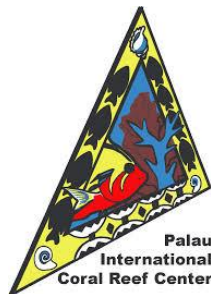


Socio-economic Baseline Study of Ngiwal State



PICRC Technical Report No. 16-09

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Executive Summary

In 2010, the Palau International Coral Reef Center conducted a socio-economic assessment training exercise in Ngiwal State to (1) train conservation officers on how to conduct a socio-economic assessment as a tool to improve management of coastal and marine resources and (2) develop data collecting tools for an assessment of Ngiwal State (Oldiais, 2010). The 2010 study covered a total of 60 households with a focus on the "Ngiwal State Protected Areas and Natural Resource Management Plan" and utilized secondary data, household surveys, key informant interviews and focus group discussions.

In 2015, Palau International Coral Reef Center in collaboration with the University of Queensland conducted another socio-economic study within six PAN States of Palau. The results illustrated in this report are based on Ngiwal State, one of the six PAN States. The study was conducted using household questionnaires and key informant interviews incorporating key socio-economic indicators at the regional level (Micronesia Challenge), National level (Palau Indicators) and site level (local management plan).

Results from this study show that most respondents were aware and supportive of the PAN, State bul¹ and State conservation areas, while only 39% of respondents were aware of the MC. 58% of households reported that they or members of their households go fishing or harvesting invertebrates mainly for income and food consumption purposes, and 94% of households indicated growing household crops.

¹Bul refers to a Palauan traditional form of conservation where certain restrictions are placed to regulate the harvesting of plants or fishing. The bul would only be lifted, if the village chiefs or men's clubs observed that the reefs and/or plants were ready to be harvested again.

Majority of respondents did not attribute any changes to locally sourced marine and terrestrial food availability to the protected areas. However, respondents indicated that the terrestrial protected areas have somewhat increased the size and abundance of building materials in Ngiwal State.

Most respondents were fully aware of the Ngemai Marine Protected Area (MPA) and 89% of respondents were knowledgeable of its boundaries. Similarly, in 2010 over 85% of Ngiwal respondents had knowledge of the rules and regulations of Ngemai MPA (Oldiais, 2010).

Although most respondents indicated having been involved in activities related to the protected areas, 60.9% of respondents have never participated in resource management planning or decision making. Most respondents highly recommended that the monitoring results of Ngiwal's protected areas are presented to the community on a regular basis as a way to improve the community's understanding of the protected areas. These results serve as baseline socio-economic data for Ngiwal State as a PAN site, however further socio-economic monitoring is needed in order to assess changes and trends as they relate to protected areas.

Introduction and Context

In 2006, the chief executives of the Federated States of Micronesia, Republic of the Marshall Islands, Guam, the Commonwealth of the Northern Marianas and the Republic of Palau launched the Micronesia Challenge (MC) Initiative, with the purpose of effectively conserving 30 percent of near-shore marine resources and 20 percent of terrestrial resources across Micronesia by 2020. In Palau, a system of

protected areas known as the Palau Protected Areas Network (PAN) was created in 2003 to conserve and sustain Palau's marine and terrestrial resources. Today, the PAN is Palau's mechanism to achieving the goals of the MC. As part of a national and regional effort to conserve and sustain marine and terrestrial resources, the Palau International Coral Reef Center (PICRC) has been conducting socio-economic studies in an effort to track socio-economic trends and changes as they relate to protected areas.

In 2010, PICRC conducted a socio-economic study in Ngiwal state with the aim of gauging the community's perceptions of changes and trends of the marine resources in Ngiwal. In 2015, PICRC in collaboration with the University of Queensland implemented a socio-economic study in six PAN states of Palau which includes Ngiwal State. The purpose of this study is to assess the effectiveness of PAN sites in improving the livelihood outcomes of communities in Palau and as well as to assess socio-economic changes and trends in relation to protected areas and natural resource management.

The Protected Areas Network (PAN), being implemented across Palau, in many ways pays close tribute to the traditional marine management system – Bul – that was in place for many, many decades.

In a broad brush manner, the literature on implementing protected areas, particularly marine areas, points to their lack of success, especially in developing countries (e.g. Cinner and Awsani 2007; Johannes, 2002). While these studies promote a rather

grim prognosis for protected areas, ambitious calls to establish more conservations areas globally continue (Mora et al., 2006).

Often, studies on the impact, effectiveness and sustainability of protected areas focus heavily on biological and ecological indicators. While understanding the progress being made in these areas to conserving resources, equally important is understanding the views and perceptions of surrounding local communities – as Johannes (1978) puts it, understanding the viewpoint of the ‘conserver’. This is the core impetus for undertaking this study. Making this study novel is that it builds on a limited knowledge base of empirical data on local people’s behaviours, support for, and perceptions of the protected areas, not only in Palau, but globally (see Bartlett et al., 2009).

Methods and Study Site

This study utilized a structured household questionnaire administered across six States of Palau: Kayangel, Ngaraard, Ngchesar, Ngiwal, Airai and Peleliu. Within each state is a registered marine and/or terrestrial PAN site. While the aim of this study was to determine a variety of social factors related to marine protected areas, equivalent terrestrial questions were conducted where applicable. This study focused on surveying individuals over 18 years old who could speak on behalf of their household and were considered to be the head of household, being mindful too of the need to try and ensure a gender balance across the sample size. To do so, the local data collectors asked if either the male or female head of household was available to be surveyed.

This data collection method was deemed most appropriate and efficient in collecting a large sample size across a broad geographical area. The main objectives of the household questionnaire were to ascertain:

- Socio-demographic data on the respondent and their household;
- Livelihood activities and household income levels;
- Food and water security at the household level; and
- Individual views on the Conservation Areas in their State.

Each question attempted to align with some of the indicators set by the Micronesia Challenge, Palau Indicators and PICRCs own indicators. The questionnaire is provided in Appendix 1 and each question also shows which indicator it is attempting to align with. The questionnaire also more broadly aligns with the Marine Protected Areas Management Effectiveness Initiative set up by the World Conservation Union's World Commission on Protected Areas (Marine) and the World Wide Fund for Nature, which has developed 16 indicators related to the socio-economic dimensions of marine protected areas.

Accompanying the household questionnaires were a series of key informant interviews. These were conducted by PICRC staff with a total of 8 people from Ngiwal State. These interviews were held with members of Ngiwal State Legislature, Ngiwal PAN staff, village chiefs, conservation officers, local fishermen, and male and female leaders of Ngiwal traditional community groups. An interview schedule with a list of semi-structured questions was used to guide the interview to help clarify some of the questionnaire findings and also ascertain the views of these interviewees in relation to the success and challenges of the conservation areas. Their views have been integrated into the discussion section.

A sample size for the socio-economic household questionnaire was determined for each of the six sites based on their population size (at a household level), as well as the desired confidence interval (or, margin of error– set at 5%) and confidence level (95%). A sample size calculator (<http://www.surveysystem.com/sscalc.htm>) was used to calculate the sample size for each of the sites – the results of which are illustrated below in Table 1.

Table 1. Determining the sample size for the six study sites

State and Study Site	Number of households	Number of household questionnaires (based on the sample size calculator)	Total number of questionnaires actually collected
Ngaraard	111	86	88
Ngchesar	78	65	65
<i>Ngwal</i>	78	65	64
Peleliu	146	106	106
Airai	650	242	242
Kayangel	27	27	25
Total	1,162	591 (51% of all households)	590

In total, the sample size was determined as 591 household questionnaires. For Ngwal State, the focus of this report, 65 questionnaires were required and 64 were collected for the study in total.

The questionnaires were administered in each of the six sites by local data collectors who were trained on how to collect data ethically and systematically. The data were

then inputted into the Statistical Package of the Social Sciences (v22.0), and analysed. The analysis, for the purposes of this report to show baseline data, included basic frequencies, percentages, means and sums.

Provided below is a summary of the various indicators that were used and integrated into the household questionnaire.

Indicators

Micronesia Challenge Indicators:

- MC1: Perception of change in food availability
- MC2: Household participation in MC management planning or decision making
- MC4: Change in violations and illegal activities related to fishing, harvesting and use of natural resources
- MC8: Community awareness of MC
- MC9: Community support for MC

Palau Indicators:

- PI1: Household food availability and sources
- PI2: Household dependence on local food resources
- PI3: Level of harvesting from local resources and their conditions-fishers and farmers
- PI4: Household income, expenses and subsistence distribution by source
- PI5: Perception of quality and quantity of water

Ngiwal State Protected Areas and Natural Resource Management Plan 2010-2015 Indicators:

- Goal 3: Establish effective conservation enforcement program in Ngiwal State by 2015.
- Goal 3-2: Delineate all regulated areas in Ngiwal with proper markers by 2011. (Indicator: All regulated areas in Ngiwal properly marked).
- Goal 4-1: Implement existing state aquaculture project plan by 2012. (Indicator: Aquaculture project in Operation).

- Goal 4-2: Develop a marketing plan for Ngiwal State tourist attractions incorporating cultural sites, protected areas, and other attractions in Ngiwal State by 2012. (Indicator: # of tourist visitors to Ngiwal).

Study Site

Ngiwal State is situated on the north eastern coast of Babeldaob, Palau's largest island. The State's topography is relatively steep land area which forms a large part of the Ngerbekuu watershed. Ngiwal has two main hamlets: Ngercheluuk and Ngermechau and a total household population of 78. The village has a total population of 223 individuals (Palau Census 2005).

Ngiwal has two protected areas, Ngemai Conservation area as well as Oselkesol Waterfall and Ngerbekuu Nature Reserve. Ngemai Conservation Area is a legislated marine protected area that was established in 1997 for the purpose of recovering depleted fish and invertebrate populations (Ngiwal State Management Plan 2010-2015). The area was re-opened to fishing from 2001 to 2008. In 2009 it became a registered PAN site and is considered Category 1a under IUCN as it is strictly closed with limited visitation. Oselkesol Waterfall and Ngerbekuu Nature Reserve are terrestrial protected areas in Ngiwal, but are currently not registered as PAN sites. The nature reserve is considered category II under IUCN as there will be allowed permitted visitations as well as plans for necessary recreational infrastructure (Ngiwal State Management Plan 2010-2015). Both protected areas were accounted for in this study as marine and terrestrial protected areas in Ngiwal State.

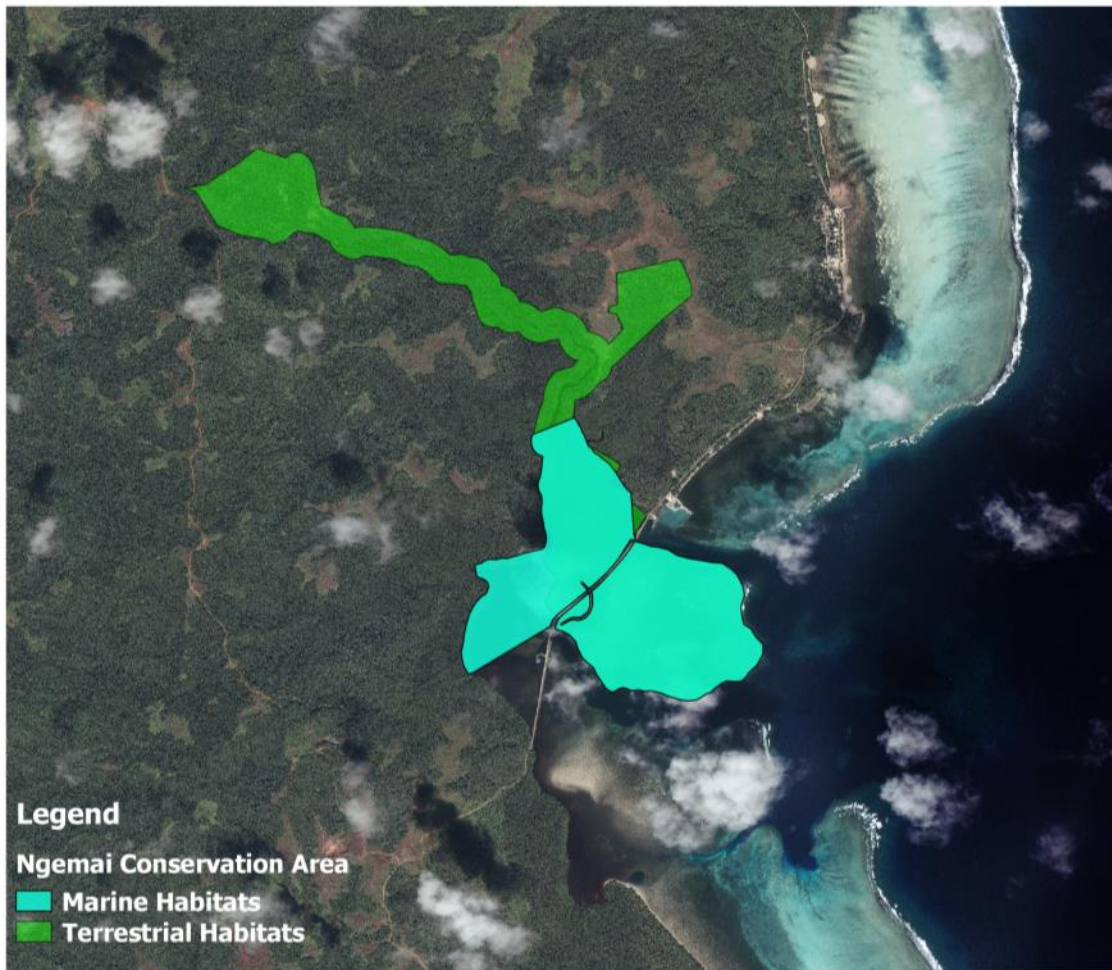


Figure 1. Map of Ngemai Conservation area (blue area), Oselkesol Waterfall and Ngerbekuu Nature Reserve (Green Area).

Results

Socio-demographics

Most respondents were male (64.1%) while 35.9% were female. The mean age of respondents was 54.6, with an age range of 25 to 87 years old. Slightly over half of respondents (51.6%) have lived in Ngiwal State all their lives, followed by 37.5% having lived in Ngiwal for more than 5 years while 10.9% have lived in the state for less than 5 years. In terms of marital status, most residents were married (57.8%),

followed by either being single or widowed (17.2% each) and divorced (7.8%). The vast majority (or all) of respondents held Palauan citizenship (96.9%) and most were males who have lived in Ngiwal all their lives. More than half of the respondents have obtained formal education of up to high school and indicated an extensive level of traditional knowledge. Majority of all household respondents (60.9%) have never participated in resource management planning or decision making. Table 2 provides some further socio-demographic characteristics of the respondents and their households.

Table 2. Socio-demographic information on respondents and their household

Education (%)		Traditional knowledge (%)		Income		Land tenure		Participate in resource management	
Up to elementary school	15.9	None	1.6	Government work	34.4	Traditional agreement	40.6	Never	60.9
Up to high school	42.9	Some	51.6	Pension/social security	34.4	Owens	37.5	Seldom	20.3
Up to college	36.5	Extensive	46.9	Fishing (fish, invertebrates)	3.1	Leases from State Government	15.6	Always	7.8
Up to university	4.8			No income	17.2	Private rental	4.7	Sometimes	6.3
				Other	6.3	Informal agreement	1.6	Often	4.7
				Private business	3.1				
				Farmer	1.6				

Household sizes ranged between 1 to 12 individuals per household, with a mean of 4 individuals per household. Most households had at least one under 18 year old individual residing within the household. Figure 2 shows the total number of people in each age group living in each surveyed household, and Figure 3 shows the average sizes of households in Ngiwal.

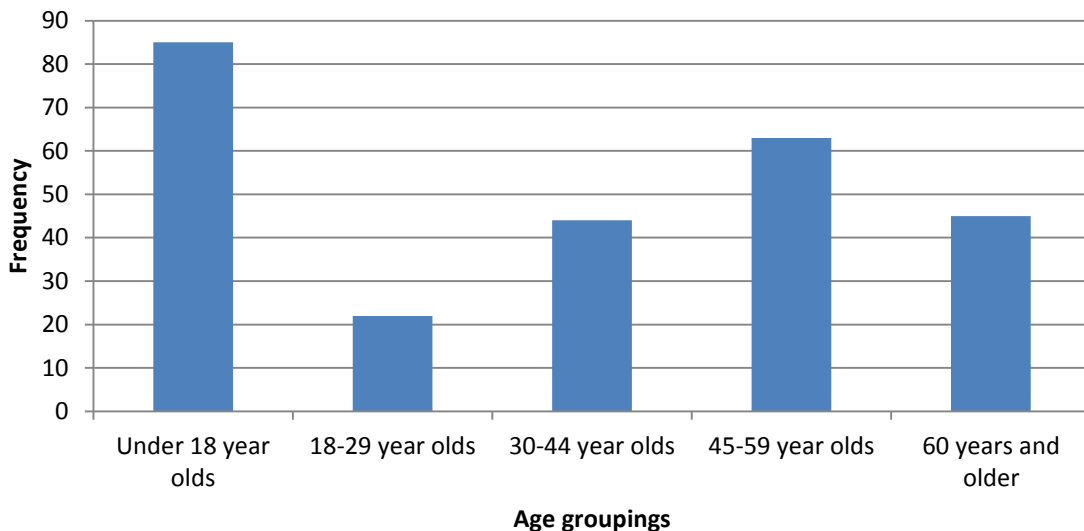


Figure 2. Total number of people in each age group across the surveyed population

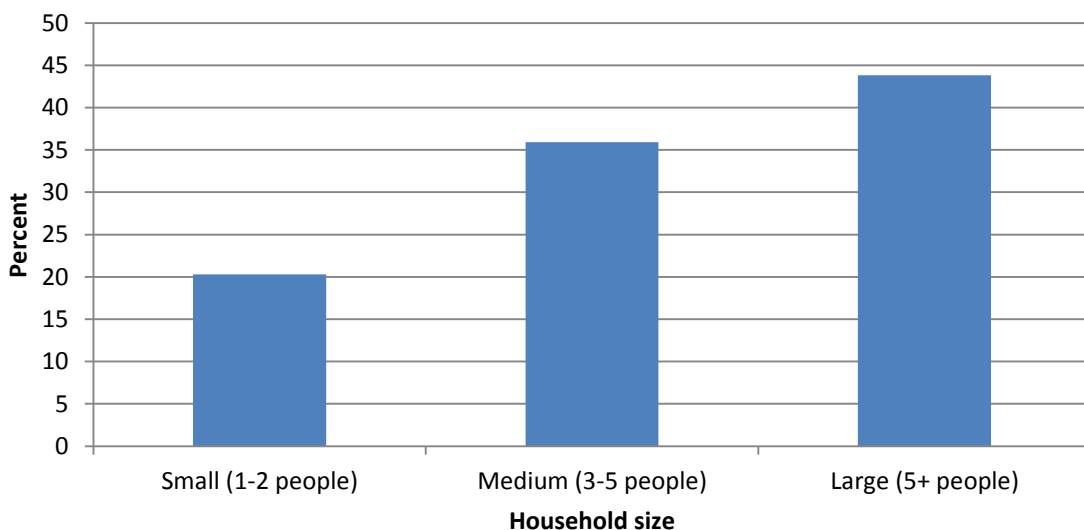


Figure 3. Average sizes of households in Ngiwal State

Income and Livelihood activities

The questionnaire sought to identify the key income and subsistent livelihood activities of each household. Majority of respondents indicated a monthly income level between \$500-\$1000 (Figure 4) and also stated that the conservation areas did not change their household income or expenses. Households were queried on their

views as to whether or not the Conservation Areas have changed their household income or household expenses. About one-fifth of respondents indicated a negative effect on their income and expenses (Table 3).

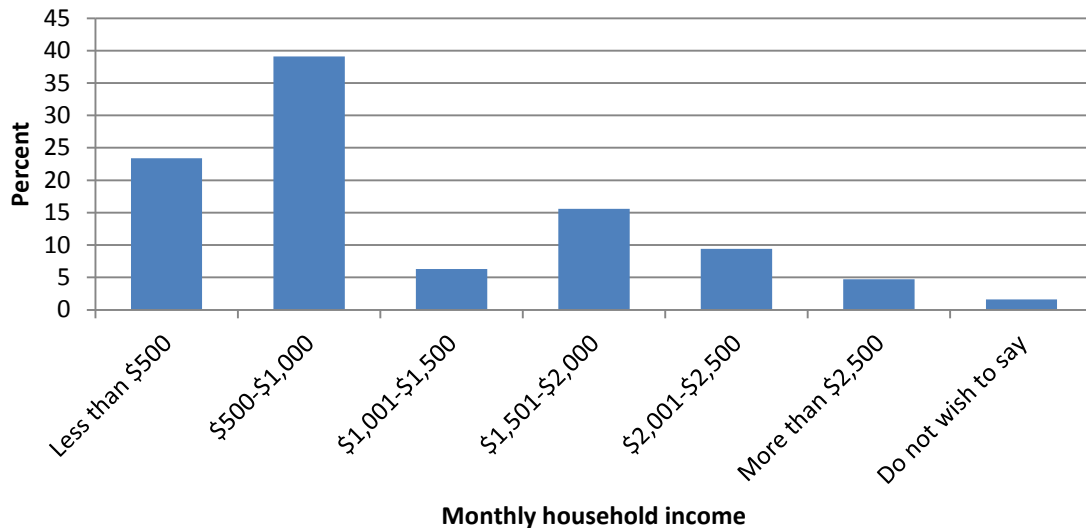


Figure 4. Proportion of households in each monthly income category

Table 3: Perceived effect of the protected areas on household income and expenses.

	Greatly increased	Somewhat increased	Not changed	Somewhat decreased	Greatly decreased	Don't know
Household <u>income</u>	0	3.1	70.3	20.3	1.6	4.7
Household <u>expenses</u>	7.8	23.4	60.9	6.3	0	1.6

In terms of livelihood activities, most respondents (57.8%) indicated that they or members of their household go out to the ocean to catch fish or harvest invertebrates. Of those households that indicated that they do fishing activities, 31% of households indicated fishing for food consumption, while 22% of households reported that they do fishing activities for both consumption and income purposes (Figure 5). 22% of households also indicated that they harvest invertebrates for food consumption and 3% for consumption and income (Figure 5). Over half of household

respondents (52%) stated that they farm crops for food, while 32% of households respondents indicated that they farm crops for income and for food (Figure 5). 34.4% of households reported that their farming land area was less than 0.25 acre, followed by greater than 1 acre (31.1%), and between 0.25 - 1 acre (18%).

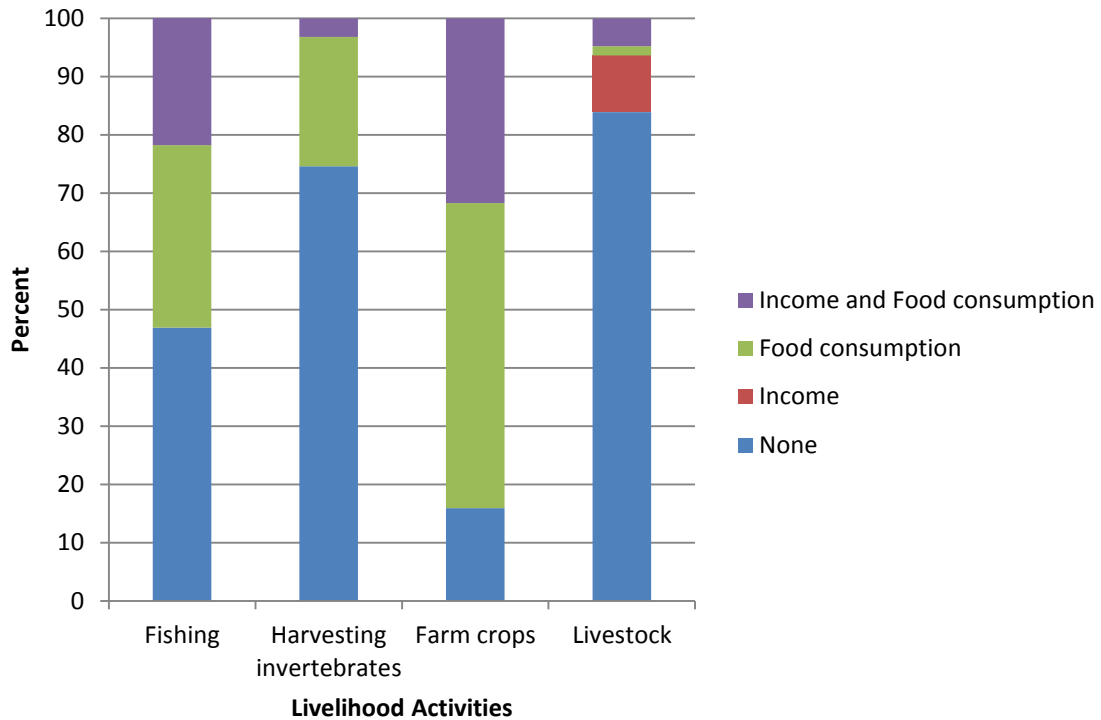


Figure 5. Household level of resource use for livelihood activities.

In terms of fishing for fish, most households indicated that on average, 25% of their fish catch was for subsistence uses or food only, while 30% of their catch was for income generating activities (Figure 6). The remaining 45% of household's fish catch was equally divided for customary practices and giving away (Figure 6). 25% of households indicated that they catch fish on a weekly basis, followed by monthly (20.3%), and every 6 months (7.8%).

In terms of livestock, those that utilized livestock as part of the suite of livelihood activities mainly had 1-5 livestock (14.5%), followed by 6-10 livestock (1.6%) (Figure 5).

Most households mainly owned livestock for income and subsistence (Figure 5). Household respondents indicated that on average, 40% of their invertebrate harvest was for subsistence or food, while 20% was for income related activities, followed by 15% for giving away and 25% for customary practices (Figure 6). Of those households that reported harvesting invertebrates, 14.3% reported that they harvested invertebrates on a 6-month basis, followed by monthly (9.5%), and daily (1.6%).

For farming-related activities, household respondents stated that 45% of their farm crop harvest was for income related activities, followed by 40% for customary practices (Figure 6). On average, only 5% of household grown crops was for giving away, and 10% was for household subsistence or food (Figure 6).

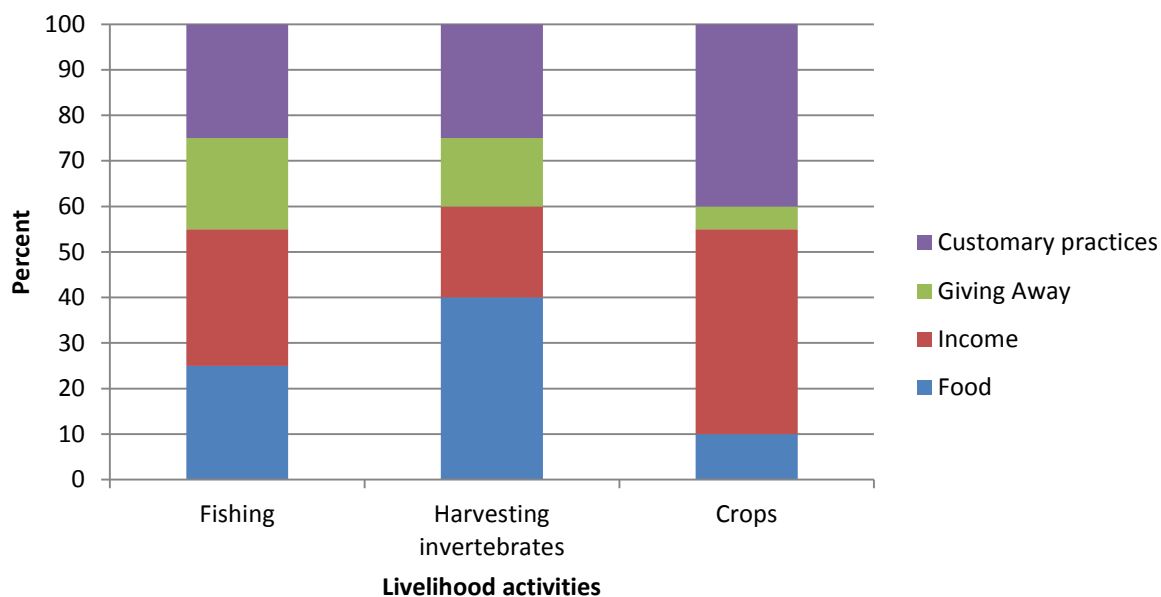


Figure 6. Percentages of resource use for household livelihood activities in Ngwal state.

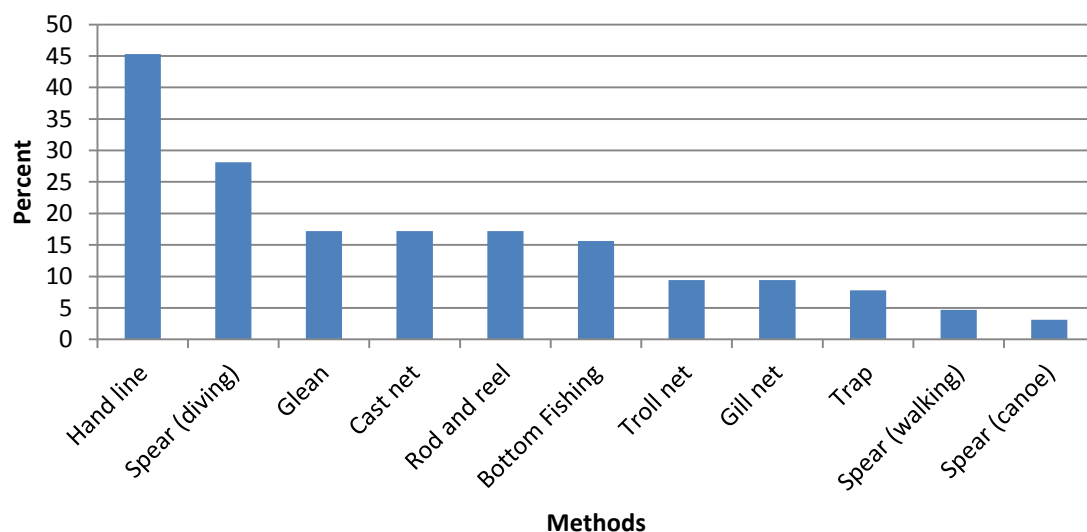


Figure 7. Methods used for fishing related activities.

The most commonly used methods of fishing by households were fishing by handline and spear (diving) (Figure 7). The key methods that all households reported using as a means to catch fish or harvest invertebrates are summarized in Figure 7.

Households reported on their most popular marine animals collectively caught or harvested. Overall, 31.3% of all household respondents indicated that their most commonly caught fish species was Keremlal (*Lutjanus gibbus*) followed by Udech (*Lethrinus obsoletus*) (25%), Ngiaoch (*Hipposcarus longiceps*) (18.8%), Mellemau (*Scarus spp.*)(12.5%), Masech (*Ctenacheatus striatus*) (12.5%), and Um (*Naso unicornis*) (12.5%). In terms of the most commonly collected invertebrates, 23% of households harvested Kim (*Tridacna spp.*), followed by Oruer (*Tridacna crocea*) (17%), Ktor (6%), and Cheled (*Holothuria spp.*) (6%). With regards to the numbers of fish caught over a year, the reported mean number of fish caught per household was 71.8 fish (ranging from 9 to 248). For invertebrates, the reported average number of invertebrates caught per household was 75.9 (ranging from 32.5 to 175). In general, respondents indicated that the fish species caught and invertebrates collected were (slightly) different to those caught five years ago.

The vast majority of respondents indicated that there were threats to Palau's marine environment (87.5%). The top two threats to fisheries listed by respondents were overharvesting and climate change. In addition, respondents also indicated the need for regulating the use of gill nets as a solution for overharvesting. In terms of solutions, the top two solutions listed by respondents were stronger enforcement and controlled or regulated fishing (i.e. setting size limits and regulating the use of gill nets).

Food and Water Security

Respondents were also asked where their household's food supply came from, how often it was sourced and if this was different compared to five years ago. Most

households relied heavily on imported processed or canned foods from stores, as well as imported livestock and imported crops and/or vegetables (Table 4). On the other hand, most households did not rely on locally produced livestock and imported marine resources (Table 4). This was similar to five years ago. 25% of households relied on self-caught marine resources and local market marine resources for food consumption (Table 4).

Table 4. Household's food supply in comparison to five years ago (**bold** denotes highest percent in each food category)

	Now - how often				Compared to five years ago			
	<i>A lot</i>	<i>Moderate</i>	<i>Little</i>	<i>None</i>	<i>More</i>	<i>Same</i>	<i>Less</i>	<i>N/A</i>
Household grown crops <u>and/or</u> vegetables	14.1	42.2	31.3	12.5	25	60.9	12.5	1.6
Local market crops <u>and/or</u> vegetables	14.1	29.7	35.9	20.3	20.3	54.7	23.4	1.6
Imported crops <u>and/or</u> vegetables	50	17.2	25	7.8	7.8	56.3	34.4	1.6
Self-caught marine resources	12.5	25	17.2	45.3	29.7	59.4	9.4	1.6
Local market marine resources	7.8	25	28.1	39.1	10.9	54.7	32.8	1.6
Imported marine resources	1.6	1.6	12.5	84.4	1.6	75	21.9	1.6
Local freshwater resources	28.1	12.5	9.4	50	21.9	67.2	9.4	1.6
Local land animals (pigs, birds, fruit bats)	1.6	10.9	56.3	31.3	21.9	70.3	6.3	1.6
Locally produced livestock	3.1	4.7	18.8	73.4	6.6	75.4	16.4	1.6
Imported livestock (meat)	34.4	25	32.8	7.8	4.8	64.5	29	1.6
Imported processed or canned foods from shop	42.2	40.6	14.1	3.1	11.3	66.1	21	1.6
Other	0	0	0	100	0	4.7	93.8	1.6

In terms of farm crops, 93.8% of surveyed respondents indicated that they or members of their household grew crops. The most common crops grown by households were fruit trees, taro, coconut, and betel nut (Figure 8). 86% of households reported growing fruit trees as well as taro (75%) (Figure 8). Of all the

households that grew crops, majority used either green manure or compost fertilizers (Figure 9).

For household source of drinking water, almost all households in Ngiwal relied on store bought or household rainwater for drinking water (Figure 10). Half of the survey respondents indicated that their household does not have access to safe drinking water (Figure 11). In relation to, 40% of households did not have access to safe general use water, and 20% of households have access to safe general use water sometimes (Figure 11).

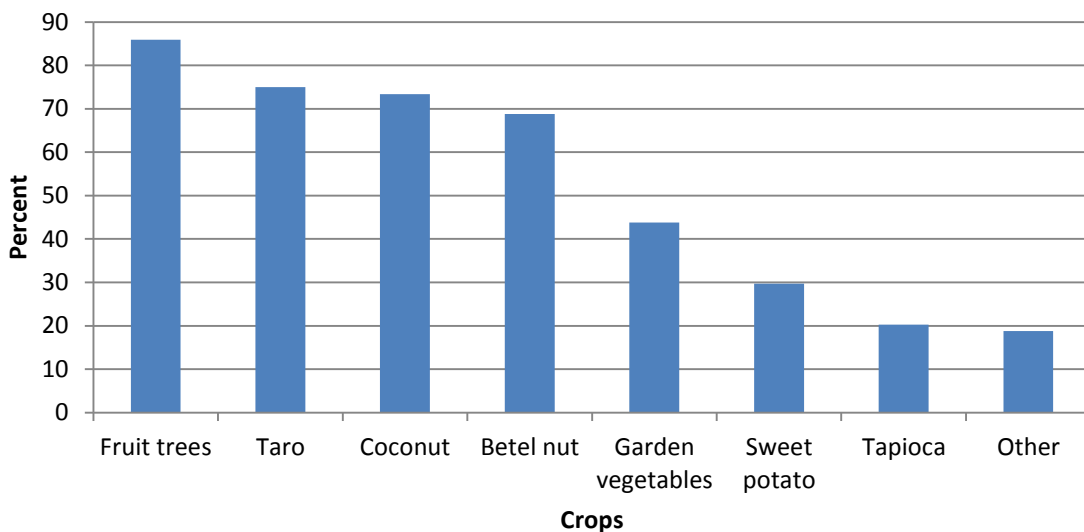


Figure 8. Crops grown by households in Ngiwal State.

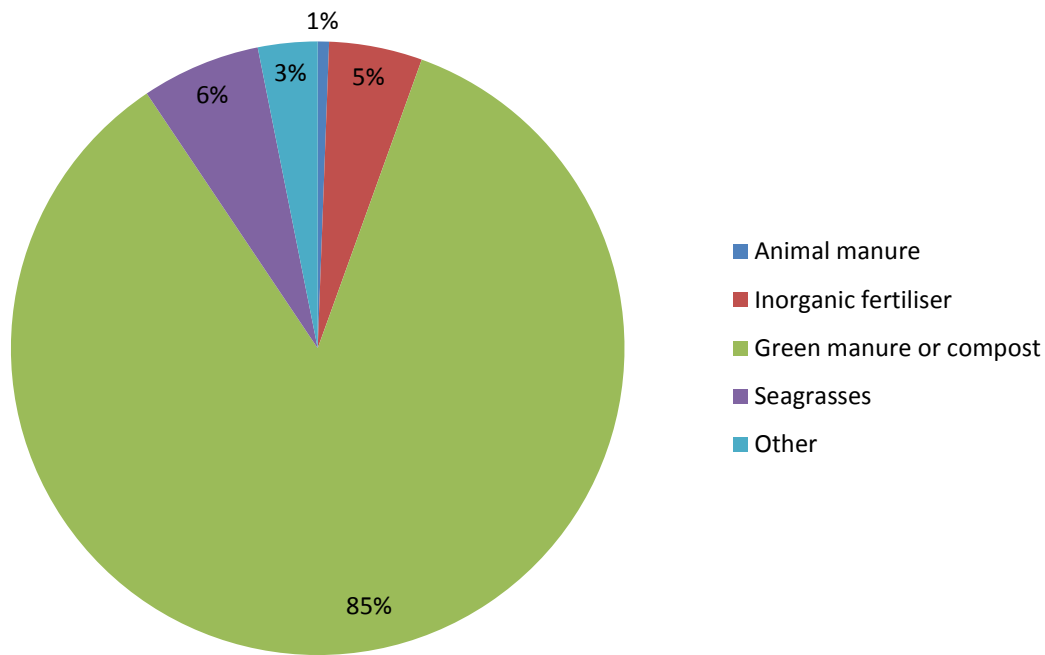


Figure 9. Fertilizer use on household crops

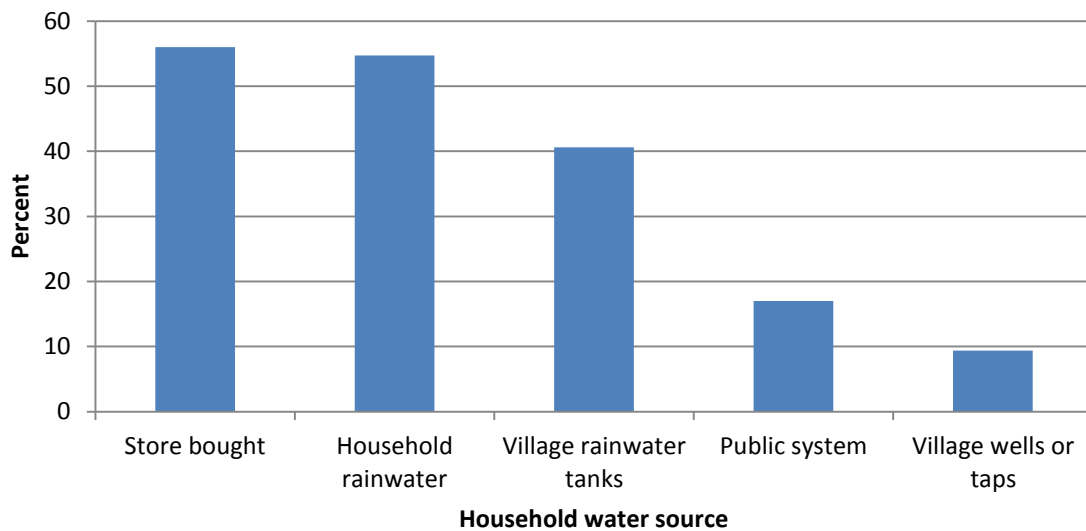


Figure 10. Sources of household water in Ngiwal State.

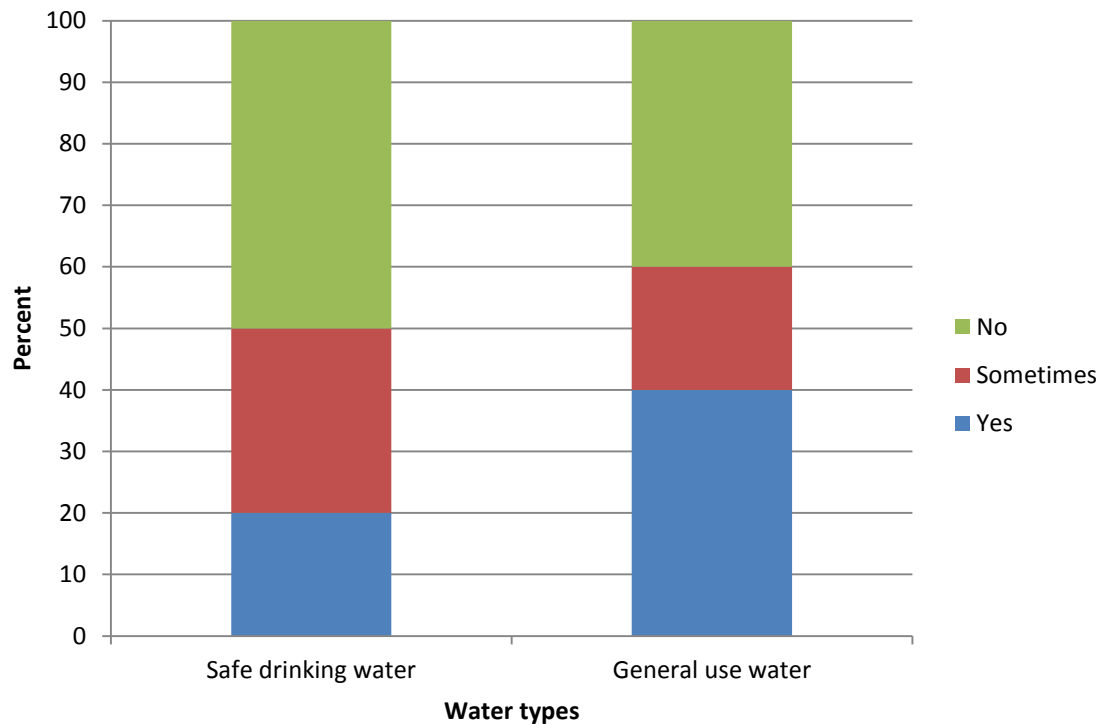


Figure 11. Household access to safe drinking water and general use water

In terms of pesticide use (including insecticides, herbicides and fungicides), respondents showed very limited use of pesticides (4.8%) on household grown crops.

The majority of respondents indicated that there were threats to farming crops. The top three threats listed by respondents were crop pests, crop disease that inhibit growth and climate change.

Views on the Conservation Areas

Given the focus of this study, it was crucial to identify if respondents had heard of the PAN, MC, State Bul and State Conservation areas. Most respondents (97%) were aware of the PAN as well as the State conservation areas (98.4%) and State Bul

(86%). In terms of community awareness of the MC, only 39.1% of respondents were aware of the MC (Figure 12).

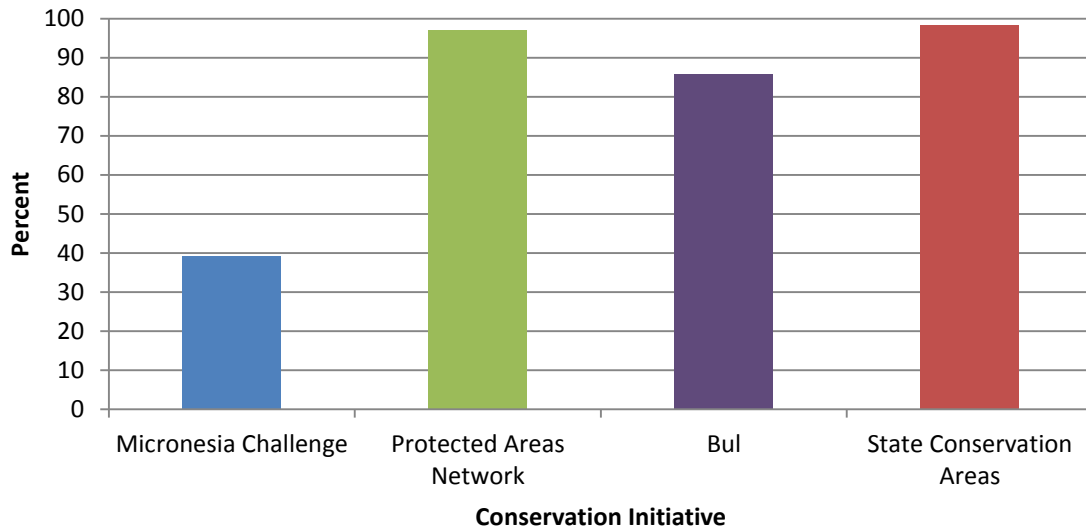


Figure 12. Respondents level of awareness for different conservation initiatives

Respondents were also queried on their level of knowledge regarding different conservation initiatives. Of the total surveyed respondents, 97% were aware of why the Conservation Areas were established in Ngiwal State. On a scale of 0 (no knowledge) to 4 (extensive level of knowledge), respondents' mean level of knowledge about the purpose of the different conservation programs was 2.9 for State Conservation Areas, followed by the PAN (2.5), Bul (2.5), and Micronesia Challenge (0.9) (Figure 13). In terms of the MC, 62.5% of respondents indicated that they had no knowledge of the MC, with 23.4% of respondents indicating medium level of knowledge regarding MC (Figure 13). With regards to the PAN, 40.6% of respondents reported that they had medium level of knowledge regarding the PAN, followed by 17.2% (Extensive level of knowledge) and 28.1% indicating a high level of knowledge of the PAN (Figure 13). A large proportion of respondents also

indicated extensive level of knowledge (30.2%) and high level of knowledge (28.6%) regarding the Ngiwal state Bul (Figure 13). Similarly, most respondents had knowledge of the State conservation areas, with only less than 5% having limited or no knowledge of the State conservation areas (Figure 13).

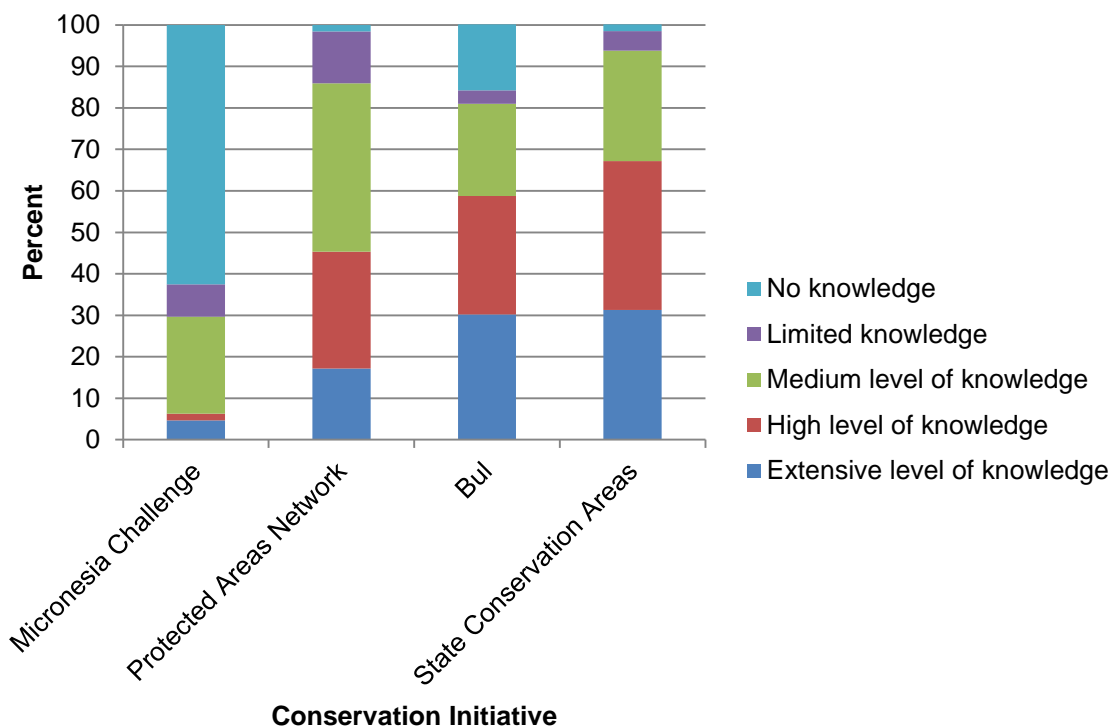


Figure 13. Respondents level of knowledge for different conservation initiatives

Local levels of support for the Conservation Programs, particularly the PAN, are of utmost importance. On a scale of 0 (no support) to 4 (extensive level of support), respondent’s mean level of support for these different conservation programs was 3.4 for the State Conservation Areas, followed by the PAN (3.3), Bul (3), Micronesia Challenge was 1.8. Most respondents indicated an extensive (45.3%) and high (40.6%) level of support for the PAN as well as an extensive (54.7%) and high (34.4%) level of support for the state conservation areas (Figure 14). This was similar for the state Bul. In terms of the MC, 19.3% of respondents indicated an extensive level of support for the MC, followed by 15.8% (high level of support),

17.5% (medium level of support), 24.6% (limited support) and 22.8% (no support) (Figure 14).

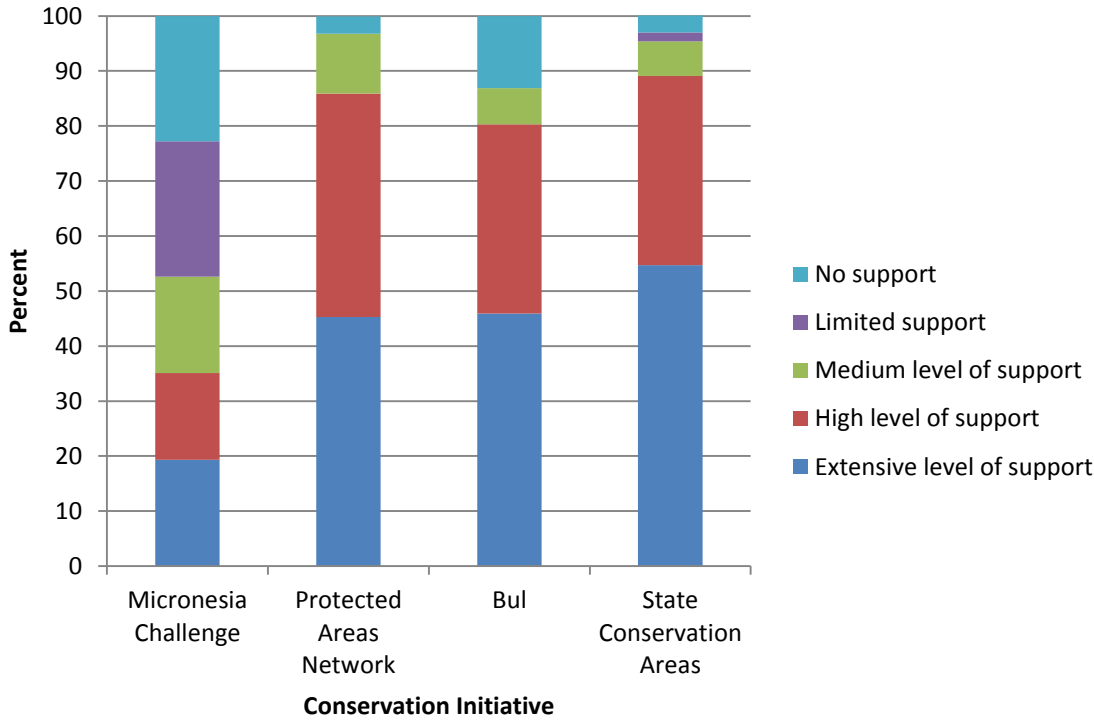


Figure 14. Respondents level of support for different conservation initiatives.

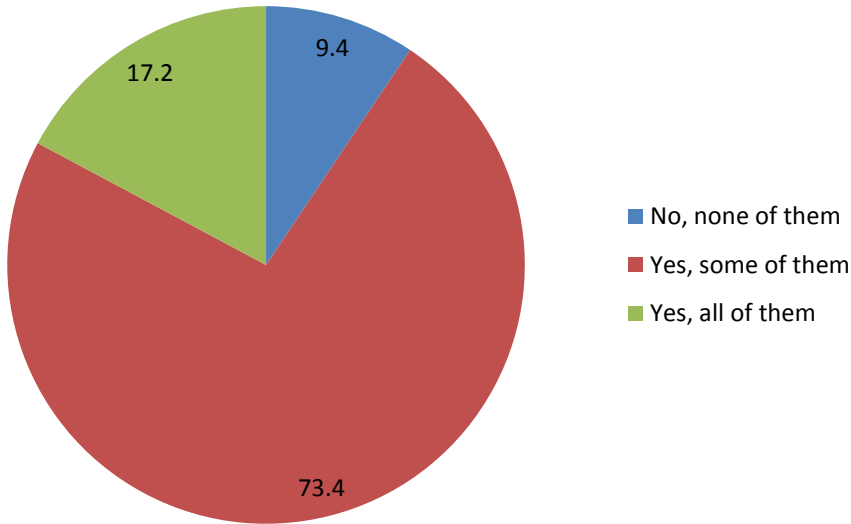


Figure 15. Respondents level of knowledge of the allowable activities in the Conservation Areas of Ngiwal State.

73.4% of respondents were aware of at least some allowable activities in the conservation areas (Figure 15). Figure 16 shows whether or not any members of respondents' households had seen read and/or participated in any outreach or awareness activities related to the Conservation Areas. The main sources of outreach or awareness activities reported by respondents were through fact sheets (37.5%), awareness print materials (34.4%) and community meetings/media (22%) (Figure 17).

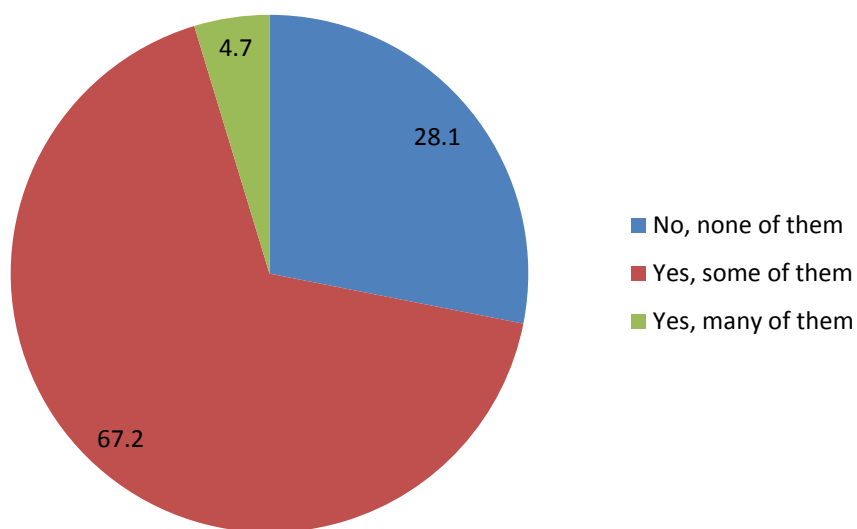


Figure 16. Involvement with activities related to the Conservation Areas in Ngiwal State.

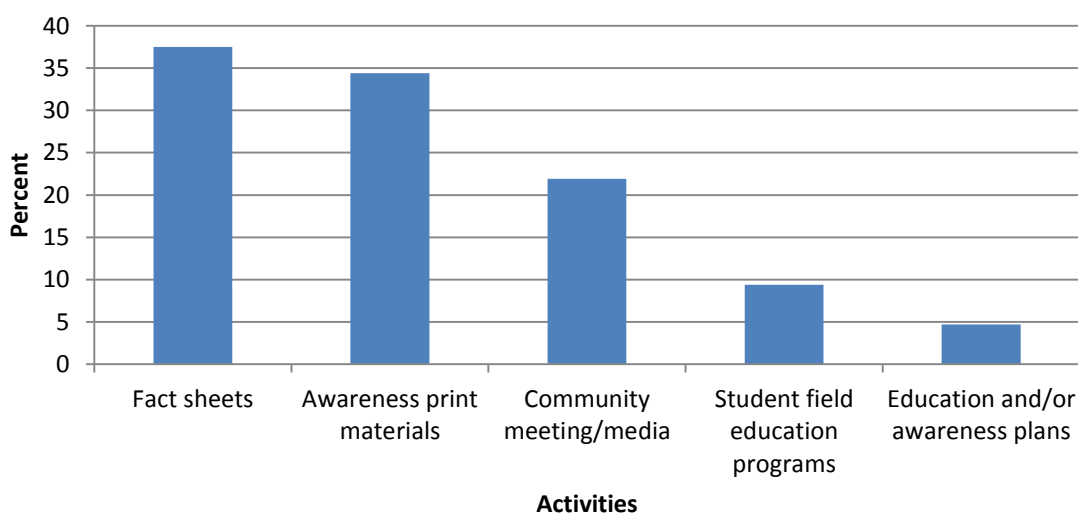


Figure 17. Activities that respondents, and their household members have participated in.

Respondents were asked if they believed the Marine Protected Areas have changed a series of factors related to their household. These are summarised in Table 5 below. Most respondents did not attribute changes in locally sourced marine food availability to the marine protected areas (Table 5). This was similar with the overall quality of the marine environment (Table 5). Similarly, respondents did not attribute changes in locally sourced farm food crops to the terrestrial protected areas, however 30% of respondents believed that the terrestrial protected areas have somewhat increased the overall quality of the terrestrial environment (Table 6). 45% of respondents indicated that the terrestrial protected areas have also increased the abundance of building materials as well as the size of building materials (41.3%) in Ngiwal (Table 6).

Table 5. The perceived impact of the Marine Protected Areas on livelihood factors (**bold** denotes highest percent for each variable listed in the first column).

	Greatly increased	Somewhat increased	Not changed	Somewhat decreased	Greatly decreased	Don't know
Overall quality of the marine environment	9.4	18.8	56.3	9.4	0	6.3
Abundance of fish	6.3	23.4	45.3	14.1	1.6	9.4
Abundance of invertebrates	4.7	12.5	51.6	9.4	6.3	15.6
Size of fish	3.1	23.4	50	10.9	0	12.5
Size of invertebrates	3.2	6.3	52.4	11.1	4.8	22.2
Availability of food from fish	3.2	17.5	52.4	17.5	4.8	4.8
Availability of food from invertebrates	0	8.1	54.8	12.9	4.8	19.4
Spiritual and cultural amenity	1.6	6.3	57.1	7.9	6.3	20.6

Table 6. The perceived impact of the Terrestrial Protected Areas on livelihood factors (**bold** denotes highest percent for each variable listed in the first column).

	Greatly increased	Somewhat increased	Not changed	Somewhat decreased	Greatly decreased	Don't know	N/A
Overall quality of the terrestrial environment	15.6	29.7	34.4	6.3	1.6	9.4	3.1
Abundance of fruit bats	3.1	10.9	32.8	15.6	7.8	23.4	6.3
Abundance of medicinal plants	1.6	10.9	37.5	7.8	4.7	32.8	4.7
Abundance of building materials	6.5	45.2	35.5	1.6	1.6	6.5	3.2
Size of fruits bats	11.1	0	39.7	4.8	14.3	22.2	7.9
Size of building materials	4.8	41.3	39.7	3.2	3.2	4.8	3.2
Availability of farm food (crops)	1.6	17.2	53.1	6.3	0	14.1	7.8
Quality of public freshwater	4.7	23.4	50.0	3.1	3.1	9.4	6.3
Quantity of public freshwater	4.7	20.3	46.9	6.3	4.7	9.4	7.8
Spiritual and cultural amenity	1.6	6.3	42.2	1.6	9.4	21.9	17.2

Finally, respondents were asked to reflect on a series of statements related to the overall impact and progress of the Conservation Areas in improving livelihood outcomes. These attitudinal statements were placed on a scale of 0 (do not agree) to 4 (very strongly agree). The results (both means and percentages) are illustrated below in Table 7. Most respondents agreed that overall, the conservation areas have been beneficial to Ngiwal State, however 75% of respondents indicated that they often see or hear about illegal entry or taking of resources from the conservation

areas (Table 7). 70% of respondents also do not agree that there is adequate enforcement of the rules of the conservations areas (Table 7).

Table 7. Attitudinal statements related to the Conservation Areas

Statements	Mean Value	Very strongly agree	Strongly agree	Moderately agree	Agree a little	Do not agree	Don't know
Overall, the Conservation Area(s) has been beneficial to our community	2.64	35.9	28.1	6.3	10.9	14.1	4.7
I often see or hear about illegal entry or taking of resources from the Conservation Area(s)	3.60	75.0	12.5	3.1	4.7	1.6	3.1
There is adequate enforcement of the rules of the Conservation Area(s)	1.24	9.4	7.8	20.3	18.8	40.6	3.1
There is adequate monitoring of the natural resources in our community	1.36	6.3	12.5	17.2	20.3	29.7	14.1
There have been positive livelihood benefits due to the Conservation Area(s)	2.25	28.1	18.8	15.6	14.1	18.8	4.7
There have been positive economic benefits due to the Conservation Area(s)	2.34	25.0	23.4	14.1	14.1	14.1	9.4
There have been positive cultural and spiritual benefits due to the Conservation Area(s)	1.54	10.9	15.6	12.5	4.7	34.4	21.9
There have been positive environmental benefits due to the Conservation Area(s)	2.60	29.7	26.6	20.3	12.5	7.8	3.1
Everyone benefits	1.00	14.1	7.8	6.3	3.1	64.1	4.7

equally from the Conservation Area(s)							
If we want to preserve our natural resources then 'closing off' certain areas is necessary	2.52	21.9	31.3	23.4	12.5	6.3	4.7

Local Management Plan

All respondents were aware of the Ngemai MPA in Ngiwal State, and 89% of respondents were knowledgeable of the boundaries of the MPA. 83% of respondents were able to name the terrestrial protected areas in Ngiwal State, and 78% were knowledgeable of the boundaries of the terrestrial protected areas (Figure 18).

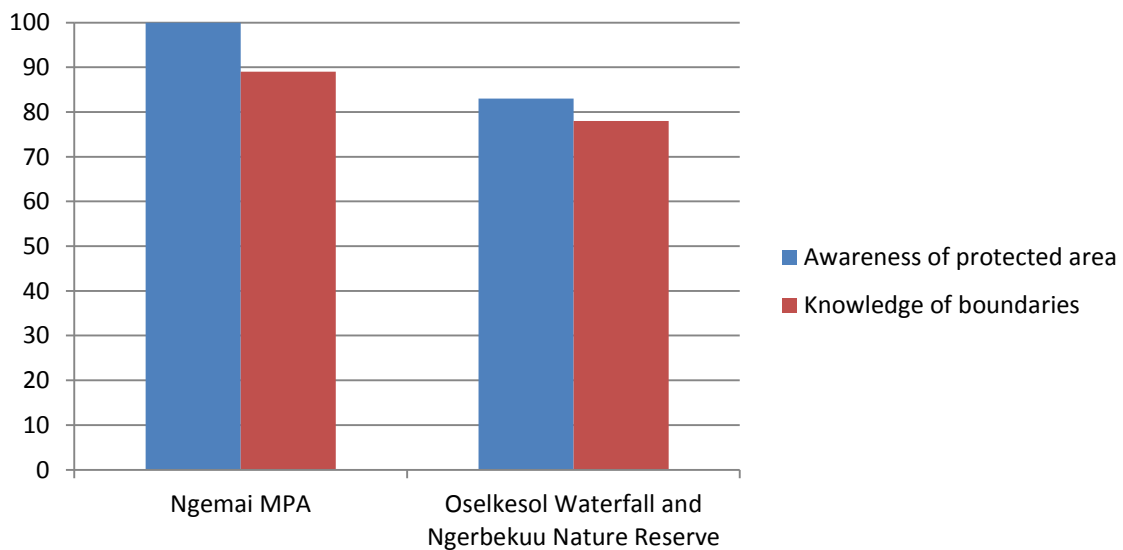


Figure 18. Respondents awareness of Ngiwal protected areas.

Respondents were also asked about their level of knowledge regarding sea level rise as well as their level of support regarding opportunities for aquaculture and tourism in Ngiwal. 17.5% of respondents indicated that they had no knowledge of sea level rise, while 27% of respondents indicated medium level of knowledge, followed by High level of knowledge (23.8%), and extensive level of knowledge (20.6%). More

than half of respondents showed extensive support (45.3%) and high support (36%) for increase in tourism opportunities and visitors to Ngiwal. This is a positive change since the 2010 study which showed that approximately 88% of participants reported that their households were not willing to participate in tourism activities or development (Oldiais, 2010). Similarly, 59% of respondents indicated extensive support for aquaculture opportunities in Ngiwal, followed by 30% showing high support for aquaculture activities.

Discussion

More than half of respondents surveyed in this study were male, with 35% female respondents. A majority of households reported an average annual household income between \$500-1000. Approximately 58% of respondents indicated that they or members of their household went out to the ocean to catch fish or harvest invertebrates. Most households reported that their fish catch was mainly for food consumption and income generating activities, with less for customary practices and giving away. Households' most commonly used fishing methods were fishing by handline and spear (diving).

In terms of household grown crops, most respondents (93.8%) indicated that they or members of their household grew farm crops and had very minimal use of pesticides. Most household crops were used for income generating activities and customary practices with only 10% for food consumption. A large proportion of households relied heavily on imported and processed canned foods from stores, as well as imported livestock, crops and vegetables.

The majority of household respondents were knowledgeable of why the conservation areas were established in Ngiwal State, and were also aware of the PAN, State conservation areas as well as the State bul. Only 39% of respondents indicated having heard of or having knowledge of the MC, which indicated the need to increase the community's awareness and knowledge of the MC. 73% of surveyed households had knowledge of the allowable activities in the conservation areas. Although 67% of respondents reported having some type of involvement with activities related to the protected areas, over half of household respondents (60.9%) indicated that they have never participated in resource management planning or decision making.

Majority of households' awareness of the conservation areas was acquired through fact sheets, awareness print materials and community meetings. Majority of respondents did not attribute changes in locally sourced marine and terrestrial food availability to the protected areas as well as the overall quality of the marine environment. However, 30% believed that the terrestrial protected areas have somewhat increased the overall quality of the terrestrial environment. In addition, 45% of respondents indicated that the terrestrial protected areas have somewhat increased the abundance and size (41%) of building materials.

During Key Informant interviews, some key informants stated that the community needed to be more informed of the purpose of Ngiwal's conservation areas. In addition, several key informants stated that conducting community awareness programs through house to house visits would help in allowing community members to be more informed of the conservation areas and related activities. Two key

informants also recommended that conservation related activities and/or programs should target Ngiwal individuals within the age range of 18 to 35 years old as this would allow for involvement from the younger generation of Ngiwal State.

Most key informants stated that there was a lack of enforcement for Ngiwal's conservation areas, and that monitoring results should be communicated to the general community on a regular basis. Regarding enforcement of the conservation areas, one key informant stated that there was difficulty in citing poachers due to personal and cultural relationships, hence communicating the importance of Ngiwal's protected areas to community members will help to ease this difficulty.

While most households believed that the conservation areas were beneficial to Ngiwal State, however, a majority of respondents indicated that they often saw or heard about illegal entry or taking of resources from the conservation areas. In relation to, a large proportion (70%) indicated that there was inadequate enforcement of the rules of the conservation areas.

Conclusion

The results illustrated in this study provide socio-economic baseline data on the trends and changes that are currently taking place in Ngiwal community. More importantly these results can be used by site managers and relevant stakeholders to make a preliminary assessment on the effectiveness of conservation areas as well as PAN sites in improving livelihood outcomes. Socio-economic monitoring overtime is necessary in order to assess changes and trends as they relate to livelihood outcomes and activities.

Acknowledgements

We wish to acknowledge and thank the Ngiwal state Government, Ngiwal State PAN office and the people of Ngiwal as well as the data collectors, Melinda Wasai and Huana Nestor for their assistance and support throughout this study. We would also like to thank the Palau Socio-economic working group, Dr. Supin Wongbusarakum, and King Sam for their feedback and assistance with the survey questionnaires and performance rubric for this project. Lastly we would like to thank PICRC researchers, research assistants and numerous interns for assistance with data entry for this project. Funding for this study was made possible through funding from the GEF Small Grants Program, NOAA Coral Reef Conservation Program and the Micronesia Conservation Trust.

References

Bartlett, C.Y., Pakoa, K. and Manua, C. (2009) 'Marine reserve phenomenon in the Pacific Islands', *Marine Policy*, 33, 673-678.

Cinner, J.E. and Aswani, S. (2007) 'Integrating customary management into marine conservation', *Biological Conservation*, 140: 201-216.

Johannes, R.E. (1978) 'Traditional marine conservation methods in Oceania and their demise', *Annual Review of Ecology and Systematics*, 9: 349-364.

Johannes, R.E. (2002) 'The renaissance of community-based marine resource management in Oceania', *Annual Review of Ecological Systems*, 33: 317-340.

Oldiais N.W. (2010) 'Ngiwal Socio-economic Assessment Training Report.

Mora, C., Andrefouet, S., Costello, M.J., Kranenburg, C., Rollo, A., Veron, J., et al. (2006) 'Ecology: Enhanced coral reefs and the global network of marine protected areas', *Science*, 312: 1750-1751.

Ngiwal State Protected Areas and Natural Resource Management Plan 2010-2015.

Veitayaki, J. (1997) 'Traditional marine resource management practices used in the Pacific Islands: An agenda for change', *Ocean and Coastal Management*, 37: 123-136.

Project Title: Socio-economic Study of Palau's Protected Areas Network

PARTICIPANT INFORMATION SHEET FOR SURVEY PARTICIPANTS

I, Karen McNamara, kindly seek your assistance with a research project exploring the effectiveness of the Protected Areas Network on livelihood outcomes across six sites in Palau. This research project is being conducted by The University of Queensland in close partnership with the Palau International Coral Reef Center (based in Koror). This research seeks to draw on the views and experiences of locals to better understand the overall livelihood benefits, or not, of the protected areas network.

This research will involve the collection of information about your household socio-demographics, livelihood activities and income, food and water security, and views on the conservation areas. The results from which will be written up in reports and peer-reviewed literature to illustrate progress towards the socio-economic outcomes of the Protected Areas Network.

Your participation is voluntary. At all stages of the research, participant feedback is warmly welcomed. If you would like more information on this research project, please don't hesitate to contact me.

This study adheres to the Guidelines of the ethical review process of The University of Queensland and the National Statement on Ethical Conduct in Human Research. Whilst you are free to discuss your participation in this study with project staff (contactable on +61 (7) 3365 6069 or karen.mcnamara@uq.edu.au), if you would like to speak to an officer of the University not involved in the study, you may contact the Ethics Coordinator on +61 (7) 3365 3924.

I would like to thank you very much in participating in this research.

Dr Karen McNamara

Lecturer

School of Geography, Planning and Environmental Management

The University of Queensland

E: karen.mcnamara@uq.edu.au

HOUSEHOLD QUESTIONNAIRE: PALAU INTERNATIONAL CORAL REEF CENTER

Surveyed by: _____ Date: _____ Survey No: _____

State: _____ Hamlet: _____

SECTION ONE: Socio-demographics. Telengtengil a delengchokl

1. Obtain the following information for the ‘interviewee’ - who is the ‘head of household’ (remember to aim for a gender balance, where possible). (PICRC1, MC2)

A. Who Ng techa oungerachel er a delengchokl?	B. Age (in years) Ng tela rekim?	C. Have you always lived in this State? Ke meketeketang el kiei er tia el beluu?	D. Marital Status Ke bechiil?	E. Highest level of formal education Kot el ngar bab el skuul el mtilobed er ngii	F. Highest level of practice of traditional knowledge Klemdengei er a siukang, klebelau me a klechibelau	G. How do you predominately earn an income? Uchul a klekerngem	H. Citizenship Chad er ker	I. Does your family own the land you live on? Tia el om kiei er ngii ng chetemem	J. Participate in resource management planning and decision making Mla nga er a omesodel me a omelchesel a llechul me a omengermelel a ngikel, cheled, blul el basio.
(Interviewee)									
1=‘Male’ head of household 2=‘Female head of household’		0 =Yes 1 =No, less than 1 year 2 =No, between 1-5 years 3 =No, more than 5 years	1=Single 2=Married 3=Widow 4=Divorced 5=Other (specify)	1=Up to elementary 2=Up to high school 3=Up to college or similar 4=Up to university or similar 5=None 6=Other (specify)	1=Extensive Dmolech el klemdengei 2=Some Medengei a bebil 3=None Diak	1=No income 2=Handicraft 3=Fishing (catch and/or harvest) 4=Farmer (crops, livestock) 5=Private business 6=Remittances 7=Land or house lease 8=Government work 9=Family custom 10=Pension/social security 11=Other (specify)	1=Palau 2=Other (specify)	1=Yes 2=No, lease from State Gov’t 3=No, private rental 4=No, informal agreement 5=No, traditional arrangement	0= Never Diak 1= Seldom Derstang 2= Sometimes Bebil ra taem 3= Often Oumesind ra taem 4= Always Bek el taem

2. Indicate how many people (adults and children), including yourself, live in your household, including their age group: **Te tela el chad el uldimukl er kau a kiei er a delengcheklem e dertela rekrir?** (PICRC1, MC2)

	Under 18 years old	18-29 years old	30-44 years old	45-59 years old	60 years old and higher
Number					

SECTION TWO: Livelihood Activities and Income. Omenged, Omelngot me a Omengerker

3. What income and subsistent livelihood activities does your household do? **Ngera el omenged me a omelngot a omoruul er a delengcheklem?** (PI1, PI3, PI4)

E.g.: Do you or anyone else in your household go out to catch or harvest? **If No, select 'None'. If Yes, is this for money or food or both (select all that apply).** And how often (on average over a year) ? **Ng ngar ngii a ngar er a delengcheklem el oumenged el melngot el di kall, ng makit a lechub e ngii el teblong? E a le ngar er ngii e ng locha tela el taem er a ta el rak?**

Complete this for all the other livelihood activities (harvest, farm crops and livestock).

Catch (fish, turtles etc)			Harvest (invertebrates)			Farm crops			Livestock		
<input type="checkbox"/> None			<input type="checkbox"/> None			<input type="checkbox"/> None			<input type="checkbox"/> None		
For \$	For food	How often (on av./yr)	For \$	For food	How often (on av./yr)	For \$	For food	Area (acres)	For \$	For food	How many (on av./yr)
<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	_____
		1=daily 2=weekly 3=monthly 4=6 months+			1=daily 2=weekly 3=monthly 4=6 months+			1=<0.25 2=0.25-1 3=>1			1=1-5 2=6-10 3=>10

4. What is the monthly income level of your household? **Ng locha telang a uldekial a kerrekerngem me a rebek el mengerker el kiei er a delengcheklem er a chesel a ta el buil?** (PI4)

Less than 500\$ Mekesai er a 500	500-1,000\$	1,001-1,500\$	1,501-2,000\$	2,001-2,500\$	More than 2,500\$ Betok er a 2,500	Do not wish to say Diak el soal el ouchais
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Have the Conservation Area(s) changed your household income or household expenses? **A ika el blul el basio, ng ngar er ngii a blal ngedechii er a klungel a kerrekerngem me a omengitem er a udoud?** (PI4)
- **If No, mark ‘not changed’ box**
 - If Yes, has it increased or decreased your household income/expenses? Greatly/Somewhat?

	Greatly Increased Kmal klou	Somewhat Increased Ngar er ngii	Not Changed Diak a mla mengodech	Somewhat Decreased Mla ngmanget	Greatly Decreased Kmal mla ngmanget	Don't Know Ng ngaukai
Household <u>income</u> . <u>Kerrekerngel a delengchokl</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Household <u>expenses</u> . <u>Omengitel a udoud er a delengchokl</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION THREE: Food and Water Security. Ulekerreuil a Kall me a Ralm

6. Indicate where your household's food supply comes from, how often it is sourced, and if this is different compared to five years ago: **Ka mouchais el kmo a kall er a delengcheklem ng ngar ker el mei, e merames ng mekudem a ngeiul/skel , e ngodech a lechub e ng di osisiu me a eim el rak er a mla me mong?** (PI2)

	Now - how often chelechang el taem - kudem				Compared to five years ago Eim el rak er a mla me mong		
	<i>A lot</i> <i>Mekudem</i>	<i>Moderate</i> <i>Klebech</i>	<i>Little</i> <i>Merames</i>	<i>None</i> <i>Diak</i>	<i>More</i> <i>Betok</i>	<i>Same</i> <i>Osisiu</i>	<i>Less</i> <i>Mekesai</i>
Household grown crops and/or vegetables Sers er a ongraol me a yasai	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local market crops and/or vegetables Ongraol me a yasai er a makit (delomel er Belau)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Imported crops and/or vegetables Ongraol me a yasai el ngar er a ikrel Belau el mei	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Self-caught marine resources Oumenged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local market marine resources Ngikel me a cheled er a makit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Imported marine resources Ngikel me a cheled el ngar er a ikrel Belau el mei	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local freshwater resources Usbechel a ralm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local land animals (pigs, birds, fruit bats) Odoim el charm er a beluu (babii, charm el suebek, olik)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Locally produced livestock Kerbou, kaming me a babii er a sers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Imported livestock (meat) Tech er a kerbou, kaming el mla er a ikrel a Belau	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Imported processed or canned foods from shop Kansume er a stouang	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kuk bebil							

The following questions are only applicable if the interviewee and/or members of their household go out to the ocean to catch or harvest (if not, move to the end of Question10)

Select this box if the following questions are not applicable

7. Which methods do you and/or members of your household use to catch or harvest? **Ng ngera el teletael er a omenged a om ngar er ngii, kau me a rebek el chad er a delengcheklem?** (select all that apply) (PI3)

<input type="checkbox"/> Glean Omelai el cheled	<input type="checkbox"/> Spear (walking) Omurch (di merael)	<input type="checkbox"/> Spear (diving) Melechelbaki
<input type="checkbox"/> Spear (canoe) Oltoir (a uel) Melkelikes (omurch a chemang me a ngikel)	<input type="checkbox"/> Hand line Mengereel Omedesaki	<input type="checkbox"/> Rod and reel Mengereel obang a sao
<input type="checkbox"/> Trap Omub (ngikel me a chemang)	<input type="checkbox"/> Cast net Omuked	<input type="checkbox"/> Gill net Mengesokes
<input type="checkbox"/> Bottom fishing Mengereel er a dmolech	<input type="checkbox"/> Trolling Mengetaki	<input type="checkbox"/> Other _____

8. Over the past year, list up to three locations that you and/or members of your household most frequented for catch or harvest, and indicate if these sites are different to where you most frequented five years ago? Please try and keep these locations quite general and broad. **A chesel tia el mlo merek el rak, e ngera a kldei el basio el kau me ar kiei er a delengcheklem a blechoel el mo er a chei er ngii. E a ika el basio ng ngodech a lechub ng osisiu er a basio el obla er a chei er ngii er a cheim el rak er a mla me mong?**(PI3)

Location	Compared to five years ago	
	Same <i>Osisiu</i>	Different <i>Ngodech</i>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>

9. Over the past year, list the most popular marine animals your household collectively caught or harvested, how many, and indicate if these animals are different compared to five years ago? **Tia el mlo merek el rak, ng ngera el ngikel, cheled me a charm er a kereker (daob) a oblechoel el melai? E locha mle uangera ildisel? E betok ng mekesai er a cheim el rak er a mla me mong?**(PI3)

Catch		Compared to five years ago		Harvest		Compared to five years ago	
Name <i>Ngakl</i>	Number <i>Ildois</i>	Same type <i>Osisiu el bedengel</i>	Different type <i>Kakerous el bedengel</i>	Name <i>Ngakl</i>	Number <i>Ildois</i>	Same type <i>Osisiu el bedengel</i>	Different type <i>Kakerous el bedengel</i>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>

10. Are there any threats to catch or harvest? **Ng ngar ngii a sebecel uchul e ng mo nguemed a ika el ngikel, cheled me a charm er a kereker (daob)?** (PI3, PI11)

No

Yes → Can you list up to two top threats? _____

Ng sebecem el masech a teblong el uchul?

Can you list up to two top solutions? _____

Ng sebecem el masech a teblong el sebecheklel?

The following questions are only applicable if the interviewee and/or members of their household grow crops (if not, move to Question 15)

Select this box if the following questions are not applicable

11. Over the past year, which crops did your household collectively grow? (select all that apply) **Tia el mlo merek el rak e ngera el dellomel a omullalem?** (PI3)

<input type="checkbox"/>	Taro Dait/Brak	<input type="checkbox"/>	Coconut Lius	<input type="checkbox"/>	Garden vegetables Yasai
<input type="checkbox"/>	Tapioca Diokang	<input type="checkbox"/>	Sweet potato Chemutii	<input type="checkbox"/>	Fruit trees Rodech
		<input type="checkbox"/>	Betel nut Buuch	<input type="checkbox"/>	Other _____

12. Over the past year, what percentage of each input did your household use on its crops? (select all that apply to add up to 100% or if None then put 0%) Tia el mlo merek el rak e ngera el koeas e uangerang a klungel (tela el basent) a omuluusbech er a omelalem a dellomel? (PI3)

Fertilisers	
Animal manure Dechil a charm	
Inorganic fertiliser (chemicals) Koeas er a Ngebard	
Green manure (weeds) or compost Ramk	
Seagrasses Char	
Other _____	
	100%

13. Over the past year, have any pesticides been used on your household crops? Tia el mlo merek el rak, ng ngar er ngii a spray er a charm er a dellomel el bla mousbech er a dellemelem? (PI3)

<input type="checkbox"/>	No Diak	<input type="checkbox"/>	Yes Choi
--------------------------	-------------------	--------------------------	--------------------

14. Are there any threats to farming crops? Ng ngar er ngii a uchul e ng mo smecher a lechub e ng mad a dellemelem? (PI3, PI11)

No

Yes → Can you list up to two top threats? _____

Ng sebechem el masech a teblong?

Can you list up to two top solutions? _____

Ng sebechem el masech a teblong el kerul a lechub e ng sebecheklel?

15. Over the past year, what percentage of the total amount of catch and harvest, and crops grown by your household would be for the following purposes (select all that apply to add up to 100% or if None then put 0%): (PI3) Tia el mlo merek el rak, ng tela el basent er a cheldmiu me a dellemeliu a mo usbechall er a ika el teletael el beldukl er eou:

Catch		Harvest		Crops	
Eating Blengur		Eating Blengur		Eating Blengur	
Selling Makit		Selling Makit		Selling Makit	
Giving Away Omekang		Giving Away Omekang		Giving Away Omekang	
Family Custom Mechesang		Family Custom Mechesang		Family Custom Mechesang	
	100%		100%		100%

16. Indicate where your household water comes from: (select all that apply) (PI5) A imeliu el ralm ng ngar ker el mei?

<input type="checkbox"/>	Stream or river Omoachel	<input type="checkbox"/>	Household rainwater tank Tank er a blai	<input type="checkbox"/>	Village wells or taps Chido er a beluu
<input type="checkbox"/>	Spring Madedok	<input type="checkbox"/>	Village rainwater tanks Tank er a buai	<input type="checkbox"/>	Other _____ Kuk bebil

17. Does your household have access to safe drinking water and/or access to water for general use? (P15) **A delengcheklem ng ngar ngii a roel a ungil el ralm el ilumel me a dousbech er a blai el me er ngii?**

Safe drinking water Ungil ilumel el ralm		General use water Ralm el dousbech	
Yes Choi	<input type="checkbox"/>	Yes Choi	<input type="checkbox"/>
Sometimes Al Bebil	<input type="checkbox"/>	Sometimes Al Bebil	<input type="checkbox"/>
No Diak	<input type="checkbox"/>	No Diak	<input type="checkbox"/>

SECTION FOUR: Views on the Conservation Area(s) Klemedengei me a Osengem er a Blul el Basio

18. Which of the following have you heard of? (select all that apply) (MC8) **Ke mla remenges a chisel a ika el beldukl er eou? Mlecha olangch er a ike el rokui el modengei.**

<input type="checkbox"/>	Micronesia Challenge	<input type="checkbox"/>	Protected Areas Network	<input type="checkbox"/>	Bul	<input type="checkbox"/>	State Conservation Area(s)
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19. Can you list the allowable activities in the Conservation Area(s)? (MC8) **Ng sebechem el masech a sebeched el meruul er a chisel a blul el basio er a beluam.**

<input type="checkbox"/>	No, <u>none</u> of them Diak	<input type="checkbox"/>	Yes, <u>some</u> of them Choi, medengei a bebil	<input type="checkbox"/>	Yes, <u>all</u> of them Choi, medengei el rokui
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20. Do you know why the Conservation Area(s) in your State were established? (MC8) **Ke medengei el kmo ng ngera uchul e ng mlekedmokl a blul el basio er a beluam?**

<input type="checkbox"/>	No Diak	<input type="checkbox"/>	Yes Choi
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21. Indicate your level of knowledge about the purpose of each of the following: (MC8) **Mleliang a olangch el olechotel a delechel a klemedengei er kau er a ika el beldukl er eou:**

	Extensive level of knowledge Dmolech el klemedengei	High level of knowledge Medengei a betok	Medium level of knowledge Medengei a bebil	Limited knowledge Oumededenger	No knowledge Diak kudengei
Micronesia Challenge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protected Areas Network	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bul	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State Conservation Area(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. Have you and/or any members of your household seen, read and/or participated in any outreach or awareness activities related to the Conservation Area(s)? (MC8) **Ng mla ta el om mesang ke oiuii, ke ngar er a miting me a lechub a cheldech duch el olisechakl a teletelel a blul el basio er a beluam?**

<input type="checkbox"/>	No, <u>none</u> of them Dirkak	<input type="checkbox"/>	Yes, <u>some</u> of them Mla ngar er a bebil	<input type="checkbox"/>	Yes, <u>many</u> of them Kmal betok
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If Yes, select which ones (select all that apply): **A le ngar er ngii, e mlecha olangch er a ngii er a ika el beldukl er eou.**

<input type="checkbox"/>	Fact sheets Babier er a sodel a charm, dellomel, basio, me abebil el tekoi er a science el kirel a blul el basio	<input type="checkbox"/>	Student field education programs Omesarch me a omesuub er a skuul	<input type="checkbox"/>	Other _____
<input type="checkbox"/>	Awareness print materials Babier el mesaod, omeklatk e omeketakl a teletelel me a llechul a blul el basio	<input type="checkbox"/>	Education and/or Awareness Plans Plan me a lechub e ng babier el smaod a telbiil, ureor, okedmeklel, omengkerengel, me a osisecheklel a blul el basio.	<input type="checkbox"/>	Other _____

23. Indicate your level of support for each of the following: (MC9) **Kau mleliang a olangch er a kmo koumerang e oldubech a ika el beldukl er eou:**

	Extensive level of support Dmolech el klaumerang e oldubech	High level of support Kmal oumerang e oldubech	Medium level of support Kuumerang e oldubech	Limited support Diak sa el oumerang e oldubech	Do not support Diak kuumerang me a ka kuldubech
Micronesia Challenge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protected Areas Network	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bul	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State Conservation Area (s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. Do you think the Marine Protected Area (s) have changed the following for your household? (PI4) **A blul el basio er a kerker, ngar ngii a blal ngedechii er a delengcheklem?**

- If No, mark ‘not changed’ box. **A lak e mleliang a olangch er a “dirkak a mengodech”**
- If Yes, has it increased or decreased the items listed? Greatly/Somewhat? **A le ngar er ngii e mleliang a olangch er a klungel a mla mengodech er a ika el beldukl er eou.**

	Greatly Increased Kmal klou	Somewhat Increased Telkib el klou	Not Changed Dirkak a mengodech	Somewhat Decreased Telkib mla ongesngesii	Greatly Dereased Kmal klou a bla losengesii	Don't Know Ngaukai
Overall <u>quality</u> of the <u>marine environment</u> <u>Klungiolel a kerker</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Abundance</u> of <u>fish</u> <u>Ildisel a ngikel</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Abundance</u> of <u>invertebrates</u> <u>Ildisel a cheled</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Size</u> of <u>fish</u> <u>Meklungel a ngikel</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Size</u> of <u>invertebrates</u> <u>Meklungel a cheled</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Availability</u> of food from <u>fish</u> <u>Ildisel a odoim el ngikel</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Availability</u> of food from <u>invertebrates</u> <u>Ildisel a kall el cheled</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Spiritual</u> and <u>cultural amenity</u> <u>Nglsecheklel a klebelau me a tekoi el chelid</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. *If applicable*, do you think that the Terrestrial Conservation Area (s) have changed the following for your household? (MC1, PI1, PI2, PI7) **A omomdasu e a blul el basio er a beluu ng ngar ngii a bla el ngedechii er a delengcheklem?**

- If No, mark ‘not changed’ box. **A lak e mlelia olangch er a “Dirkak a mengodech”**
- If Yes, has it increased or decreased the items listed for your household? Greatly/Somewhat? **A le ngar er ngii e mlecha olangch er a klungel a mla mengodech er a ika el beldukl er eou:**

	Greatly Increased Kmal klou	Somewhat Increased Telkib el klou	Not Changed Dirkak a mengodech	Somewhat Decreased Telkib mla ongesngesii	Greatly Dereased Kmal klou a bla losengesii	Don't Know Ngaukai	Not applicable
Overall <u>quality</u> of the <u>terrestrial environment</u> <u>Klungiolel a beluu</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Abundance</u> of <u>fruit bats</u> <u>Ildisel a olik</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Abundance</u> of <u>medicinal plants</u> <u>Ildisel a dellomel el kar</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>Abundance of building materials</u> Ildisel a klalo el kerrekar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Size of fruit bats</u> Meklungel a olik	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Size of building materials</u> Meklungel a klalo el kerrekar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Availability of farm food (crops)</u> Ildisel a delomel el kall (ongraol me a yasai)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Quality of public freshwater</u> Klungiolel a ralm er a beluu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Quantity of public freshwater</u> Ildisel a ralm er a beluu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Spiritual and cultural amenity</u> Nglsecheklel a klebelau me a tekoi el chelid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. Indicate if you agree (and the level to which you do) with the below statements: (PI3, PI11,MC4)
Mleliang a olangch el kmo ke kongei a lechub e ng diak er a ika el beldukl er eou:

Statements Tekoi	Very strongly agree Ak mal mui el kongei	Strongly agree Choi ak kongei	Moderately agree Ou ralm sils	Agree a little Oumededengei	Do not agree Diak moldubech	Don't know Diak Kudengei
Overall, the Conservation Area(s) has been <u>beneficial to our community</u> A ika el blul el basio a ngar er ngii al relii er a beluad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often <u>see or hear about illegal entry or taking of resources</u> from the Conservation Area(s) Ak blechoel mesterir e remenges a chisir a re mo soiseb me a re melemall a llechul a blul el basio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is <u>adequate enforcement</u> of the <u>rules</u> of the Conservation Area(s) Ng ungil a otutel a llechul a blul el basio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is <u>adequate monitoring</u> of the <u>natural resources</u> in our community Ng ungil a klekerngel (monitoring) a dikesel a beluu (natural resources)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There have been <u>positive livelihood benefits</u> due to the Conservation Area(s) A ika el blul el basio a uchul a ungil omenged, omelngot, omengerker me a ungil el klengar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There have been <u>positive economic benefits</u> due to the Conservation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Area(s) A ika el blul el basio a dirrek el uchul a ungil kerruul el me er a beluu						
There have been <u>positive cultural and spiritual benefits</u> due to the Conservation Area(s) A blul el basio a uchul a ngesecheklel a klebelau me a tekoi el chelid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There have been <u>positive environmental benefits</u> due to the Conservation Area (s) A ika el blul el basio a msa klungiolel a beluu me a kerker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Everyone <u>benefits equally</u> from the Conservation Area(s) A klungiaol el mengai er a ika el blul el basio a tabesul e oberk el mo er a dertang el chad er a beluu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If we want to preserve our natural resources then <u>'closing off' certain areas is necessary</u> <u>Al sekum e ng soad el mengeluoluo a dikesed e ng kired el osimer/omul a bebil er a basio</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION FIVE: Views on the Local Management Plan

For Ngiwal State

1. Can you tell us the name of the State Conservation Areas? ? **Ke medengeli a ngklel a conservation area me a lechub e ng blul el basio er kemiu?** (only select 'Yes' if they correctly state it) (Goal 3)

	Yes	No
<i>Oselkesol Waterfall and Ngerbekuu Nature Reserve (Terrestrial)</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ngemai Conservation Area (MPA)</i>	<input type="checkbox"/>	<input type="checkbox"/>

2. Do you know the official boundaries for these Local Conservation Areas? **Ke medengeli a kerrengsel tia el blul el basio el kmo ng nga er ker el mo er ker?** (Goal 3-2)

	Yes	No
<i>Oselkesol Waterfall and Ngerbekuu Nature Reserve</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ngemai Conservation Area</i>	<input type="checkbox"/>	<input type="checkbox"/>

3. Indicate your level of knowledge of the impact of sea level rise on communities in Ngiwal. **Ng uangera klemedengei er kau er a dolech a mla mer bab me a telemelle?: (5-2)**

	Extensive level of knowledge Dmolech el klemedengei	High level of knowledge Medengei a betok	Medium level of knowledge Medengei a bebil	Little knowledge Oumededenger	No knowledge Diak Kudengei
Knowledge of impact of sea level rise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Indicate your level of support for the following new sustainable livelihood opportunities for the local community. **Ke oldubech a ika el uchul a kerruul me a omengerker el mei er a beluu?: (Goals 4-1, 4-2)**

	Extensive level of support Dmolech el klaumerang e oldubech	High level of support Kmal oumerang e oldubech	Medium level of support Kuumerang e oldubech	Limited support Diak sa el oumerang e oldubech	Do not support Diak kuumerang me a ka kuldubech
Aquaculture project. Sers er a ngikel, cheled me a bebil er a charm er a daob.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increasing tourist visitors to Ngiwal. Tekoi er a tourist.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If there are any other comments, please write them here: