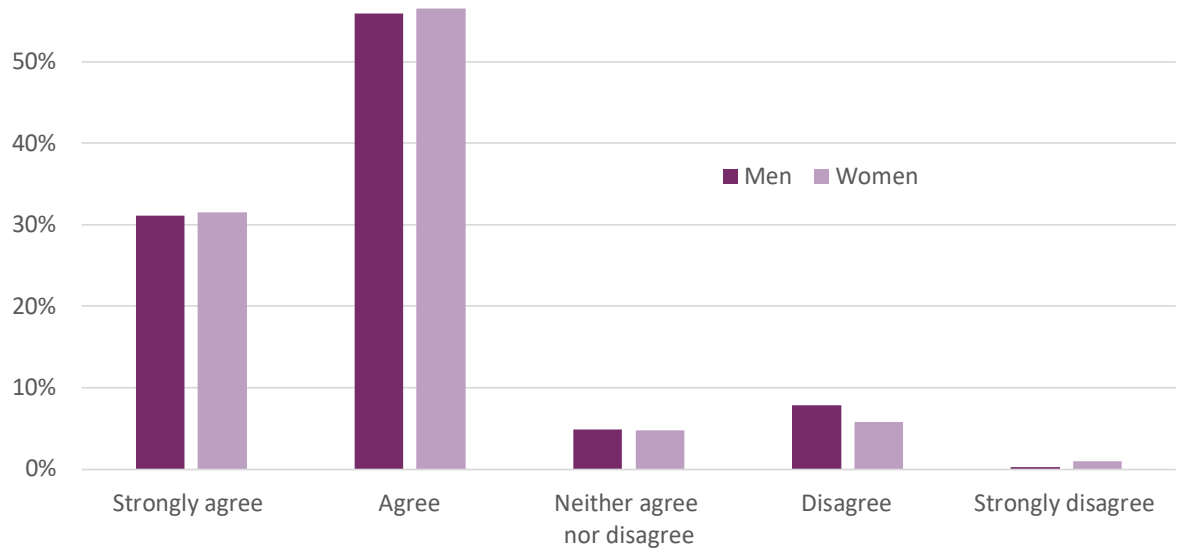

Figure 6. 88% of respondents agreed (46%) or strongly agreed (31%) that women and men have different knowledge of marine resources (n = 748).

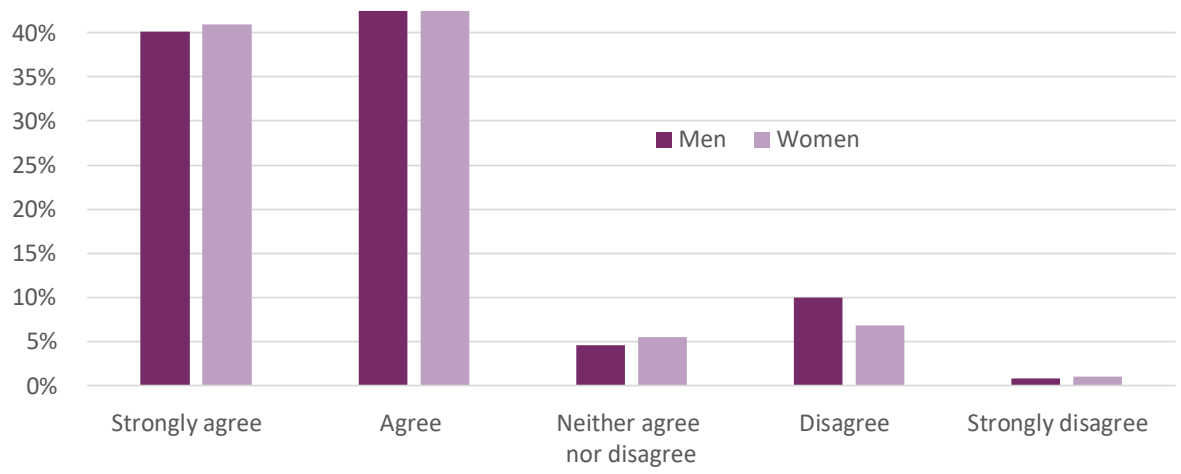

Figure 7. 85% of respondents agreed (45%) or strongly agreed (41%) that women and men should both be included in marine resource decision-making (n = 748).

(60% of men and 46% of women). For other fishing methods, the gender gap is much wider, with men significantly more likely to have participated in trolling (41% of men and 12% of women) and casting (37% of men and 18% of women). Spearfishing (56% of men and 8% of women) and net fishing (26% of men and 5% of women) are done almost exclusively by men, with only 32 and 18 women respectively reporting that they had been spearfishing or net fishing in the past year.

Harvesting of non-fish marine species is also widely done in Palau (Fig. 3). Across the entire sample, 48% of individuals reported harvesting some non-fish marine species within the past year. Women and men were equally likely to harvest non-fish marine species, with men dominating some fisheries and women dominating others. The most commonly harvested non-fish marine species were clams: smooth giant clam (*Tridacna derasa*), crocus clam (*Tridacna crocea*), bear paw giant clam (*Hippopus hippopus*), China giant clam (*Hippopus porcellanus*) and elongate giant clam (*Tridacna maxima*) (32% of men and 37% of women). Land crabs (multiple species; 23% of men and 25% of women) and sea cucumbers (multiple species; 9% of men and 21% of women) were also commonly harvested (Fig. 4).

While women dominate the most popular non-fish fisheries, men dominate the most lucrative, including sea turtles (13% of men and 2% of women), mangrove crabs (12% of men and 5% of women), lobsters (11% of men and 2% of women), and coconut crabs (6% of men and 5% of women). A small number of respondents also reported fishing for mangrove clam (*Enigmonia aenigmatica*; 8 men and 26 women) and trochus (*Trochus niloticus*; 6 men and 3 women); trochus is an illegal fishery at present in Palau.

The roles of women and men in marine resource management

In order to understand attitudes towards the roles of women and men in marine resource management, we asked all survey participants (n = 748) to respond to a series of agree–disagree statements. When posed with the statement "Women and men use marine resources differently," 72% of respondents agreed (49%) or strongly agreed (23%) that women and men use marine resources differently, with little difference between women's and men's responses (Fig. 5). The large majority of respondents (88%) also agreed (46%) or strongly agreed (31%) with the statement "Women and men have different knowledge of marine resources". Again, responses of women and men were closely aligned (Fig. 6). Finally, the statement "Both women and men should be included in marine resource decision-making" elicited the largest "strongly agree" response (41%), with an additional 45% agreeing, giving a total of 85% of respondents agreeing that women and men should both be included in management. Again, there was little difference between women's and men's responses (Fig. 7). Together, these responses indicate not only an opportunity, but also a need for marine resource management to be inclusive of women and men, in order to capture women's and men's unique ecological knowledges, values, and perspectives.

Women and men both central to intergenerational ecological knowledge sharing

Both gleaners and fishers reported that they take children with them when they harvest. Gleaners are more likely to bring children along, with 53% of gleaners and only 36% of fishers taking children with them when they harvest, which reflects the historical practice of children gleaning with their families. Gleaners are equally likely to teach boys and girls. Among finfish fishers, women (n = 147) are significantly more likely than men (n = 295) to take children with them when they go fishing ($\chi^2 = 13.34$, $p < .001$). Among men who do take children with them, 39% take only boys; however, women are equally likely to take boys and girls.

Together, these findings indicate that (a) women and men are both central to the intergenerational transfer of ecological and stewardship knowledge regarding marine resources in Palau, and (b) girls are not receiving as much education and mentoring in fishing as boys, while both boys and girls are being educated about gleaning. This implication was discussed with youth researchers during a review of these findings, many of whom agreed that they were not confident they would be able to use marine resources sustainably because they had not been taught how. Boys in this group felt somewhat more confident than girls (Box 2).

Box 2.

As a girl who loves her culture and traditional conservation practices, I believe that the transfer of marine ecological knowledge should be passed on to the youth, especially to girls like me. As a girl, I do not hold the responsibility of gathering most marine resources because that is the traditional responsibility of men. However, I am responsible for gleaning sea cucumbers. It is important that I learn how to protect the population of sea cucumbers and know its threats. In order for me to do so, I have to understand the rest of marine life since they are all interdependent on each other. However, this is just the traditional perspective on things. In the modern world, women participate in many fishery activities. We are not limited to sea cucumber gleaning only. We also practise spearfishing, bottom line fishing, trolling, etc. If marine ecological knowledge is passed on to girls equally as it is to boys, we will understand the value of marine life and use it sustainably. (Iseko Willyander)

Figure 8. Finfish fishing is dominated by men in Palau. Both women and men are highly engaged in harvesting marine resources. © Richard Brooks

Conclusions

- Both women and men in Palau rely heavily on marine resources for food, income, recreation, and cultural practices.
- While women tend to dominate nearshore invertebrate fisheries such as clams and sea cucumbers, men tend to dominate higher-value fisheries for reef fish, sea turtles, lobsters, and mangrove crabs.
- Palauans agree that women and men have different knowledges of marine environments, and that both women and men should be involved in managing marine resources.
- Women and men are both central to intergenerational ecological knowledge-sharing, and there is a need to expand the transfer of marine ecological knowledge to youth, especially girls.

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