



**Palau**  
**Gender and Natural Resources**  
**2020 National Report**

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# Executive Summary

The result of this research will demonstrate how men and women of Palau use natural resources in fishery, aquaculture, agriculture, forestry, and sustainable tourism. The information gathered is intended to inform policy design and planning for development so that we can consider the reliance of our communities on our natural resources for sustainability as we develop our nation.

As high as 70% of Palauans rely on oceans resources, and 45% (N=748) rely on forests for sustenance and economics. On top of that, 41% (N=748) rely on tourism for some level of income—considering our tour industry is one based on our natural and cultural heritage. This is evident in the use of established protected areas both in nature and culture, serving as main tourist attraction throughout Palau.

Further analysis of the survey data shows a decline in the number of younger generations, farming or collecting medicine from the forest, suggesting that the importance of agriculture and traditional medicines has declined over time as shown in the graph, (N=748), 57% seniors compared to 43% adults, and 28% youth. Traditional medicine shows dramatic decline Senior 14% compared to adult 6%. If this trend continues, and people lose their connection to the forest, it poses a real threat to the protection and sustainability of our forest known for its high biodiversity contributing to its global value as a “World Key Biodiversity Area.” This concern is amplified further as elder traditional medicinal practitioners in Koror and Airai, state their fear of diminishing medicinal plants habitat continually destroyed and replaced with structural development. Women are further identified as predominant users of forest and agriculture resource and should be included in decision making towards land-based resources development and management.

Fishing is a male dominated practice compared to gleaning, which is female dominated, a cultural gender resource use division that has continued for thousands of years. Among those who self-identified as fishers or gleaners, 67% of fishers (N=444) were men and 85% of gleaners (N=67) were women. Gleaners are more likely to sell (male:27%, female:15%) their catch compared to fishers (male:11%, female:9%) demonstrating higher level of dependence on subsistence market for income. Majority (69%) of gleaners travel less than 30 minutes to their harvest site, indicating reliance on nearshore coastal resources that can be accessed without a motorboat. Thus, women face further vulnerability to food insecurity and loss of income from increasing unsustainable coastal development such as dredging, sand mining, and land reclamation, including polluted, unproductive fishing grounds.

# Motivation

## A kluluk a rkemei

“Klukuk a rkemei,” a Palauan proverb meaning “tomorrow is still to come,” often used to remind of responsibility to sustainable use of resources so as not to overharvest. For thousands of years Palauans have maintained an intricate relationship between human and nature- what you do to nature comes back to you, good and bad. A highly personalized relationship believed to be of a reciprocal nature and where individuals rely on their natural surroundings to inform of opportunities and potential threats when going out to sea or into the forest. Such an intricate relationship and pronounced level of dependency on natural resource make them most vulnerable to any negative impact from environmental degradation. Thus, understanding how to maximize benefit from economic development that embrace our way of life is not just crucial, it is wise.

# Introduction

The concept of sustainability has been an ongoing policy guidance for Palau's development since committing to Agenda 21's call for sustainable development principles in 1993. In order to effectively plan, current data and information on natural resource use is critical to sustainably develop without compromising the health of our environment and the lives that depend on it. Fig. 1 shows how men and women use marine and terrestrial resource of Palau (N=748).

Fisheries and agriculture are identified as top two priorities for most of the respondents (N=748). This graph shows an important division of sociological aspect of natural resource in Palau and the importance of engaging with a diverse stakeholder in resource management in order to understand the full scale of resource use. This means engaging with small and large farmers and fishers, entrepreneurs, local market associations (makit), local authorities, NGOs, grassroots, and policy makers in identifying problems and opportunities in development, research concepts, and monitoring and evaluation of implemented plans. The importance of this recommendation cannot be overstated if we are to address our natural resource management with a longevity view that considers biological and sociological components to managing resources. It is critical that we understand how men and women access and use resources, generational distribution and use of knowledge- learning from farmers, fishers, healers, artist, makit producers, and how they view what we call resource management (International Development Research Centre, Canada, 2006).

No matter how much development Palau goes through, most Palauans continue to rely on the ocean and forest resources for their lives. This is most clear in our small coastal communities where 70% of fishers' populations can only access fisheries habitat in small technology without motor such as canoes, bamboo rafts, or simply wading and snorkeling for gleaning and spearfishing in shallow areas (Ebiil Society Babeldaob-fishers registry 2020, N=375). Such habitats are most vulnerable to coastal development like dredging, sand mining, and land reclamation for major hotels and other commercial development. The weak due process for community consultation during planning for development and the low technical capacity by small communities to review and question project social and environmental impact, push out the vulnerable members of our society, and put communities at risk of loss of livelihood and increased poverty. These are the types of development that are permanently changing natural habitats and ecosystems, resulting in loss of food and resources needed for important traditional medicine practices in women and men's health, arts and technology and utilitarian tools, and a diminishing value in tourism industry.

A recent economic study on Palau’s tourist industry, shows that 76% of tourist employment is foreign labor and 88% of the hotels are foreign owned. The highest profit margins from tourism are from lodging or hotel fees (EconMAP FY2018). Today, Palau is examining closely the value and benefit of its tourism industry which is considered a prime economic source that perhaps has not benefited the Palauan people as originally intended and struggles to balance the benefits with social and environmental impact.

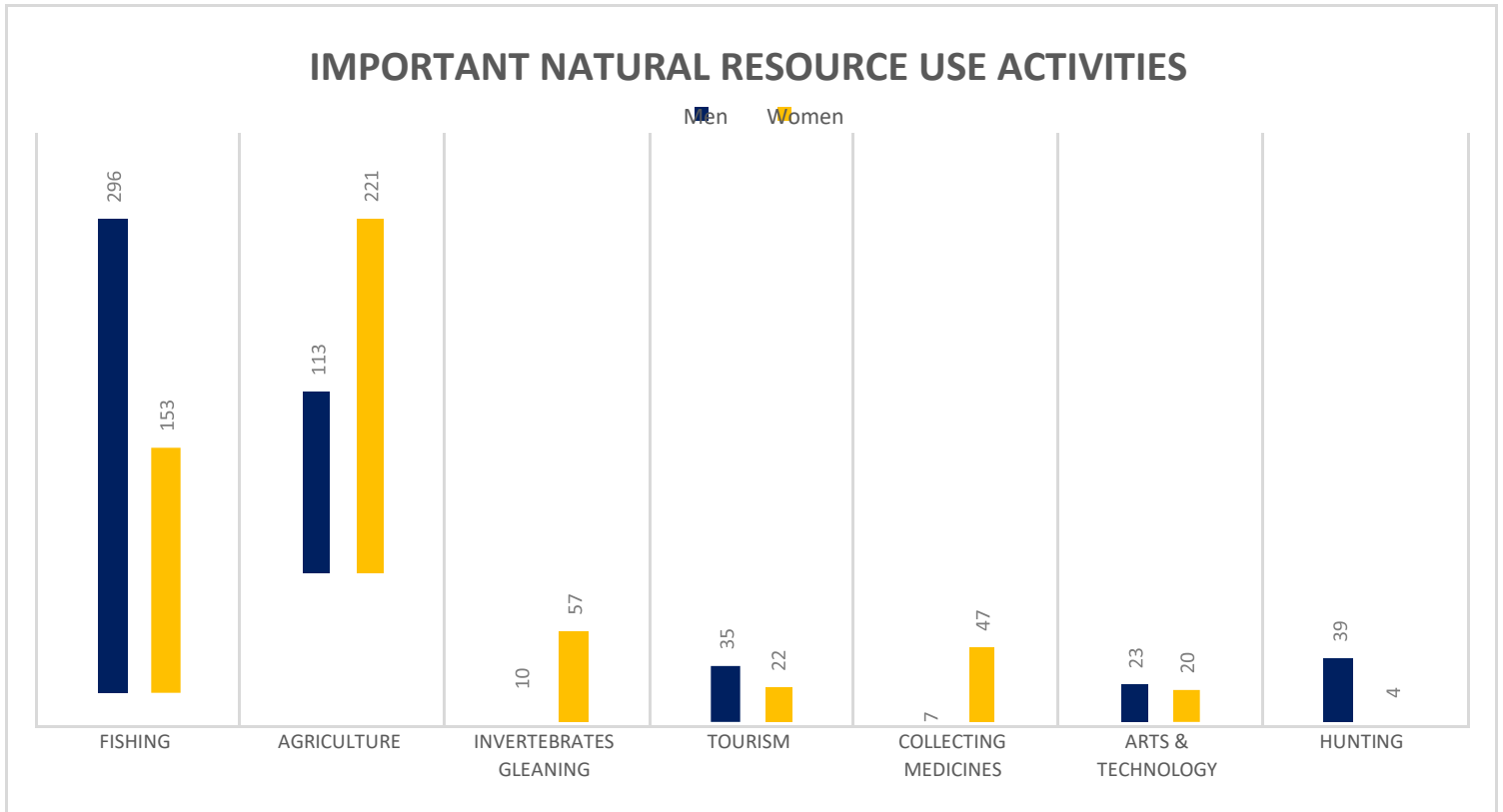


Figure 1: Natural resource use and division by gender.

# Methodology

## Survey

From June to August 2020, we conducted 747 surveys with a random sample of women (n=365) and men (n=382) in Babeldaob, Koror, and Peleliu (Figure 1). We stratified the sample by gender to ensure roughly equal participation of women and men. The number of respondents per state was proportionate to the population in each state. We reached a 95% confidence interval with a 10% margin of error with our sampling design, allowing us to generalize these findings to the entire population.

Using the Qualtrics app ([www.qualtrics.com](http://www.qualtrics.com)) on tablets, we asked every person surveyed about their general use of terrestrial and marine resources over the past year (i.e., “In the past year, have you collected any of the following species...”). Then, we asked each respondent to select up to two resource categories about which they were particularly knowledgeable or engaged; these categories were: fishing, hunting, collecting cheled (English: marine invertebrates), farming, collecting medicines, tourism, and arts & crafts. Respondents then answered a series of survey questions for the categories they selected. For the tourism category, key informants were interviewed to supplement survey data. Each respondent provided their free, prior, and informed consent to participate in the study. All surveys and interviews were administered in English and Palauan, depending on the preference of the respondent. Surveys were completed in the app by the researcher based on participants’ responses.

## Key Informant Interviews

We conducted 34 key informant interviews with individuals who were identified as experts by survey participants (Annex A). Interviews were conducted with guiding questions referring to current practice, threats, access, food security, knowledge and practices for sustainability, and perceptions of future generations’ access to and dependence on natural resources.

## Expert Mapping Workshops

Two expert mapping workshops were held with a group of men fishers and both men and women tour operators. The task was to identify major dive sites and fishing habitats and their current conditions. Mapping of significant plant species was also conducted with local experts. These included plant of cultural significance and key biodiversity such as those of rare or endangered species. The areas were mapped into the national office of PALARIS or Palau Automated Land Area Resource Information System.

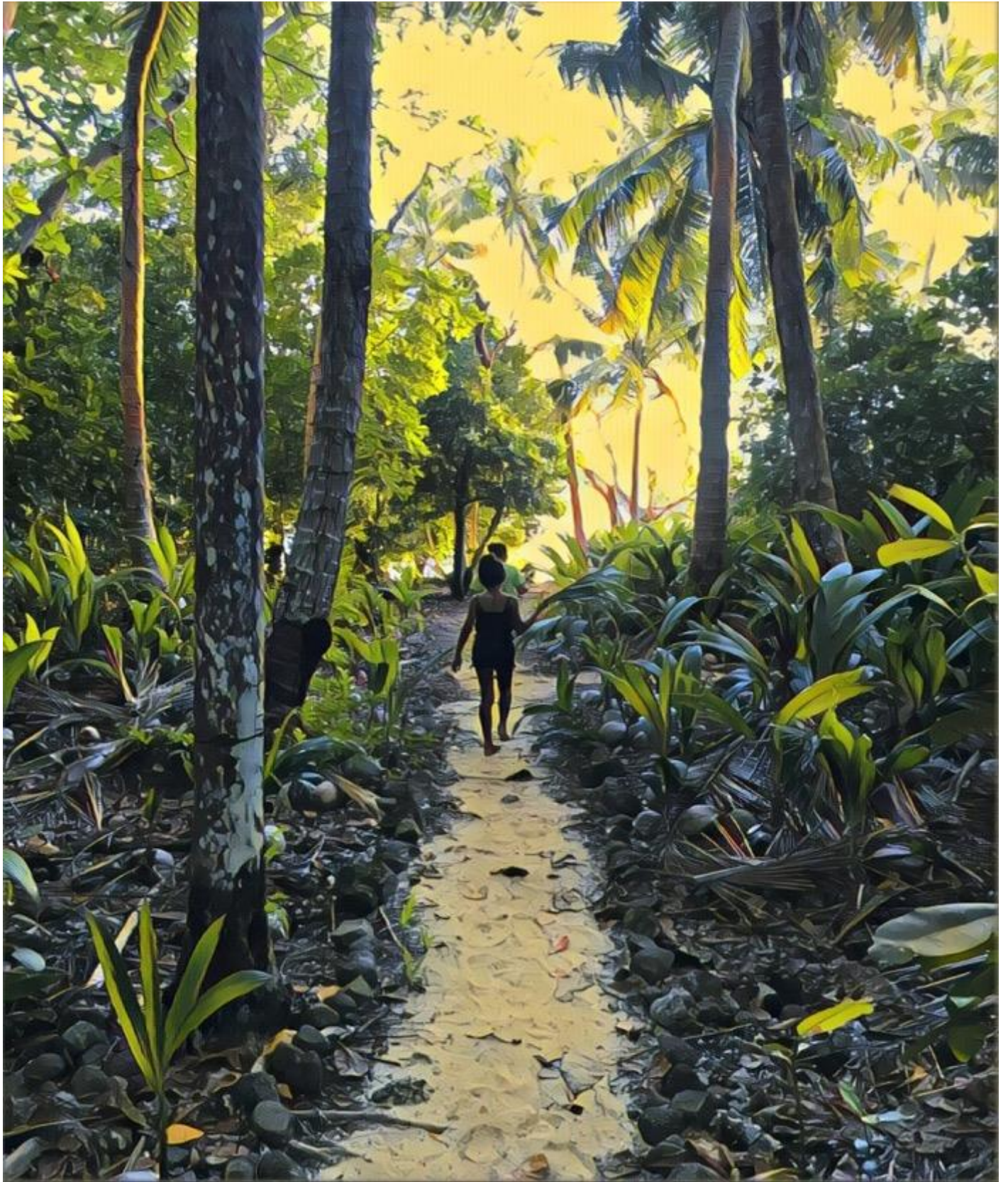


### **Research Team Responsibilities**

Ebiil Society, Stanford University, and Oregon State University each contributed to the development of the survey instrument. Staff and volunteers from Ebiil Society conducted data collection, including fifteen youth investigators who were received training in survey protocols. Data on marine resources were analyzed and written up by Caroline E. Ferguson and Liza Hafner at Stanford University; data on terrestrial resources were analyzed and written up by Bryan Endress, Maren B. Peterson, Ruby Gabriel, Reid Endress, and Dylan Heppell at Oregon State University; and data on tourism were analyzed and written up by Ann Singeo and Heather Ngiratregd at Ebiil Society. All data and analyses were then reviewed by the whole research team (Annex C). Ann Singeo from Ebiil Society revised the whole report to integrate a Palauan cultural lens throughout and extract culturally appropriate lessons for policy and practice.



Figure 2. Map of Palau's geographical location and main island groups (inset)



# Forest & Agriculture Resources

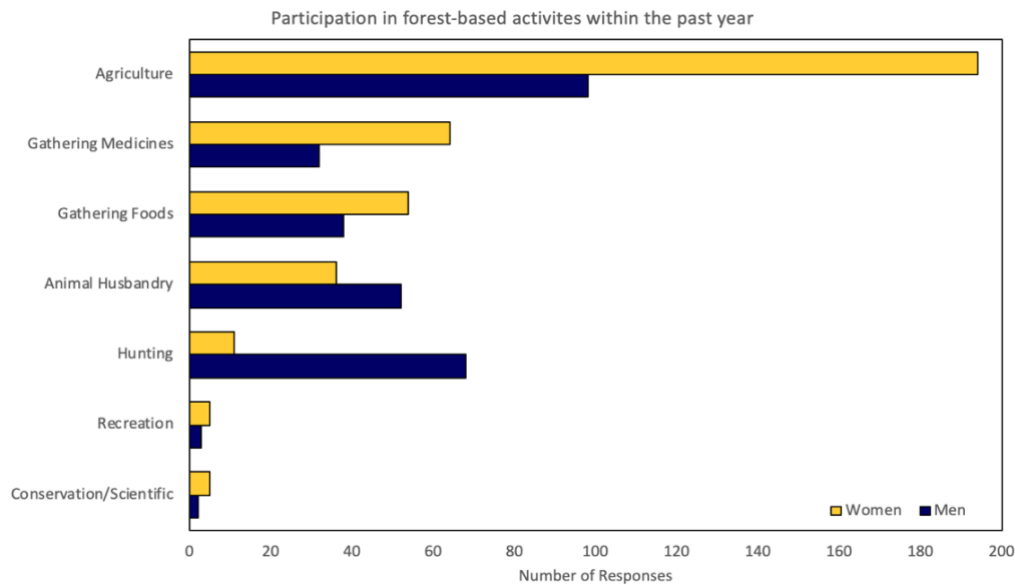
## Importance of Forest and Agricultural Resources

**The Earth is our mother. Providing us everything we need from food to medicine to shelter...**

**I hope to be able to teach younger people of my knowledge of the forest so that one day they can be self-reliant**

Of the 748 survey responses, 45% chose agriculture (N=335), as one of their top two most important resource use activities. Women were more likely to identify the collection of medicinal plants and agriculture as important resources as compared to men who were more likely to hunt. Responses did not significantly differ by age group or region of Palau. However, there was a trend showing a greater percentage of respondents from the outer islands (Peliliu, Sonsoral, Hatotobei) that identified the collection of medicinal plants as a top resource use activity (26%) as compared to other regions of Palau (ranged from 4-14%). Similarly, a lower percentage (63%) of outer island respondents identified agriculture as one of the most important resource use activities compared to other regions (ranged from 76-82%).

Over 56% of all survey participants (N=421) stated that within the past year they utilized forests and other terrestrial ecosystems including savannahs and agroecosystems for a variety of purposes. The most common activities included agriculture (43%), gathering medicines (14%), gathering food (14%), animal husbandry (13%) and hunting (12%). These five activities accounted for 95% of all responses, highlighting the importance of terrestrial ecosystems, including forests, for food security and access to natural medicines. Women more frequently reported entering the forest for agricultural purposes (66%) as well as the gathering of medicine (67%) and food plants (59%), while men were much more likely to hunt (86%).

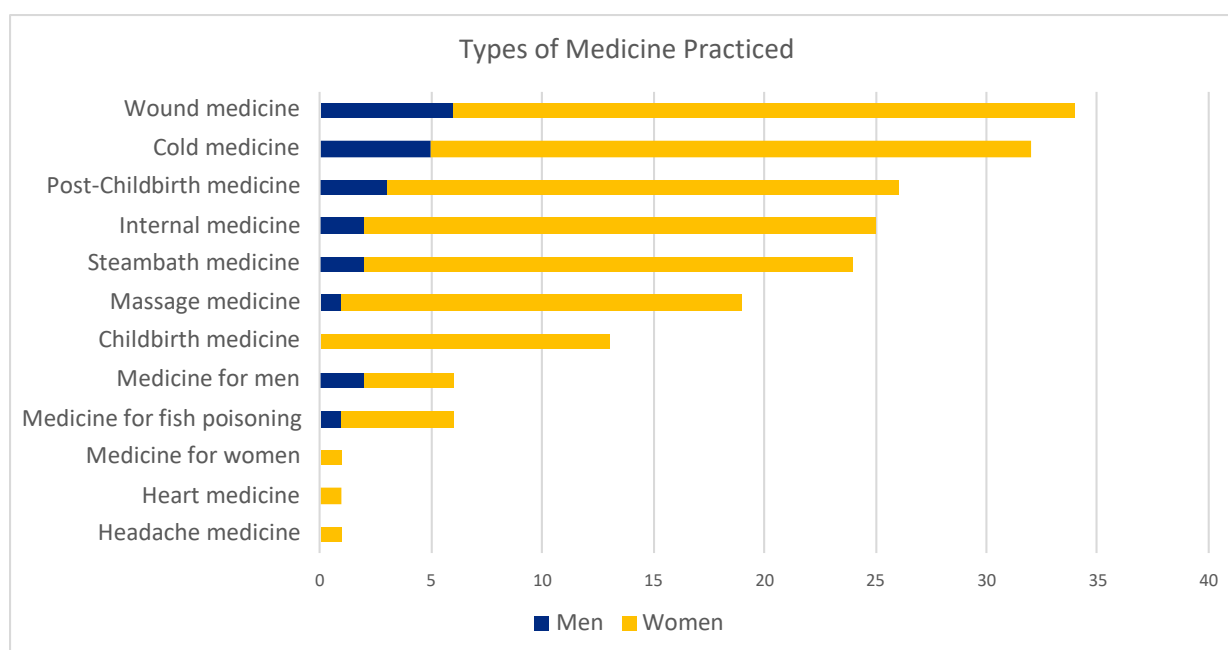


**Figure 3:** Percentage of men and women that selected collecting forest medicines, agriculture and hunting as one of two most important resources use activities.

People younger than 65 year of age were much less likely to include collecting medicinal plants in their top two resource use activities (6%) as compared with seniors (14%). This represents a large decline, suggesting that the importance of traditional medicines has declined over time. A similar finding was evident for agriculture, as 57% of seniors selected agriculture in their top two, compared with 43% of adults, and just 28% of youth.

### Traditional Medicine

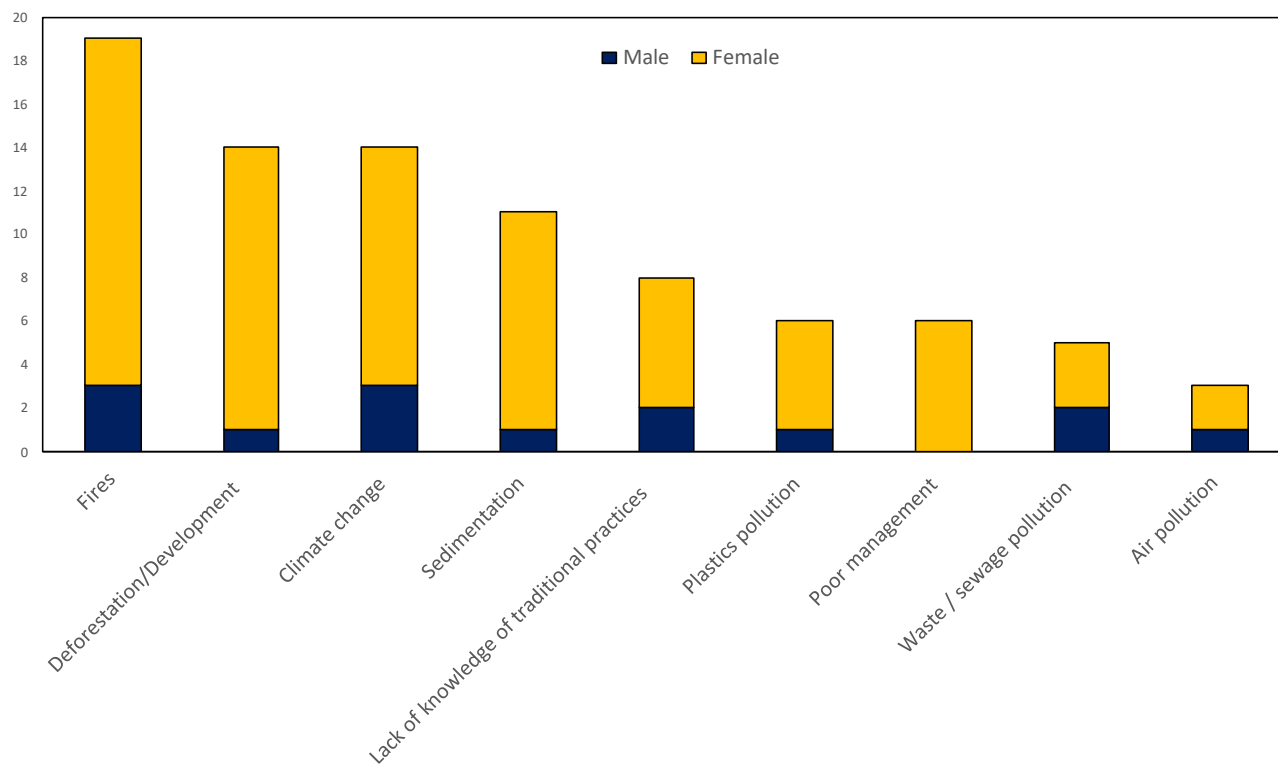
Terrestrial ecosystems are critically important for the collection of traditional medicines. Of all individuals surveyed, 14% (N=54) collected medicinal plants in the past year, and 7% identified collecting medicines as one of their top two resource use activities. Most of these individuals were women, 87%. Medicines were used in a wide range of healing practices for a variety of conditions (Fig. 4), of which 34% were exclusively for women (medicine for steam baths, childbirth, etc.). Traditional practitioners regularly collected medicinal plants with 72% of respondents indicated they gather medicines at least once per month, 28% weekly, and 31% monthly.



**Figure 4:** Types of traditional medicine practiced by men and women.

Respondents indicated that knowledge of traditional medicines and healing primarily comes from relatives, particularly female relatives with 59% of responses stating women as the source of knowledge, such as their aunt, mother, and grandmother. Regardless of the gender of the knowledge source, transfer of knowledge within families and clans was important with 88% of all responses identifying family/clan/lineage as the knowledge source. This highlights the importance of gender and family to the transmission of knowledge related to traditional medicine and healing practices. However, just 6% of young adults (< 25 years old), and 11% of young women identified medicinal plants as a priority resource. This could be translated as a potential breakdown in knowledge transfer among generations, which would be of significant cultural concern given the prevalence of traditional medicines and practices associated with pregnancy and childbirth.

Respondents identified a number of threats to the access, availability, and use of medicinal plants (Fig 5). Most identified main threats as loss or degradation of forest ecosystems (fires, deforestation, climate change, sedimentation, etc.). Additionally, 15% percent of respondents also noted a loss of knowledge related to traditional practices. No difference was observed between men and women practitioners and the threats identified.



**Figure 5:** Threats to medicinal plants as identified by respondents (N=54).

## Hunting

A total of 43 individuals (6% of all interviewed) indicated that hunting was one of their top two resource use activities. Nearly all were men (91%). Fruit Bats (*Pteropus pelewensis*) were the most commonly hunted species, with 70% of hunters reporting hunting fruit bats, followed by chickens (42%), wild birds (28%) and feral pigs (23%). Nearly half of respondents hunted at least once per week, and another 30% hunt at least once per month. The vast majority of hunting was for personal household consumption (50%) or to be shared with extended family and friends (34%); on average just 12% of hunters' harvest was sold.

Hunters identified a number of factors which threaten their ability to hunt, the most frequently included deforestation (54%), fires (50%) and loss of traditional management practices (26%). Of the top 10 threats identified by respondents, seven were related to ecological degradation (e.g., deforestation, fires, climate change, sedimentation) while 3 were policy/management related (loss of traditional practices, creation of no-take protected areas, and poor management)

## Agriculture

Agriculture was one of the most frequently identified resource use activities, with 45% of all respondents placing agriculture as one of the top two resource use activities. Women were more than twice as likely to identify agriculture in their top two as compared to men (68% compared to 32%). This highlights the large gender-based differences in the value and importance of agriculture. Most respondents reported having one farm, though 43% had two or more farms. A total of 83% of respondents had dryland farms, while 54% had mesei (taro patch), with 37% having both mesei and dryland farms.

Farms generated a wide range of produce, with taro (kukau and brak), tapioca, fruit and sweet potatoes being the most common (Fig 6). Fruit species included pineapple, starfruit, papaya, lemon, breadfruit, banana, mango and more. Vegetables included pumpkin, squash, chilis, cucumbers and more. Of the top eight most cultivated plants, six were food, and two buuch and kebui (betelnut and pepper leaf) were for chewing betelnut. On average 80% of the produce from people’s farms was consumed within the household or shared with family and friends; on average only 15% of people’s harvest is for commercial purposes. Just 4% of respondents stated that farming generates over 50% of their annual income. These results show that farming and crop production is an important, yet primarily non-market activity where the harvest is consumed and shared among family and friends.

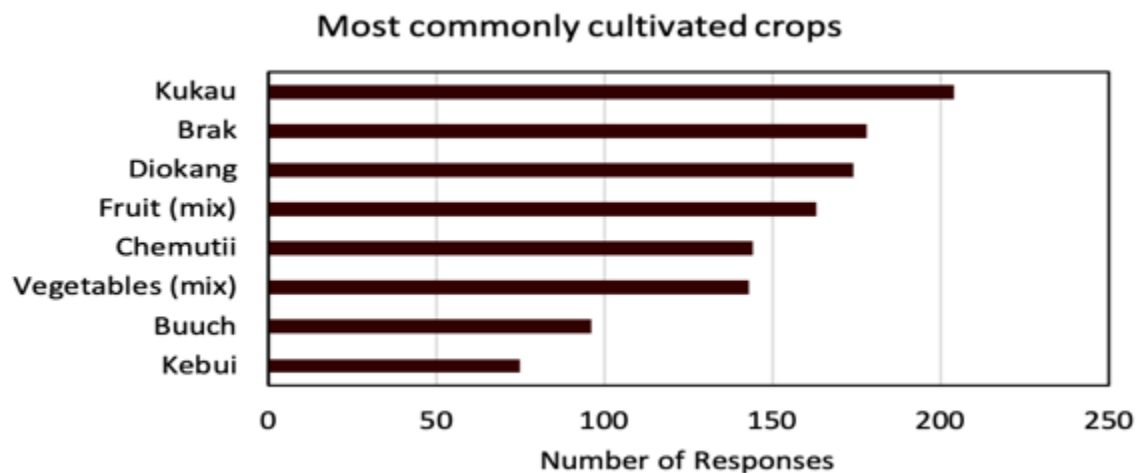


Figure 6: Most commonly cultivated crops.

Farmers shared a wide range of environmental threats to agricultural production (Fig 7). The most frequently cited were climate change, sedimentation, development and fires; these four factors accounted for over 67% of the responses.



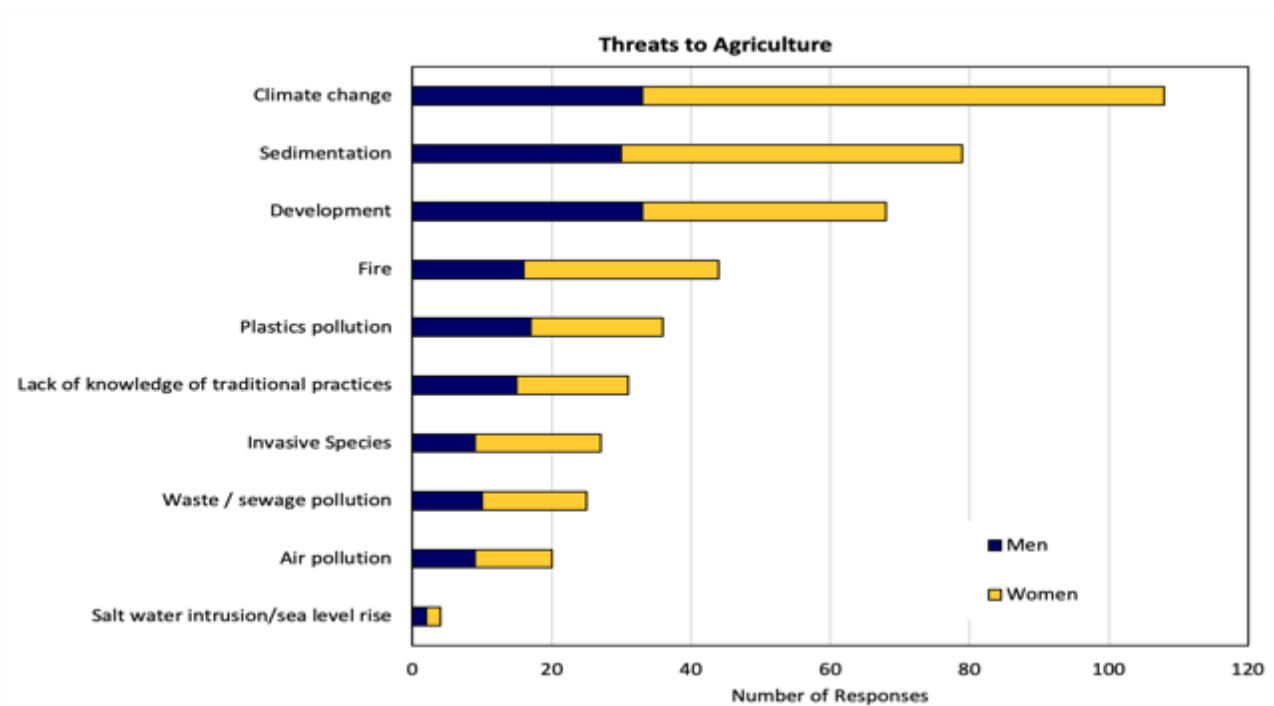


Figure 7: Threats to agriculture.

Another threat to agriculture is the apparent decline in importance of farming for younger generations, with just 28% of all survey respondents under the age of 25 selecting farming as an important livelihood activity, compared with 57% of respondents over 65 years of age. Additionally, nearly 40% of respondents with children who considered farming as important, do not have their children accompany them. This may further accelerate a decline in the knowledge, skills, and interest in farming. Key informant women traditional medicine practitioners share their growing concern of diminishing habitat for medicinal plants, often replaced by major infrastructures. Practitioners from Koror and Airai tell of their increasing time to travel to find medicinal plants that requires crossing into other States. What normally had taken them less than 30 minutes to find can now take up to 2 hours to find. Male hunters identify forest fire as the biggest threat to the sustainability of their practice and must be addressed nationally. They disclose their tradition of following flowering and fruiting tree species across Babeldaob as main indicator of hunting seasons. That loss of these trees from wildfire causes decline in bird populations and threatens the knowledge and practice of hunters altogether.



# Arts & Technology Resources

## Importance of Arts and Technology

A total of 43 respondents (6%) included the production of arts and technology in their top two most important activities. Along with tourism, arts and technology exhibited the least gender difference compared to the other sectors, as the number of male and female who included arts and technology in their top two was almost equal. However, it was evident that there was gender differentiation by the types of arts and technology produced; tools, blai, storyboards and bai were most often made by men, while most basket weavers were women.

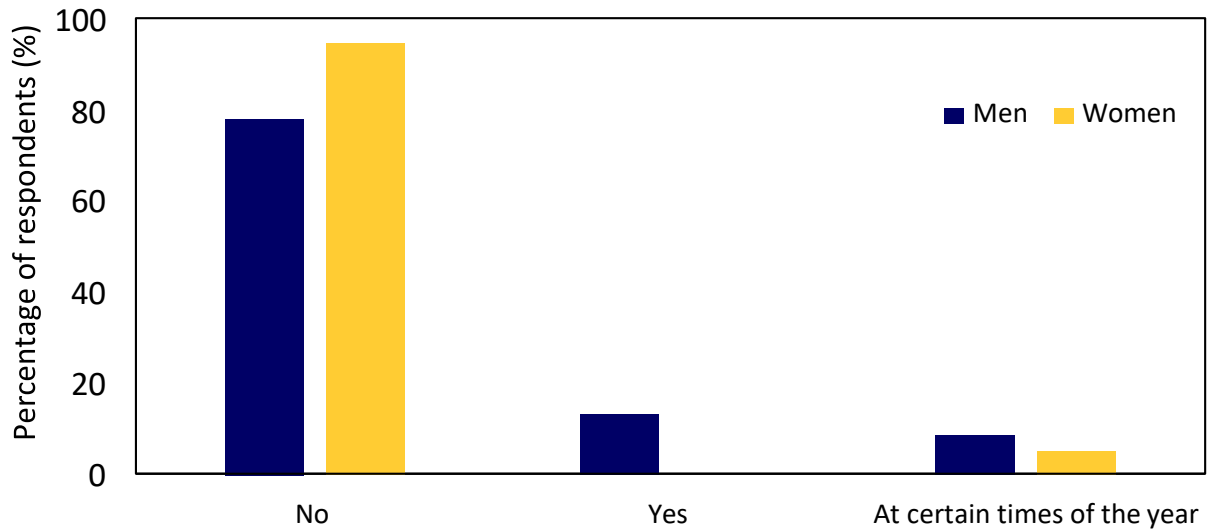
Many of the identified arts and technology activities can be characterized as utilitarian in nature (e.g., tools, baskets). Within the conservation arena, a number of the types of arts and technology identified may be categorized as timber or non-timber forest products.

Analysis of income data from the Arts and Technology sector supports this conclusion as respondents indicated that arts and technology only serve as a primary source of income for a small percentage of respondents. Most arts and technology are not sold or, if they are, only provide negligible income, as, 88% of respondents stated they had another source of income that was more important. The majority of respondents (66%) indicated that monthly income was negligible, either with the respondents stating they did not know, do not sell their art, or that they receive none or negligible earned income. There was no relationship between the type of arts and technology produced and contribution to income.

Arts and technology were the primary source of income for just three (7%) of the respondents year-round. All respondents (3) who earned their primary income from arts and technology were men; 87% of respondents for which arts and technology was a primary source of income for all or part of the year were men. Only one woman stated that at times, arts and technology was her primary source of income. The annual income of 50% of the respondents who stated arts and technology provided their primary source of income year-round or during part of the year fell into the \$1,000-5,000/year annual income bracket. The only other respondent whose primary source of income was arts and technology and also identified an annual income level, fell into the \$5,000-10,000 income bracket. Whereas the amount people make per month may be low, the percentage it contributes to their annual income of some respondents comprises is a high percentage of their income.

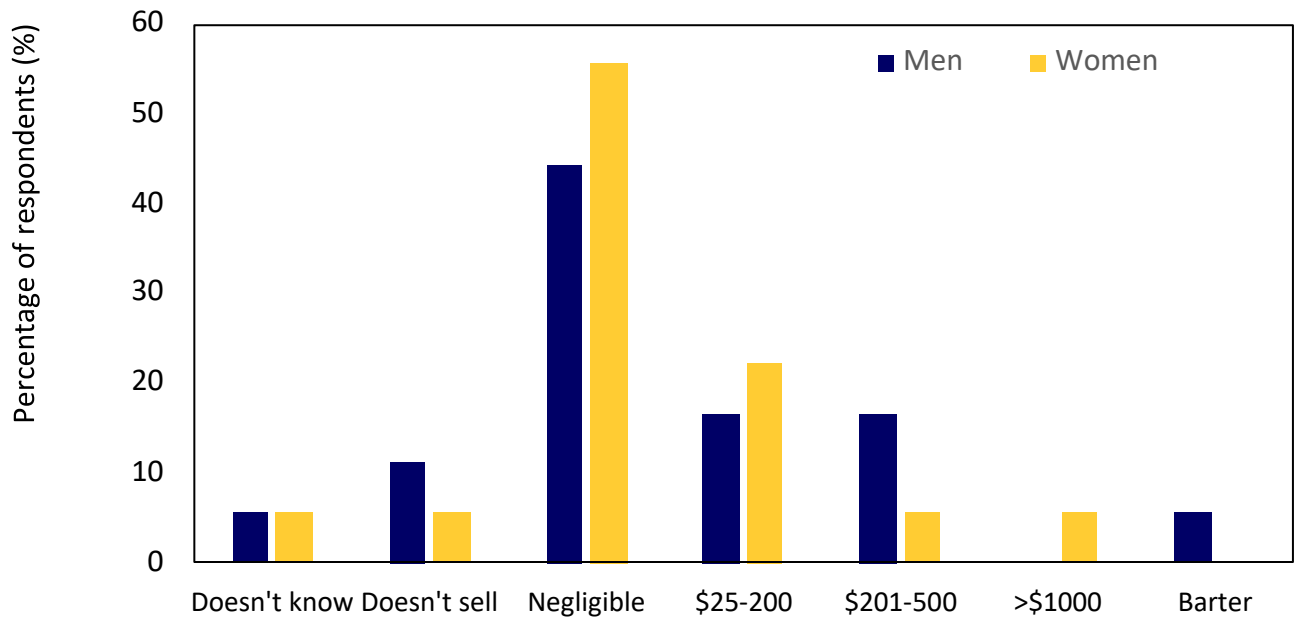
All of the respondents who earned over \$100/month were over the age of 40. Six out of eight of the respondents (75%) were over 60 years old. The type of arts and craft activities that provided income, especially those that provided a higher monthly contribution, include, itabori (story board), basketry, and painting. The majority of the types of arts and technology produced are utilitarian in nature (e.g., tools, blai or house). The type of arts and technology identified, and the associated income data arts and technology are primarily for subsistence/ non-market uses and only contribute meaningful income to a small proportion of Palauans.

### Are arts and crafts your primary source of income?



**Figure 8:** The importance of arts and technology as a primary source of income for men and women (N=43)

### Monthly income earned from arts and crafts by gender



**Figure 9:** Monthly income generated from arts and technology by gender (N=43).

### Accessibility of Resources for Arts and Technology

Respondents were asked whether they can easily access the resources that they need to create their arts and technology. In response to the statement “I am able to easily access the arts and technology resources I rely on,” 67% of respondents either agreed or strongly agreed that they can easily access the required resources for their arts and technology. Only 19% disagreed or strongly disagreed. Responses differed among gender, with almost twice as many men responding they agree or strongly agree that they can easily access resources while almost twice as many women responded that they were neutral/unsure, disagreed, or strongly disagreed that they can easily access the resources necessary for their arts and technology. This provides a really interesting question for the future to which species and specific use are depleted. Also, is it locally depleted that they need to travel further to other areas to find what they need?

### Resource Depletion

Results indicate a strong concern about resource depletion of materials used for arts and technology, despite respondents indicating that current resources are easy to access. Survey respondents assessed whether the resources they use to make their specific types of arts and technology were depleted. In response to the statement, “The arts and technology resources I rely on are depleted,” 68% of respondents agreed or strongly agreed and only 9% of respondents disagreed (Fig. 10). An equal number of men and women indicated that the resources they depend upon for their craft were depleted (either agreed or strongly agreed). Ninety percent of participants who produce tools state that the resources they rely on are depleted. Only a few respondents indicated they received income from this type of activity, indicating that sustainability of resources for utilitarian/subsistence uses are a concern for Palauans.

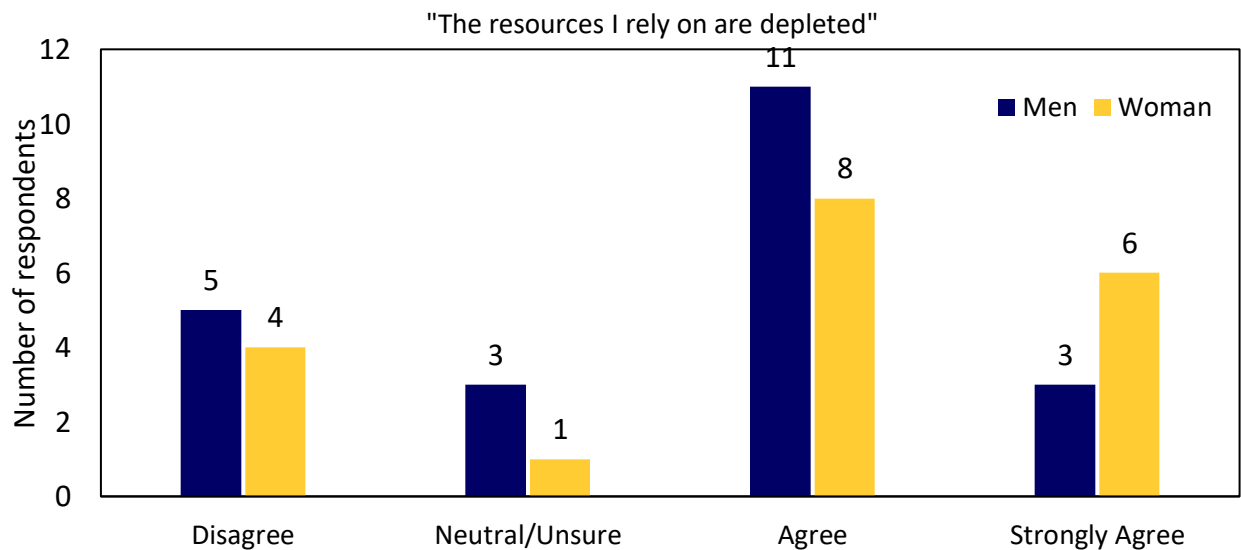


Figure 10: Most men and women perceive that their arts & technology resources are depleted.

A majority of respondents (55%) who engage in basketry craft stated they “Strongly agreed” or “Agreed” that the resources they rely upon are depleted; 11% were neutral or unsure. It is unclear whether the basketry products are sold locally or if they are incorporated into the tourism market. Future research may want to further identify the specific types of plant species utilized by resource users in this sector to assess conservation status and concerns.

### **Arts and Technology Knowledge**

The majority of respondents (71%), when asked “I know where I can access support for my arts and technology activities” agreed or strongly agreed. While only 17% disagreed or strongly disagreed, just one respondent strongly disagreeing. Nearly equal numbers of women and men agreed or strongly agreed that they know where to access support. There were some respondents that do not know where to access supports, spanning the entire range of arts and technology activities. More data is needed to identify the type of support needed for arts and technology activities.

### **Intergenerational Knowledge Transfer**

Slightly over half of respondents (51%) stated they have passed their knowledge down to children. Men were more likely than women to indicated they passed on their knowledge. In total, 84% of all respondents agreed or strongly agreed that future generations will continue to rely on the same arts and technology resources as they do today. Twenty-four percent strongly disagreed or disagreed with that statement and 12% were unsure. Men were much more likely than women to state future generations will rely on the same resources; 83% of men stated they agreed or strongly agreed that future generations will rely on the same resources, compared to only 42% of women. Only 13% of men stated they disagreed or strongly disagreed, whereas 37% of women disagreed or strongly disagreed as to whether future generations would rely on the same resources.

For resources needed for furniture, tools, blai (house), and bais (chief house), the majority of responses indicated agreement or strong agreement that future generations will rely on the same arts and technology (100%, 80%, 75%, and 100%, respectively). This further suggests the cultural and utilitarian importance for many respondents identified arts and technology resources.

A greater percentage of men agreed or strongly agreed that the next generation will create arts and technology, while more women responded they disagreed or strongly disagreed that the next generation will make arts and technology when they grow up. In this case, nearly 4 times as many women do not believe the next generation will participate in arts and technology. This may correspond to the belief by more women than men that resources will not be available for arts and technology.



# Marine Resources







## Prevalence of Fishing and Gleaning

Men dominate fishing activities, particularly in spearfishing and net fishing.

Women dominate the most popular non-fish marine harvests, especially sea cucumbers and kim/choruer.

Fishing is a popular activity in Palau, with the majority of Palauans 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. Men were more likely to have participated in fishing activities, with 84% of men and 56% of women reporting some kind of fishing in the past year. The most popular fishing method among both men and women was bottom line fishing (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.

Harvesting of non-fish marine species is also widely done in Palau. Across the entire sample, 48% of individuals reported harvesting of some non-fish marine species within the past year. Men and women 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 kim and choruer or giant clam (32% of men and 37% of women), land crabs (23% of men and 25% of women), and sea cucumbers (9% of men and 21% of women). While women dominate these most popular non-fish fisheries, (41% men dominate harvesting of 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 ngduul (8 men and 26 women) and trochus (6 men and 3 women), trochus being an illegal fishery at present in Palau.



## Gender Division of Marine Resources

Among those who self-identified as fishers or gleaners--meaning fishing or gleaning was especially important to them from a subsistence, income, cultural, or personal values perspective--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 cultural history in Palau.

## Food Production, Food Security & COVID-19

There is high variability in how people in Palau obtain foods. Some Palauan households depend entirely on foods produced within the household. On average, Palauans are producing about 50% of their own seafoods within the household, indicating a high reliance on local marine resources for food security and food sovereignty (Figure X). This finding highlights the importance of sustainably managed and accessible marine resources.

Many Palauans currently enjoy diets rich in seafoods, but respondents indicated a desire to consume even more seafood, while reducing their intake of unhealthy kansume (e.g. SPAM). 29% of respondents reported that they currently consume seafoods every day, while 44% would ideally prefer to consume seafoods every day. On the other hand, 14% of respondents reported that they consume kansume (canned goods) at least five times per week, while only 6% would ideally prefer to eat kansume that often. Together, these findings indicate a desire to transition from imported canned meats to more local seafoods, which would likely yield personal and public health benefits, in addition to strengthening Palau's food sovereignty.

Though our study only addresses the first phase of pandemic response, early results indicate a high degree of resilience in the Palauan seafood economy to the global market shocks associated with COVID-19. Overall, 58% of gleaners and 66% of fishers reported no change in their harvesting activities since the onset of the pandemic. However, there was a strongly significant difference

between commercial and non-commercial fishers, with commercial fishers much more likely to report a decrease in their fishing (X2,  $p < .001$ ). Although the sample size was too small to perform similar statistical tests for gleaners, the trend indicates that commercial gleaners have also been more impacted by the pandemic response than non-commercial gleaners. These findings indicate the need to give special consideration to commercial fishers and gleaners, who have been particularly impacted by the response to the COVID-19 pandemic.

## Frequency of Harvest

The majority (76%) of gleaners (N=67) collect at least once per month, with most gleaners reporting that they would prefer to glean more often. 90% reported that they would ideally prefer to glean at least once per month, with 37% reporting they would ideally prefer to glean several times

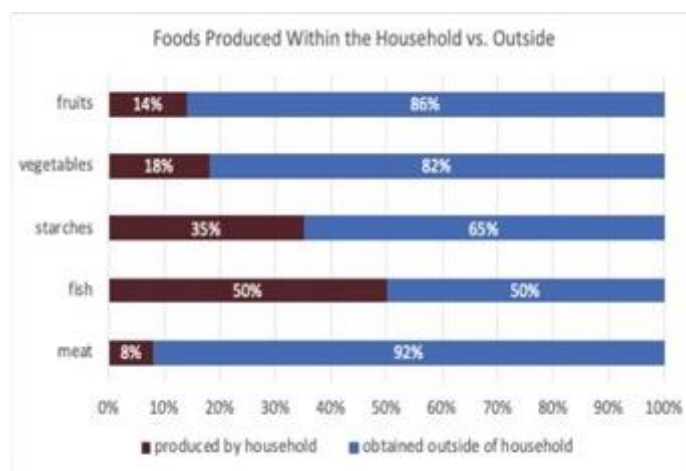


Figure 11: Palauans rely heavily on local marine resources for food

per week. Similarly, the majority (80%) of fishers (N=443) reported that they fish at least once per month, while the overwhelming majority (93%) reported that they would ideally prefer to fish at least once per month, with 58% reporting they would prefer to fish several times per week. These data suggest that outside constraints on time and/or resources prevent gleaners and fishers from harvesting as often as they would like.

### **Travel to Harvest**

The majority (69%) of gleaners travel less than 30 minutes to their harvest site, while fishers are most likely (40%) to travel between 30 minutes and 1 hour. Few members of either group travel more than 1 hour, with only 4% of gleaners and 23% of fishers reporting that they travel over an hour to their harvest grounds.

### **Intergenerational Knowledge Transfer**

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. There were no significant differences between commercial and non-commercial gleaners or fishers. Gleaners are equally likely to be teaching boys and girls. Among fishers, fisherwomen (N=147) are significantly more likely than fishermen (N=295) to take children with them when they go fishing ( $X^2, p < .001$ ). Among men who do take children with them, 39% take only male children; however, women are equally likely to take male and female children.



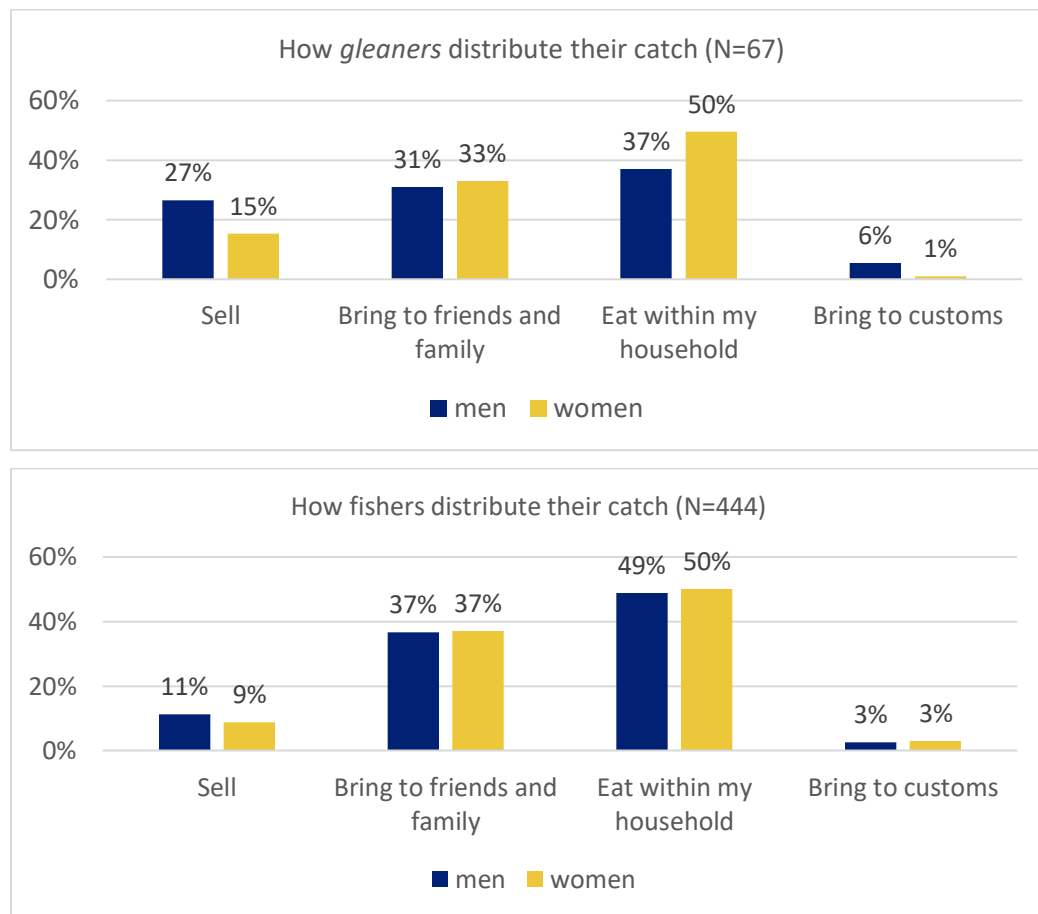
Figure 12: Woman fisher gleaning sea cucumber. Photo by George Stoye

Together, these findings indicate that girls are not receiving as much intergenerational education in fishing as boys, while both boys and girls are being educated about gleaning. This is reflective of long-standing practices and stands to reinforce the male-dominated nature of many fishing methods documented in this study.

### Distribution of Catch: Commercial and Non-commercial Fishing

The lines between commercial, recreational, and subsistence fishing are blurred in Palau. Many fishers engage in each type of fishing, often simultaneously. Subsistence fishers often related a deep enjoyment in fishing, and commercial fishers almost always indicated that they consume some of their catch within their household or share a portion as a matter of customary obligation. Our findings show that the majority of gleaners (61%) and fishers (74%) in Palau never sell any of their catch.

On average, gleaners consume 48% of their catch within their household, share a further 33% with friends and family, sell 17% at market, and bring 1% to customs (Figure Xa). Men gleaners sell, on average, a higher portion of their catch (27%) than women gleaners (15%), while women gleaners, on average, consume a higher percentage within their household (50%) than men gleaners (37%). Although there is high variation among gleaners, these findings indicate that gleaning is done primarily for subsistence by both men and women, with men somewhat more likely to be gleaning for commercial purposes. Catch from fishing is distributed very similarly to catch from gleaning. On average, fishers consume 49% of their catch within their household, share a further 37% with friends and family, sell 11% at market, and bring 3% to customs (Figure Xb). Fisherwomen and fishermen distribute their catch in roughly equal proportions to one another.



**Figure 13:** (a) women and men gleaners, on average, distribute their catch somewhat differently, (b) fisherwomen and fishermen, on average, consume most of their catch within the household.

## Aquaculture

A total of 7 (4 women/3 men) clam farmers were interviewed as key informant for aquaculture. Within the interviewed group is representation from community subsistence clam farmers of men and women, an experienced female farmer with export capacity, and a seedling production technician from Bureau of Marine Resources.

The male clam farmers identify poaching as their biggest threat to the practices. Because local laws do not provide for monitoring of the clam farms as part of their job it leaves the task to individual farmers to manage. Women farmers on the other hand named key challenges as the intense labor required for maintenance and availability of seedlings from Bureau of Marine Resources to reseed their farms after they have sold their stock. Farm maintenance requires monthly cleaning of cages and repair after damaging storms or marine predators. The high level of poaching and lack of State capacity to help with monitoring of farms becomes discouraging for new farmers who often times would eventually disregard the farm. When asked what can be done to better support clam farmers, men suggested that stronger materials for cages be provided to them including improving their market access. Women on the other hand suggested developing means for improved collaboration and cooperation between and amongst clam farmers, access to training that can help them improve their practice and improving clam seedling and distribution by Bureau of Marine Resources.



**Figure 14:** Bureau of Marine Resource/ Ebiil staff assist women clam farmers. Photo by Surech Bells.

The female farmers were more likely to be exploring other methods of farming practices to improve survivability and growth of their stocks. A female farmer with the most experience and the largest farms states her challenges as access to financial and technical assistance to help with her expanded practice. The increased operational cost is mostly on maintenance and monitoring. The same female farmer discloses farming in three different reef areas to determine habitat suitability for effective farming and to reduce risk from storms and predator. Other women farmers disclose transferring out mature seedlings to deeper areas to increase growth and survival rates. From those interviewed, women farmers maintained higher seedlings compared to male farmers and had more concerns regarding consistency in seedling supplies and farming management knowledge and practices that can help improve farming practices and profitable outcomes.

## **Marine Resource Management**

### **Attitudes toward 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, 382 women and 365 men) to respond to a series of agree-disagree statements about marine resource knowledge and management. Participants were posed with a statement (e.g., “Women and men have different knowledge of marine resources.”) and asked to rate their agreement on a scale of Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, and Strongly Disagree.

When posed with the statement, “Women and men use marine resources differently,” 72% of respondents agreed (49%) or strongly agreed (23%) that men and women use marine resources differently, with little difference between women’s and men’s responses.

The large majority of respondents (88%) also agreed (46%) or strongly agreed (31%) with the statement, “Men and women have different knowledge of marine resources.” Again, responses of women and men were closely aligned.

The statement, “Both men and women should be included in marine resource decision-making” elicited the largest ‘strongly agree’ response (41%), with an additional 45% agreeing for a total of 85% of respondents agreeing that men and women should both be included in management. Again, there was little difference between women’s and men’s responses.

Finally, 75% of respondents agreed (44%) or strongly agreed (31%) that “Women’s knowledge of marine resources is respected as much as men.” Again, women’s and men’s responses were roughly equal.

Together, these responses indicate not only an opportunity but also a need for marine resource management to be inclusive of women, in order to capture women’s unique ecological knowledge.

## Threats to Marine Resources

Gleaners and fishers reported the same four leading threats to their resources: climate change, overfishing, sedimentation, and plastics pollution (Fig16). More than half (53%) of all gleaners and nearly half (44%) of all fishers named climate change as a threat, followed closely by overfishing, which was a concern for 46% of gleaners and 51% of fishers. These findings indicate that both climate change and overfishing need to be urgently addressed. Though solutions to climate change will require global action, overfishing can--and must--be addressed locally.

Other commonly raised threats to marine resources included illegal fishing, waste/sewage pollution, lack of knowledge of traditional practices, coastal development, and destructive tourism. Each of these concerns can be directly addressed by policies and programs within Palau.

The large majority of gleaners (89%) and fishers (86%) have personally and directly observed the effects of climate change on their marine resources. The most commonly observed impact of climate change was bleaching corals (44% of gleaners and 57% of fishers), followed by warming waters (56% of gleaners and 52% of fishers) and rising sea levels (33% of gleaners and 44% of fishers). 25% of gleaners observed an unusual occurrence they describe as “melting” cheled or sea cucumber in the hot and shallow waters. Some gleaners (16%) and fishers (18%) observed changing distributions of marine species. Some gleaners (14%) and fishers (18%) observed mass fish die-offs that they attributed to climate change. A small number of gleaners (3%) and fishers (8%) also observed drowned sea turtle nests that they attributed to climate change.

Together, the overwhelming observations of climate change impacts on marine resources in Palau calls for swift and immediate action

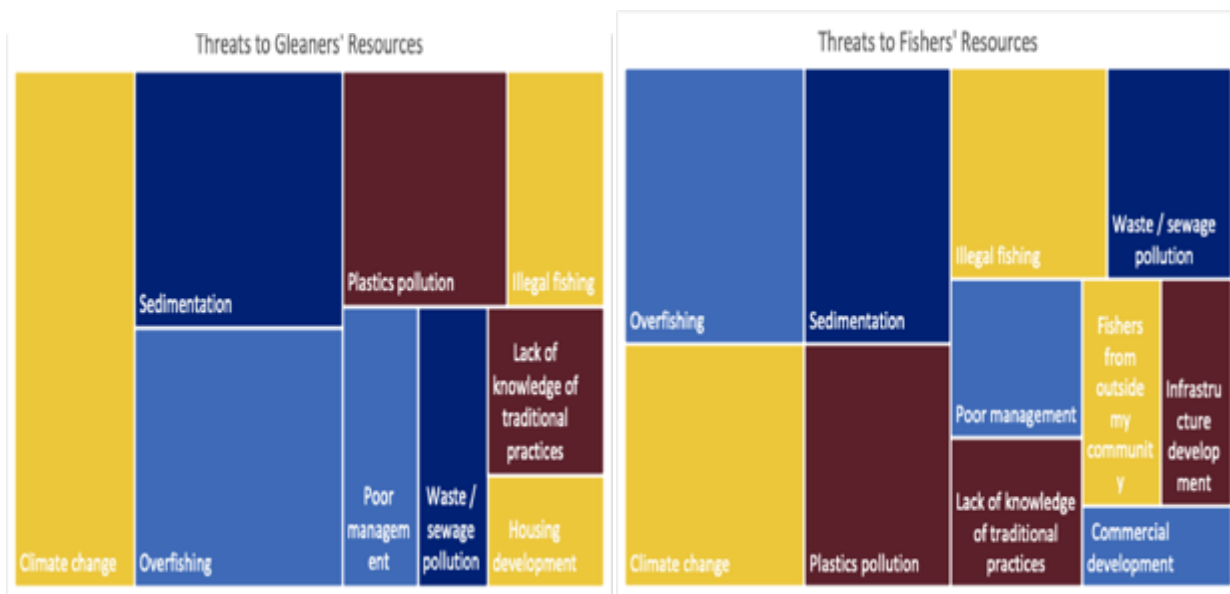


Figure 16; Threats to gleaners' and fishers' resources



### Trust in Community and Authorities

We asked all survey respondents (N=764) to rate their trust in a variety of groups: people living in their communities, traditional leaders, park rangers, NGOs, and elected officials. Respondents rated their level of trust on a scale: Trust all, Trust more people than distrust, About half and half, Distrust more than trust, and Distrust all (Fig. 17).

Overall, the most trusted group was NGOs, with 43% of respondents reported that they “Trust all” NGOs and a further 17% reporting that they “Trust more than distrust”. Following NGOs, park rangers and traditional leaders were most trusted, with 40% and 39% of respondents reported that they “Trust all”, respectively. Next, 30% of respondents “Trust all” people living in their community. Elected officials ranked lowest, with only 24% of respondents reported that they “Trust all” elected officials; the most popular response (37%) was “About half and half” with respect to trust in elected officials.

These results indicate the potential for building trust in community members and elected officials, possibly through partnerships with NGOs, park rangers, and traditional leaders.

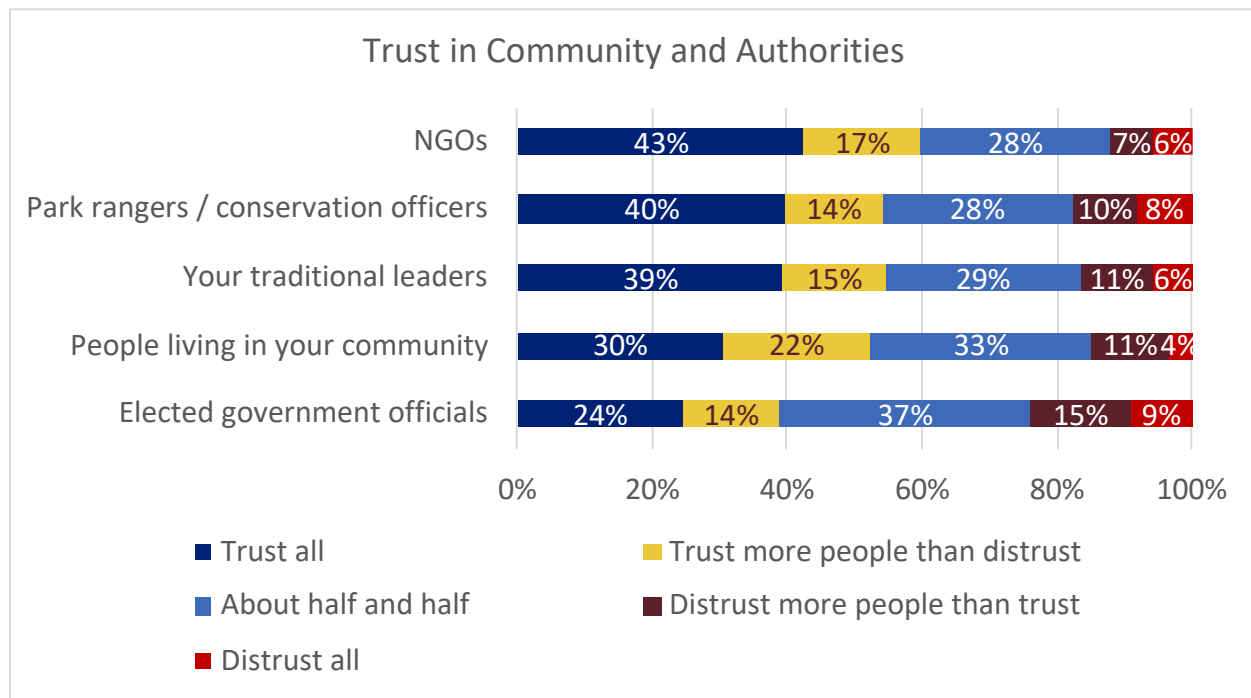


Figure 17; Levels of trust in community and decision making

# Sustainable Tourism



"Palauans need to maintain control of the tourism industry because they are the ones who know the environment very well and care for it." *M. Sadao, Peleliu*

## Participation in the tourism industry

A total of 308 of the 748 (41%) respondents reported that they had participated in tourism activities within the last year. Participation rates were similar between women (47%) and men (52%). Transportation (21%), guide services (20%) and work in catering/restaurants (20%) were the most frequently identified activities, and participation of men and women different tourist-related activities differed; women were primarily engaged in entertainment and catering services, while men were more likely to participate in the transportation, tour guide, and state park activities.

While over 40% of respondents indicated they participated in tourism-related activities in the past year, just, 8% respondents (N=57) identified tourism as one of their top two activities, following fishing, farming, and collecting cheled. Thus, while a fairly large percentage of people engage in tourism-related activities and services, these activities tend not to be the considered as in the top two most important activities for which respondents are involved.

Of the 57 individuals who identified tourism as a top resource activity, 61% were male and 38% female. Since men's and women's participation in tourism-related activities in the past year were about equal (47% vs 52%); the higher proportion of men listing tourism in their top two activities suggests that income associated with tourism is more important to men. Below we characterize tourism-related activities, importance, and perceptions for respondents that considered tourism in their top two important activities (N=57).

### **Participation in Tourism**

The most prominent roles in the tourism industry focused on hotels (28%), transportation (23%), and tour operations (24%), catering (7%) and restaurants (4%) round out the majority of common tourism roles.

Results show that women were primarily involved in hotel, lodging, restaurants and catering activities associated with tourism. Men are predominantly involved in transportation and tour operations. In general, men were more likely to work more hours than women in support of the tourism industry. A greater proportion of individuals working at least once per week were men.

Tourism sector data had limited responses (low sample sizes), and at times the results seem to diverge from the data acquired through the survey's general tourism question. Further research would be useful to assess the reliability of the responses and to provide more clarity. For example, roles in hotels had a greater response for respondents who identified tourism as one of their two main important sectors (28%) as compared to the 8% of respondents in the general survey, who identified they participated in tourism activities related to hotels. The data did confirm the larger role that women play in the restaurant and catering businesses. The results could indicate a lack of sample size, or the possibility that livelihoods associated with hotels and lodging provide a greater proportion of income (either primary or supplemental) for women than for men. Sample sizes were too low in many areas to specifically compare results in other tourism roles and activities.

### **Income from Tourism**

Most respondents indicated that they earned between \$101-500 from tourism per week, with little difference in regard to gender. However, the highest wage earners were men. There was a reduction in weekly income during the low season; income was about \$260/week lower during the low season as compared to the high season. Low sample sizes hindered more in-depth analysis, so these data must be interpreted with caution.

### **Economic Contribution**

Ninety-eight percent of respondents agreed or strongly agreed with the statement "Tourism is a strong contributor to Palau's economy". Only one person disagreed with that statement, with little difference in responses among genders.

While it was acknowledged that tourism is a strong contributor to Palau's economy, the perception of whether tourism has improved the living standard of all Palauans is more contentious. More men (77%) than women (54%) strongly agreed or agreed that living standards had improved for all Palauans (Fig. 19); however, 23% percent of women disagreed that living standards had improved, highlighting differences in perceptions among genders with respect to the role of tourism in improving living standards (Fig 20). Perceptions were even more mixed in regard to whether tourism has had a negative impact on the Palauan way of life. Perceptions were evenly split on whether tourism has a negative impact on Palauan way of life.

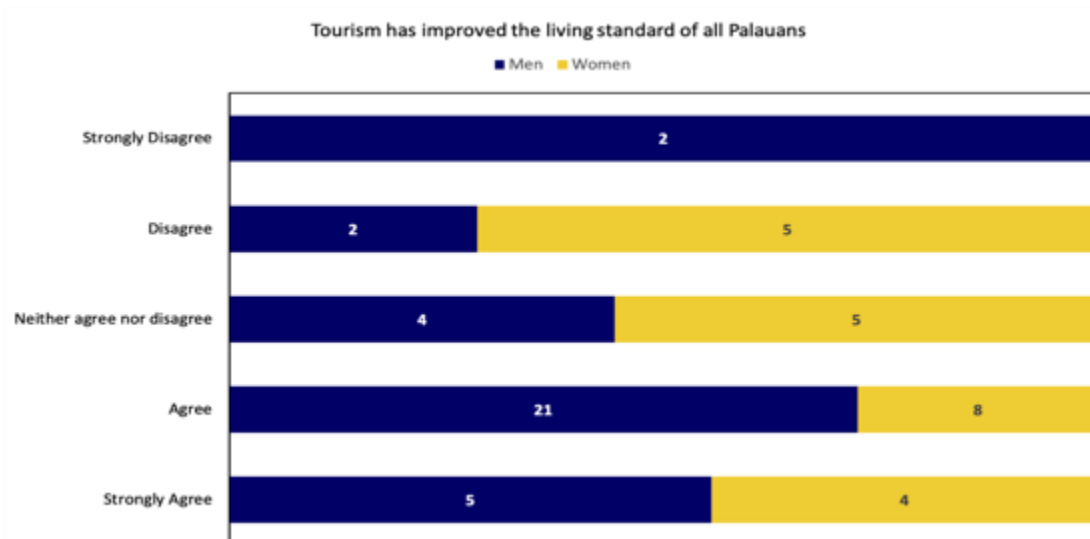


Figure 19. Perception on whether or not tourism has improved standard of living in Palau

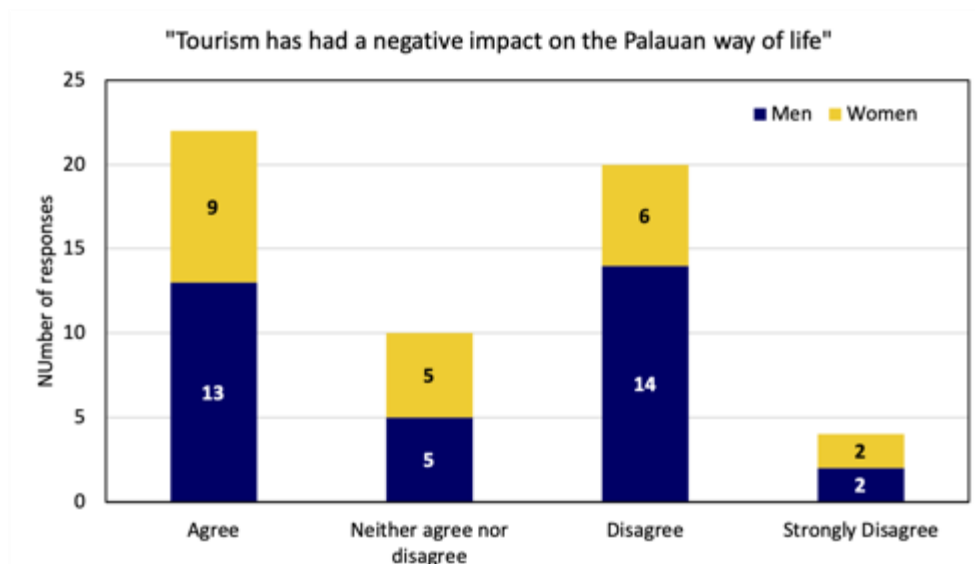


Figure 20. Perceptions about the impact of tourism on the Palauan way of life.

Since tourism is heavily based upon Palau’s natural resources, perceptions regarding tourism’s impact on the natural environment is important (Fig 45). Forty-eight percent of all respondents agree or strongly agree that tourism has had a negative impact on the natural environment, 27% percent disagree that there has been a negative impact on the environment, and 25% neither agree nor disagree. Female respondents agree to a greater extent that tourism has had a negative impact on the environment compared to their male counterparts as 55% of women and 44% of men agreed or strongly agreed that tourism negatively impacted the environment. Below photos show congestion on Palau’s reef during peak diving season.

Overall perceptions show concern about tourism activities impact on Palau’s environment. In regard to threats to the sustainability of Palau’s tourism sector, the majority of respondents agreed that both local and global environmental phenomena threaten Palau’s natural environment and their tourism related resources. Gender differences in regard to these perceptions were of no significance, though women tended to be more frequently considering the threats as “major threats.” In regard to the role of sedimentation, overfishing, or other local environmental changes, 90% of respondents indicated the local changes were a threat to Palau’s tourism sector. More women (81%) than men (72%) considered these major threats to the tourist industry. Regardless, the high percentage of respondents that view these phenomena as “major threats” bodes well for public support for action to address these environmental concerns. With respect to global environmental threats, 95% of all respondents viewed coral bleaching or other global environmental changes as a threat to the sustainability of Palau’s tourism sector. Again, a higher percentage of women (82%) viewed this as a “major threat,” compared to 74% of men.



Figure 21; Divers using reef hooks to watch fish aggregation contributing to coral degradation. Photo by Richard Brooks

Threats due to the number of tourists and enforcement of regulations were both thought of as major threats by respondents, though were slightly less of a concern than local and global environmental issues. To the question regarding the extent of poor enforcement of tourism regulations (e.g., feeding fish, taking tourists to protected areas), 86% of total respondents stated it was a threat to the sustainability of the tourism sector, with slightly more men (66%) than women (55%) considering it a major threat. Tourist congestion at one place was viewed as a major threat by 73% of respondents. A greater percentage of men (82%) than women (59%) viewed too many tourists as a major threat to the sustainability of tourism. These differences may reflect their personal experiences and gender differences within the tourism sector; a much higher percentage of men are involved in transportation and tour operations and may therefore have direct personal experience at tour sites, while women are primarily engaged in hospitality activities (restaurants, hotels) and therefore may have less direct experience at tourist sites with tourists.

## **Tourism-Key Informant Interviews**

Special effort was made to identify and interview key informants in the tourism industry as surveys had limited respondents choosing tourism as one of their top two priority areas. To identify the growth development of a sustainable industry, interviews with key industry members in the hotel and tour service were conducted to gather how the concept of sustainability is perceived and incorporated into operations by use of resources.

A mapping exercise with men and women local tour operators and workers was conducted to determine habitat health and current conditions, site reliability in tourism activities, and associated trends. The results of the mapping exercise show an alarming concern from the consulted group as they reflect on the consistent habitat degradation beginning with those closest to Koror most affected by pollution and overuse.

From the accommodations industry, four key accommodation providers on Peleliu were interviewed. All informants are entrepreneurs with no formal training in the service industry with a decade or more in operation. With the earliest one starting in 1967. Most establishments began because of the lack of rooms available to frequent dive guests and avid war relic tourists visiting the island yearly. Due to the island's remoteness, accommodations are either self-contained- or homestays with the exception of one as a fully serviced resort. Peleliu has no public sewage system so all have private septic tanks. Only one establishment utilizes a water catchment to supply all its operational needs. One establishment state using ECO Friendly reminder tags for guests to conserve the use of water.

All participate in recycling programs but only half grow their own vegetable garden and compost their organic waste. Only one operator actively endorses and reminds guests of environmental practices to protect the natural environment and to support local products. Whereas other operators state they do not interact often with guests and rely on tour operators to communicate environmentally responsible practices to visitors. The one establishment that consistently practiced sustainable tourism principles, revealed membership to an international sustainable tourism certification program. In terms of the sustainable use of resource, most stated proper management of current conservation initiatives (for existing resources) can and will ensure the access and availability for future generation to use for income and food. Many feels with proper management, future generations can enjoy existing resources.

Although COVID 19 has dramatically affected the tourism industry, with the suspension of inbound tourism, all felt supported by the government and knew where to go if they needed industry assistance. In the same way, eleven tour operators were interviewed for their perspective. All operators are long time tourism entrepreneurs with a couple being founders of the industry. Like the entrepreneurs in Peleliu, these tour operators were either self-taught or were mentored by earlier industry members at the start of their careers. Before the Covid-19 pandemic, operators were conducting fishing, diving, rock island, kayak, land and waterfall tours almost daily.

When asked about the use of the same resources (they use) for food and income by future generations, respondents felt, that although resources are slowly diminishing, they are accessible and the availability for the future relies heavily on the current management and protective initiatives for such resources.

### **Income from Tourism**

Monthly average income ranges from \$1200 for tour guides and \$3,000 monthly average for those in transportation- charter, depending on seasons and years in business. Those in lodging business in Peleliu, earn between \$10,000 to \$20,000 annually. Difference in profit is realized by the lodging companies who provide tour activities in addition.

In Peleliu State, the transfer of family business ownership from the first generation to the second is taken place. Three of the first-generation are women entrepreneurs who began their own homestays service to cater to the influx of Japanese visitors to Peleliu to visit where many Japanese lives were lost during the war. The elder female pioneering the homestay business began to invite other women to open up their homes to cater to the overflow tourist and this is how the Peleliu women owned homestay business began to grow. Today, all these women's business has been passed on to their children who have expanded their service into motels and diving tours. Most of the tour operators in Koror, are males and concentrate on providing transportation and tour guide service reflecting the data from the survey.

### **Perception on Tourism Impact**

When asked to compare the overall health of the marine ecosystem and species abundance from five-10 years past with today, respondents commonly agreed the ecosystem of corals are heavily damaged by consistent pollution from the public sewer system, unsustainable use, and much are still recovering from storms and warmer water temperatures. Consequently, there are less healthy corals and fish, affecting the quality of tour sites and visitor experiences. On the other hand, the experts state that threatened species like the bumphead parrot fish and sea turtles are observed more than before, along with small recruit of red corals. Still red and black corals remain few and simply rare to see nowadays. One respondent commented that the Koror State Tour Guide Certification should be consistently updated to ensure the proper information on the protection of Palau's natural resources be continually available for tour guides.

There is recognizable difference in perceptions on tourism impact between those in Peleliu and Koror. For instance, when the question was on future generations ability to rely on the same resources, the tour operators in Koror felt that the resources are approaching unsustainable levels and even if the future generation are going to rely on them, it will not be at the same level of productivity. On the other hand, those in Peleliu felt that Palau has taken strong steps to managing and protecting its resources and that ensures future generation's reliance. In addition, they felt that people still had access to resources for farming own food and fishing, including existing programs to support food production, and it's just a matter of individuals and community's willingness to participate.





*Figure 22; Men fishers and tour operators mapping exercise*

Both men and women tour operators (11 men/ 5 women) agreed that the continued degradation and loss of habitat for fishing and tour activities need urgent attention and addressing. The men participants put much effort into mapping important fishing grounds that's lost to various reasons with most identifying overfishing, tourist congestion, and pollution as major contributors. Women on the other hand concentrated on tour sites that have been lost or degraded as a result of too many tourists at one site at the same time, unsustainable diving practices such as reef hooks, and poor enforcement.

Both groups agreed that pollution from sewer and runoffs have had detrimental effect on fishing and dives sites within the Koror vicinity which requires all tour operators to travel further out towards Peleliu. This has also increased the need for bigger boat that can take as many tourists at one time, also increasing operational cost particularly as fuel cost has more than doubled in the last 10 years. As such, during peak season for tourism, famous tour sites such as Blue Corner and Jellyfish Lake can have up to 700 visitors in the water at the same time. Women specifically showed concern on the use of reef hooks to hold divers in place while observing fish aggregation. This allows for resting on corals or holding on to corals for balance and has cause tremendous loss of corals at dive sites.

# Youth Perspectives

## Perspectives on Management and Resource Sustainability

When asked if they will be able to rely on the same resources, about half of the response both male and female was yes for reasons that include Palau’s increasing effort to manage and protect its environment for future generations use. Female youth were more optimistic about relying on the same resources in the future. When asked if they think they will have access to the same resources, over half of them 58% (N=12) said, no- that they did not feel confident they would have access to the same resources particularly in fisheries.

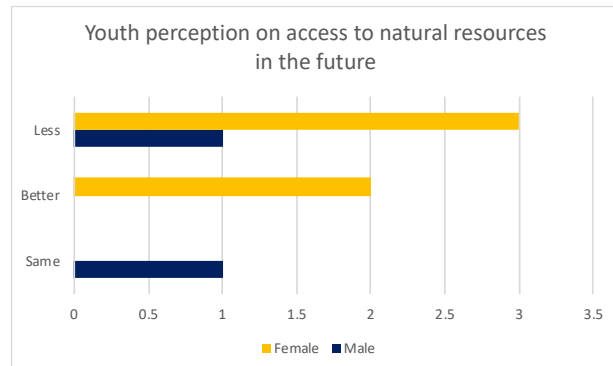


Figure 23; Youth perceive less access to natural resource in the future, especially girls

More female youth felt that today’s unsustainable land use will reduce their future access to reliable resources. Male youth were split between same access as today, and less as they felt that current use is already bad as it is. This was most expressed in fishery, where all, 100% of them felt that fishery practices were most unsustainable and that will impact on availability of fish to rely on for their generation. The youth felt that aside from unsustainable use of resources, climate change and pollution is a big threat to their future generation affecting the resources they would need to rely on. However, all but one, (11/12) felt very optimistic about their generation bearing responsibility to the environment for reasons including, better use of technology to inform and educate people, increasing populations of environmentally conscious professionals and youth, and improved environmental education programs reaching youth and schools.

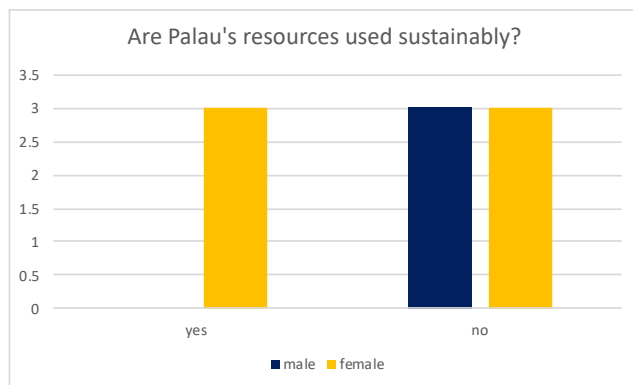


Figure 24; Youth perceive today resource use to be unsustainable

### Intergenerational Knowledge Transfer

When asked if knowledge is being passed on to their generation, both male and female equally said they are learning from either parents or through environmental outreach programs for schools. The other half did not feel that enough knowledge was provided where they feel confident, they are learning useful information that can help them be good stewards of their environment in the future.

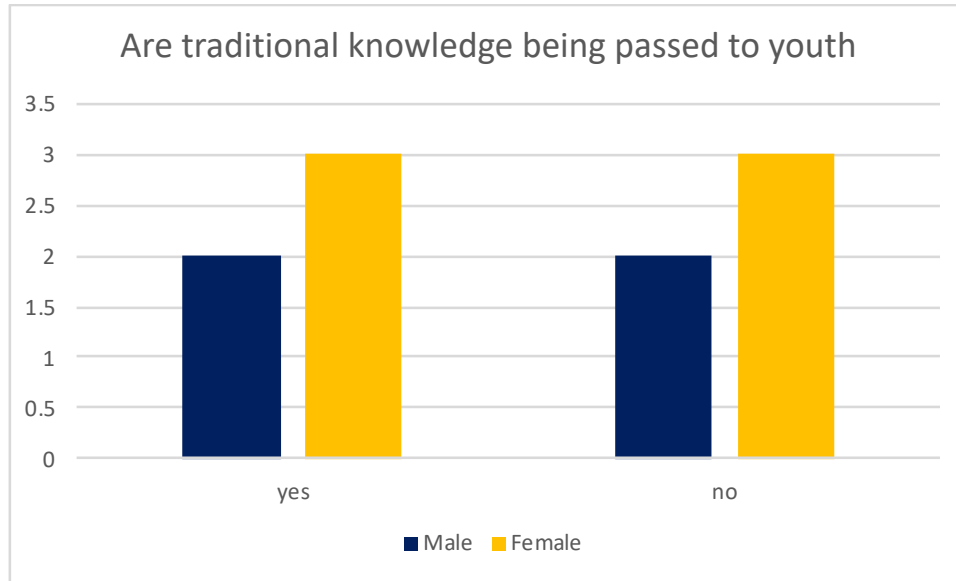


Figure 25; Youth perception on intergenerational knowledge passage

### Issue of Trust

When asked who can be trusted on managing and protecting our environment, the youths referred to NGOs and traditional leaders as people they felt can be trusted. They felt that NGOs hire professionals with training and passion towards environmental work, and at the same time are conducting research and making decisions based on data. That traditional leaders are consistent, are around longer, and bear higher sense of responsibility to the people of their own communities. All 100% of the youth felt that government officials were the least trusted figures with questionable ethics. Other youth explained that the government officials have too much authority and often times abuse that access to break environmental laws.

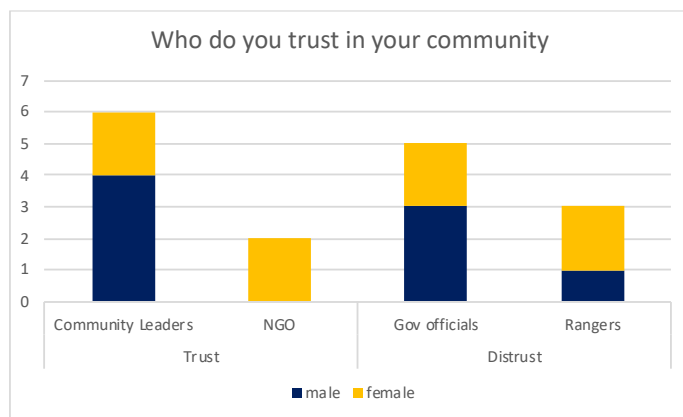


Figure 26; Youth sense of trust in their community

Annexes:

**Annex A; List of key informants interviewed**

Expertise	State	Name	Male/ female
Agriculture	Airai	Ngirkiklang Lomisang Ngirmekur	male
Agriculture	Ngaremlengui	Rosania Ngiraikelau	female
Agriculture	Airai	John Oiph	male
Aquaculture -clam farmer	Koror	Bernice Ngirkelau	female
Aquaculture clam farmer	Ngarchelong	Tino Kloulchad	male
Aquaculture clam farmer	Ngarchelong	Mechaet Temong	male
Aquaculture clam farmer	Ngarchelong	Dibch Ellis	female
Aquaculture clam farmer	Ngarchelong	Lorna Remarii	female
Aquaculture clam farmer	Kayangal	Aliti Inawo	female
Aquaculture technician	Koror	Lawrence Sumor	male
Architecture	Ngaremlengui	Samil Ngiraikelau	male
Dive Instructor/ guide	Koror	Clayton Johanes	male
Fishermen	Koror	Joe Reklai	male
Hunter	Ngardmau	Ngirakesau Renguul	male

Hunter	Ngchesar	Sakarias Kitalong	male
Lodging	Peleliu	Alex Cruz	male
Lodging	Peleliu	Emory Wenty	male
Lodging/ Tour operator	Peleliu	Mayumi Sadao	female
Lodging/ tour operator since 1968	Peleliu	Mayumi Ridep	female
Tour Guide	Koror	McCray Omelau	male
Tour guide	Koror	Newman Andress	male
Tour Guide/ fishermen	Koror	Flynn Ruloked	male
Tour Operator/ fishermen	Koror	Stomu Olebuu	male
Tour Operator/ fishermen	Koror	Lyman Singeo	male
Tour Operator/ fishermen	Koror	Adolph Demei	male
Tour Operator/ Fishermen	Koror	Melvin Toribiong	male
Tour Operator/ fishermen	Koror	Tommy	male
Tour Operator/ fishermen	Koror	Ryan Mikel	male
Traditional architecture	Peleliu	Obak Isao Singeo	male
Traditional medicine	Ngaremlengui	Haruko Ramarii	female
Traditional medicine	Peleliu	Kisaol Ngiralo	female

Traditional medicine	Ngatpang	Elin Rebluud	female
Traditional medicine	Ngardmau	Remurang Renguul	female
Traditional medicine	Airai	Omkatel Blaiyok	female
Traditional medicine/ agriculture	Peleliu	Gloria Idesiar	female

## Annex B; Total individual survey by state and gender

State	Man	Woman	Other	Grand Total
Aimeliik	17	16		33
Airai	32	27		59
Hatohobei	3	2		5
Koror	176	185		361
Melekeok	15	15	1	31
Ngaraard	13	17		30
Ngarchelong	18	19		37
Ngardmau	12	12		24
Ngaremlengui	15	15		30
Ngatpang	15	14		29
Ngchesar	9	21		30
Ngiwal	17	13		30

Peleliu	14	17		31
Sonsorol	9	9		18
<b>Grand Total</b>	<b>365</b>	<b>382</b>	<b>1</b>	<b>748</b>



## Annex C; Research team

Name	Affiliation
Ann Singeo, MA	Ebiil Society Executive Director- lead researcher
Heather Ngiratregd	Ebiil Society- sustainable tourism survey/ interview lead
Ilima Hirao	Ebiil Society- forest / agriculture survey/ interview lead
Patty Kloulechad	Ebiil Society- forest / agriculture survey/ interview lead
Sismereng Remarii	Ebiil Society - survey
Vanray Tadao	Private local botanical expert contracted by Ebiil Society
Surech Bells	Ebiil Society fishery survey/ interview lead
Caroline Ferguson	University of Stanford- PhD. Candidate Emmet Interdisciplinary Program in Environment/ Resources – lead researcher
Liza Hafner	Stanford University graduate students- data analysis and report design
Bryan Endress, PhD	Associate Professor Eastern Oregon Agriculture and Natural Resource Program Oregon State University-lead researcher
Scott Heppel, PhD.	Associate Professor Eastern Oregon Agriculture and Natural Resource Program Oregon State University-lead researcher

Maren B. Peterson , MA	Research Associate with Oregon State University- lead researcher
Ruby Gabriel	Oregon State University intern with Ebiil- data analysis, technical support
Reid Endress	Oregon State University intern with Ebiil- data analysis, technical support
Dylan Heppell	Oregon State University intern with Ebiil- data analysis, technical support
Iseko Williander	Ebiil-Youth Research Camp- survey design and administering
Macy Nagata	Ebiil-Youth Research Camp- survey design and administering
Shuri Chibana	Ebiil-Youth Research Camp- survey design and administering
Ucheliou Burton	Ebiil-Youth Research Camp- survey design and administering
Oreall Kloulechad	Ebiil-Youth Research Camp- survey design and administering
Telmetang Henry	Ebiil-Youth Research Camp- survey design and administering
Metuker Columbus	Ebiil-Youth Research Camp- survey design and administering
Rengel Henry	Ebiil-Youth Research Camp- survey design and administering
Olilai Chilton	Ebiil-Youth Research Camp- survey design and administering
Kimie-Maki Singeo	Ebiil-Youth Research Camp- survey design and administering
Ngesur Victor	Ebiil-Youth Research Camp- survey design and administering

Bilal Rengulbai	Ebiil-Youth Research Camp- survey design and administering
Kainoah Temong	Ebiil-Youth Research Camp- survey design and administering
Laisang Baiei	Ebiil-Youth Research Camp- survey design and administering
Merii Xavier	Ebiil-Youth Research Camp- survey design and administering
Cooper Sumor	Ebiil-Youth Research Camp- survey design and administering