Ngiwal Socio-economic Assessment (2010) Training Report

Conducted and supported by Palau International Coral Reef Center (PICRC) and Capacity Enhancement Project for Coral Reef Monitoring (CEPCRM)

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JICA

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Cover photo: Cyrus Renguul & Rachel Hosei (trainees) conducting a survey at Ngiwal
Photo credit: Noelle Wenty Oldiais

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1. ACKNOWLEDGMENTS

We wish to extend our thanks and gratitude to the communities of Ngwial State for participating in the 2010 socioeconomic survey, as well as the Ngiwal State Office and their support. Also, we are very grateful for the support and guidance from Dr. Supin Wongbusarkum throughout this study, as well as the Capacity Enhancement Project for Coral Reef Monitoring (CEPCRM), a collaboration project between Palau International Coral Reef Center (PICRC) and Japan International Cooperation Agency (JICA), for supporting this study. Last, but not least, we are very thankful for all the participants who contributed their efforts to ensure that this assessment training was achieved.

2. INTRODUCTION

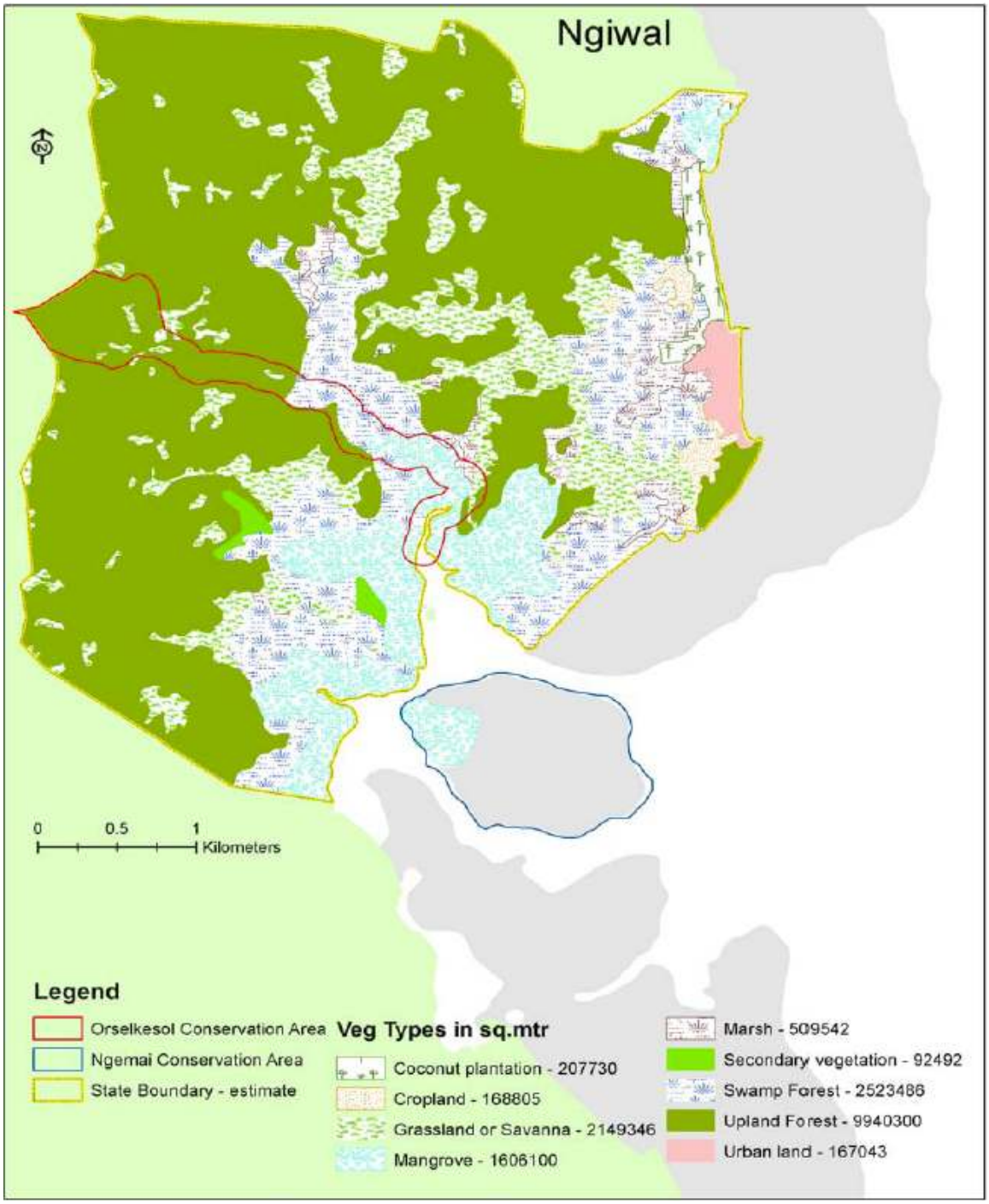
On July 2010, a socio-economic assessment training was held for representatives from Ngiwal, Ngardmau, Ngchesar, and Peleliu. The training was based on the SEM-Pasifika guideline and was conducted based on two objectives: (1) train conservation officers on how to conduct a socio-economic assessment as a tool to improve management of coast and marine resources, (2) develop data collecting tools for an assessment of a particular site –Ngiwal State.

With this training exercise in Ngiwal, two representatives from each of the states had a chance to practice on the different steps and methods of conducting a socioeconomic assessment. Because it was a training exercise, not all information from this assessment is valid. Most data for key informants and focus group discussions were not recorded properly. Therefore, even though data were collected through key informants and focus group discussions, this report will only show data that were collected through household surveys. This means, that not all assessment objectives were met.

In 2010, the State of Ngiwal produced a "Ngiwal State Protected Areas and Natural Resource Management Plan" for the people with a vision "to improve their livelihood through sustainable developments (including promotion of eco-tourism) and conservation of its natural resources to ensure healthy communities an ecosystems for future generations"[1]. With this vision, five goals were created to support it:

1. Effectively manage activities within the protected areas to improve biodiversity and livelihood on Ngiwal people by 2015.
2. Effectively manage activities outside of protected areas to reduce threat of overharvesting and sedimentation on common natural resources within the Sate of Ngiwal territory by 2015.
3. Establish effective conservation enforcement program in Ngiwal state by 2015.
4. Create sustainable development in Ngiwal to improve livelihood by 2015.
5. Building resilient Ngiwal community by adapt to sea level rise by 2015.

This plan does not only cover the management of existing marine Conservation Area of Ngemai which has been close since 1997 without active management but also includes new terrestrial Protected Area of Oselkesol Waterfall which is located in Ngerbekuu Nature Reserve. Please see vegetation Map below showing the Protected Areas.



Vegetation map of Ngiwal (Source: Ngiwal Protected Areas and Natural Resource Management Plan[1])

3. ASSESSMENT OBJECTIVES and INDICATORS

With the management goals, the trainees created socio-economic assessment objectives to provide information to assess these goals. They also developed indicators based on these assessment objectives. Below is a list of all the assessment objectives and indicators:

Assessment Objectives	**Indicators**
1. To find out national regulations and rules that are applicable to the State level	-enabling legislation -local tenure, customs and traditions
2. To identify location of buffer zone areas	- location of coastal and marine activities that cause soil erosion
3. To find out any existing regulations on commercial farming	- formal rules and regulations related to commercial farming
4. To identify the area for the State aquaculture	-location of coastal and marine resources
5. To identify the types of marine life appropriate for aquaculture	- knowledge of coastal and marine resources
6. To investigate the level of demands for tourism activities(tourist numbers)	- number and profile of visitors
7. To identify the type of infrastructure that are needed to support allowable recreational activities	- community infrastructure and technology
8. To identify threats and problems caused by soil erosion	- perceived threats to coastal and marine resources by soil erosion
9. To identify activities that cause soil erosion	- coastal and marine activities that cause soil erosion
10. To identify problems with enforcement	- perceived community problems with enforcement - perceived resource condition - enforcement body
11. To gain a better understanding of what would attract tourists	- number of visitors at different sites
12. To identify people's need of the enforcement program	- number of people's need for enforcement program

13. To identify what type of outreach is most appropriate/effective	- number of community members reached by different outreach programs.
14. To examine the willingness of community in participating in aquaculture	-number of person willing to participate in aquaculture
15. To examine the willingness of community in participating in tourism activities	- number of people willing to participate in tourism activities
16. To identify threats to coastal and marine resources	- perceived threats to coastal marine resources
17. To better understand the means of livelihood of the people of Ngiwal	- source of household income - population size and # of household - dependence on coastal and marine resource - attitude towards coastal and marine resources
18. To better understand the effectiveness of management of resources	- management effectiveness
19. To examine community's knowledge of rules and regulations of resource management	- awareness of rules and regulations
20. To examine people's awareness and impacts of sea level rise	- awareness and perceived effects of sea level rise
21. To examine perceived conditions of marine resources	- perceived conditions of marine resources

4. METHODOLOGY

Secondary data, household surveys, key informant interviews, and focus group discussions were the field data collection methods that were used for this training assessment. The secondary data was the Ngiwal State Protected Areas and Natural Resource Management Plan.

With the assessment objectives in place, questions were designed for Ngiwal household survey by the trainees. The drafting of the household questionnaire was in English before it was translated to Palauan. It was then pretested and edited multiple times among the trainees before the final revision (Appendix 1).

Trainees from Ngiwal State drafted a list of Ngiwal households to be used for the assessment exercise. The survey was conducted as a census targeting Ngiwal households who use the coastal and/or marine resources (eat, buy, and/or sell coastal and/or marine resources) in Ngiwal. Heads of households, who could have been those at the age of at least 18 and could speak for their households, were targeted to participate in the survey.

Questions and topics for key informants and focus group discussions were also designed from the assessment objectives. Key informants where selected with the help of the Ngiwal trainees as well as the Ngiwal State Office and were selected based on their experience and knowledge on a particular assessment topic. Due to the lack of validity on most of the data, because they were not recorded properly, this report excludes them.

PICRC staff entered and analyzed the household data using SPSS.

5. RESULTS

Demographics

Based on the 60 households that were surveyed in Ngiwal, 55% of the respondents were male while 45% were female. The average household number was 3.7 with 43% with no children under the age of 18. Twenty-seven percent 27% of the surveyed respondents worked for the government, while 35% were unemployed. A question was asked about the main livelihood sources for households and the surveys showed that 58% of the household had at least one member who received salary from employment, while 52% had at least one recipient of pension plan or social security. The results also showed that the top 3 household uses/consumption for livelihood sources are hunting, fishing, and farming as shown on Table 1. These activities were not so much identified as sources of household income. Salary from employment, pension or social security benefits, and money sent from relatives are the top 3 income sources for households (Table 2).

Table 1: Livelihood Sources for household uses and consumptions

		Responses	
		N	Percent
Activities for household uses & consumptions	Fishing	28	31.1%
	Farming	23	25.6%
	Hunting	29	32.2%
	Livestock	3	3.3%
	Handicraft	7	7.8%
Total		90	100.0%

Table 2: Livelihood income sources

		Responses	
		N	Percent
Household cash income sources	Salary	35	32.4%
	Fishing	3	2.8%
	Hunting	2	1.9%
	Livestock	8	7.4%
	Money sent from relatives	15	13.9%
	Handicraft	3	2.8%
	Private business	6	5.6%
	Pension/SS benefits	31	28.7%
	Others	5	4.6%
Total		108	100.0%

Dependency of marine resources

It has already been identified that fishing and collecting invertebrates are the major sources of livelihood for household consumption. Thirty percent of households harvested invertebrates 1-2 times per month and an even greater percentage, 37%, had no one in their households that fish (Table 3). The majority of the important household invertebrates were for household consumption (85%) while only 2 % were for sale and 13% were for both. As for fishing, 28% did not fish while 37% fished 6 times or less per week as seen on Table 3. The important household fishes were mainly used for household consumption (77%) while only 0.4% was for sale and 23% was for both.

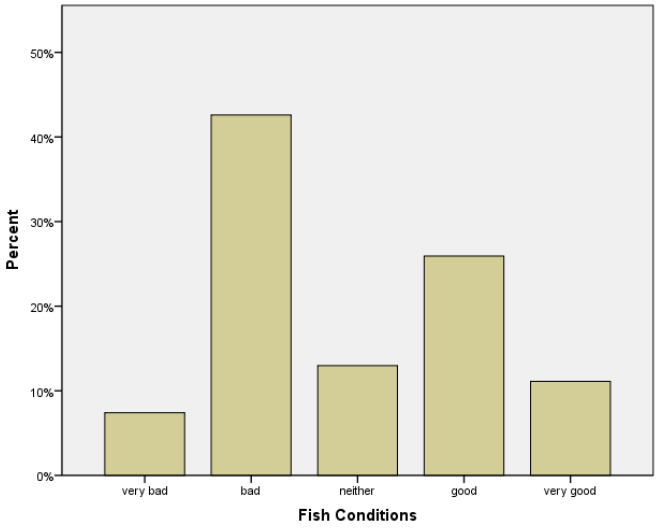
Table 3: Household frequency and percentage in harvesting and fishing

Activity	Everyday	6 or less/week	1-3/month	2-3/year	No one	Others
Harvesting Frequency	1	10	18	7	22	2
Harvesting Percentage	1.7	16.7	30.0	11.7	36.7	3.3
Fishing Frequency	1	22	10	5	17	5
Fishing Percentage	1.7	36.7	16.7	8.3	28.3	8.3

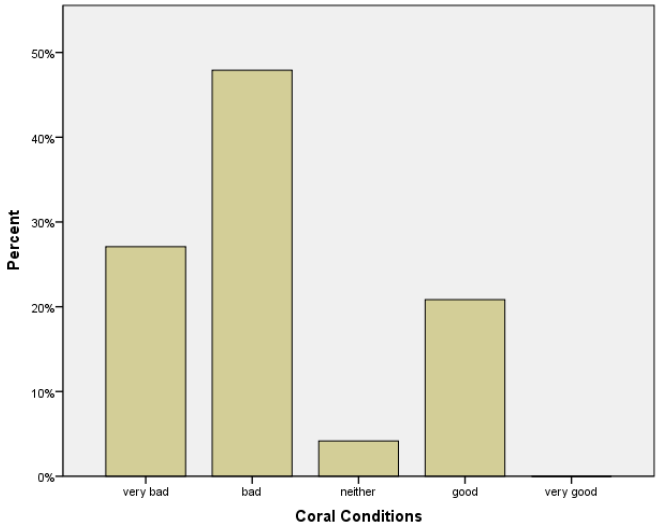
Perception of marine resources

A question was asked about the general perception of 13 marine resources of Ngiwal. This question asked the level of agreement of marine resource conditions on a five-point scale ranging from very good to very bad. The results showed that over 50% of those who were surveyed perceived fish and coral conditions as negative (Graph 1 and 2).

Graph 1: Fish Conditions

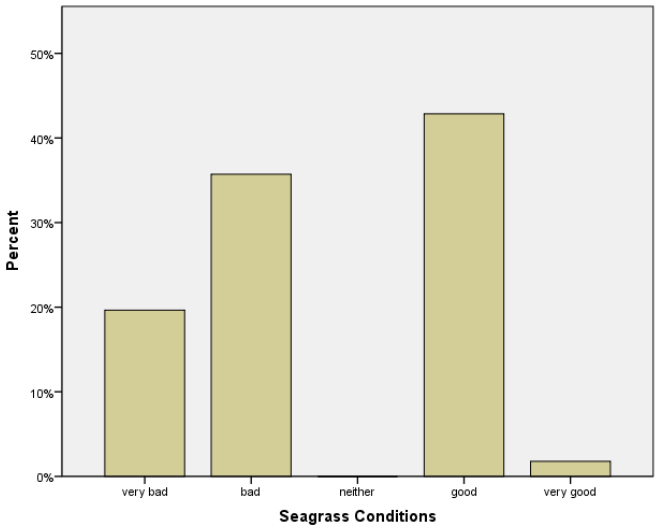


Graph 2: Coral Conditions

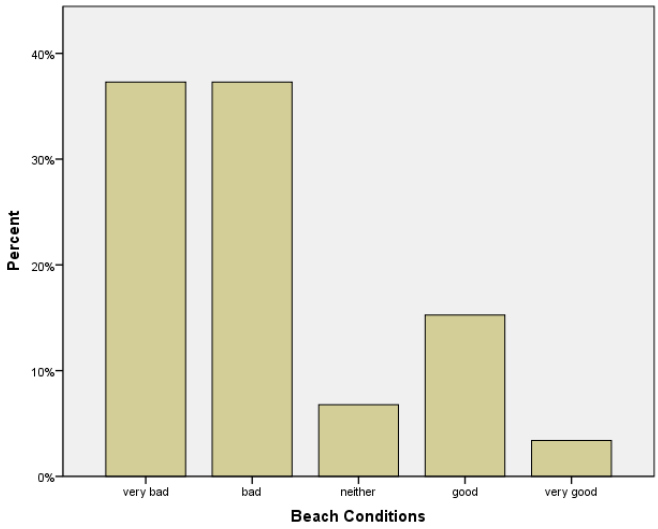


Seagrass conditions were perceived by 55% as negative (Graph 3) as well and an even greater percentage, 75%, perceived beach conditions as negative (Graph 4).

Graph 3: Seagrass Conditions

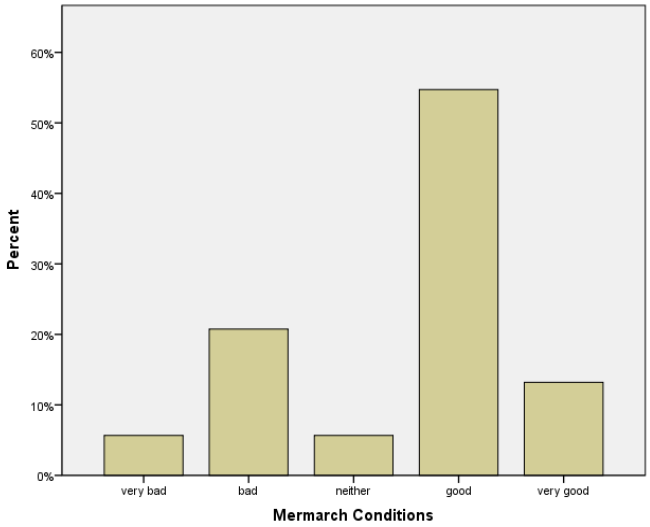


Graph 4: Beach Conditions

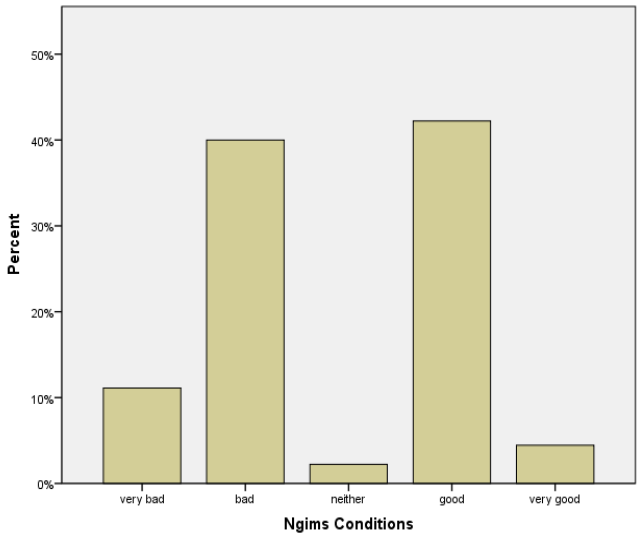


In addition, almost all edible sea cucumbers conditions were perceived on the negative side except for *B. marmorata* (mermarch) which was perceived by 68% in a more positive condition (Graph 5). Other sea cucumbers such as the *Stichopus species* (ngims) and *H. scabra* (molech) had a bit of confusion on its perceived conditions between positive and negative (Graph 6 and 7).

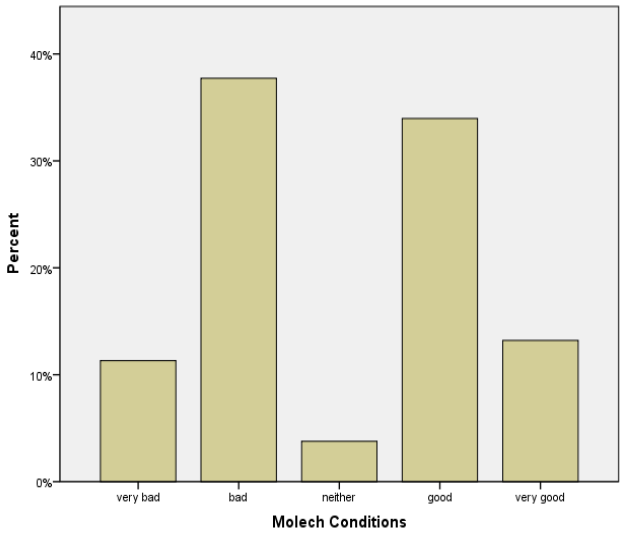
Graph 5: B. marmorata (Mermarch) Conditions



Graph 6: S. variegates (Ngims) Conditions

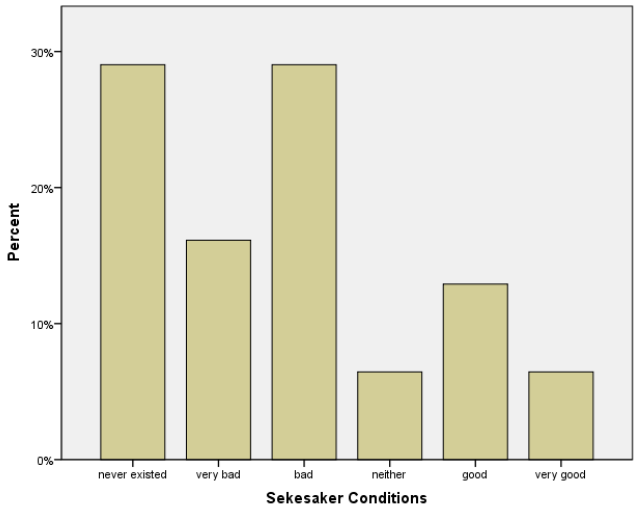


Graph 7: H. scabata (Molech) Conditions

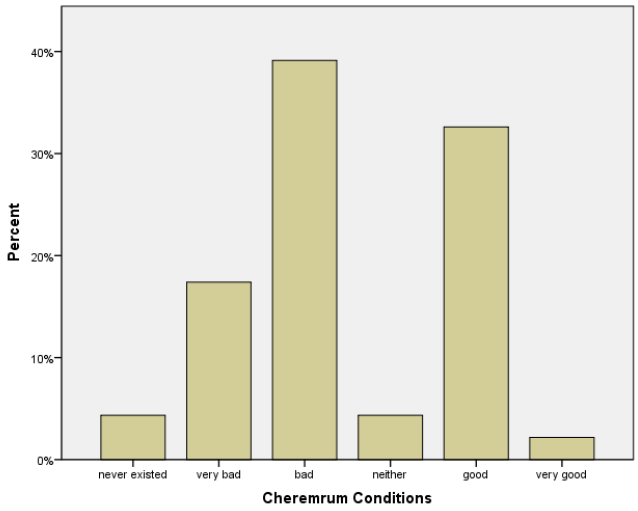


H. impatiens (sekesaker) even though was perceived by 45% in a more negative condition, there was, however, a 29% who mentioned that it never existed in Ngiwal reefs (Graph 8). *A. echinities* (cheremrum) followed the same trend with 57% on the negative side with 4.3% mentioning that it never existed in Ngiwal reefs (Graph 9).

Graph 8: H. impatiens (Sekesaker) Conditions

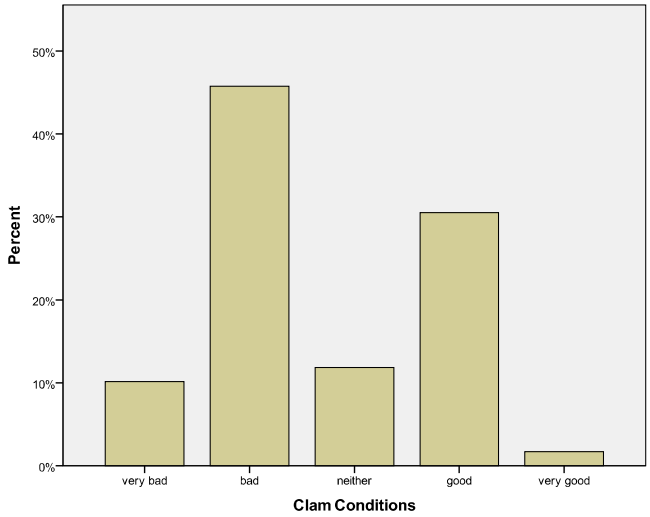


Graph 9: A. enchinites (Cheremrum) Conditions

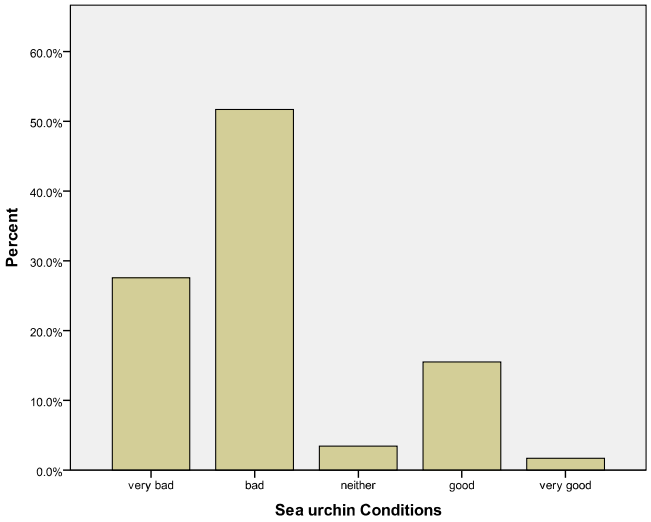


Clams and sea urchins had a similar trend as most of the sea cucumber on the negative side, 56% and 79% (Graph 10 and 11).

Graph 10: Clam Conditions

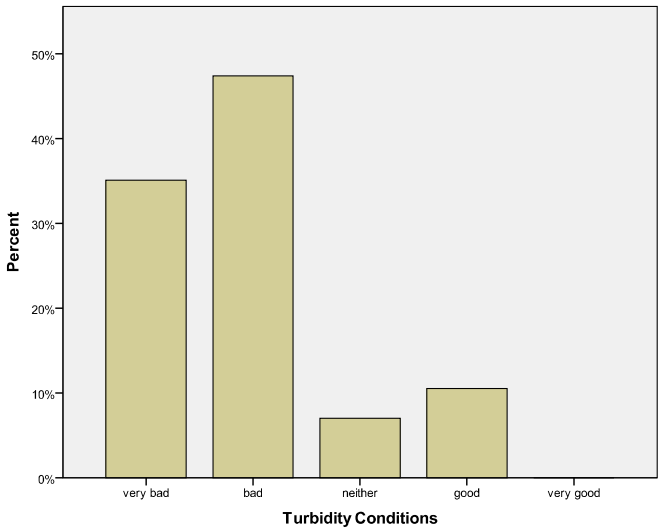


Graph 11: Urchin Conditions



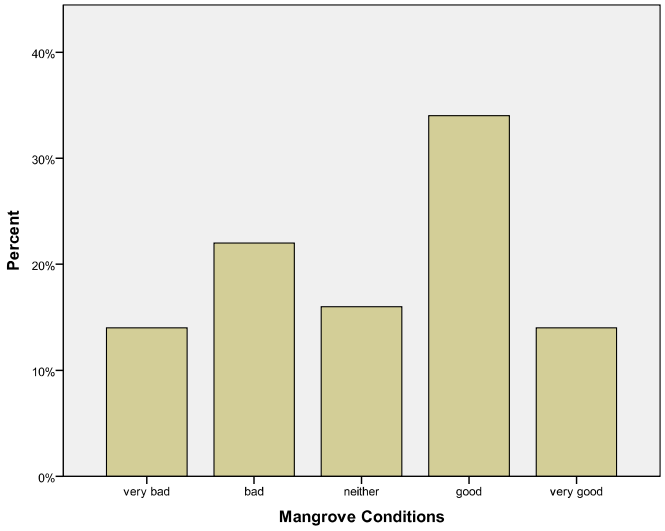
The perception on the turbidity was much more on the negative as seen on Graph 12.

Graph 12: Turbidity Conditions



The trend of the mangrove perception did not vary much and this could simply mean that people had different perception on its conditions (Graph 13). For example, some may say mangroves were doing well because it has grown so much and can provide coastal protection or house many mangrove crabs. However, some may perceived that it is bad because they have grown so much and has taken up most of the reef.

Graph 13: Mangrove Conditions



Perception of effectiveness of resource management

The perception of the effectiveness of the management of Ngiwal's resources had an interesting turn out. There was an equal number of people who perceived the management as "not effective," and "effective," and the same amount of people did not know about the effectiveness which are shown on Table 4. Even though there was confusion about the resource management, there was quite a big awareness on the rules and regulations on the Ngemai Conservation Area and the reef alongside Ngiwal. Over 85% of the respondents had knowledge of the rules and regulations but 88% of the respondents believe that there was still a need for an enforcement program.

Table 4: Management Effectiveness

Effectiveness	Frequency	Percent	Cumulative Percent
Not effective	20	33.3	33.3
Effective	20	33.3	66.7
Don't know	20	33.3	100.0
Total	60	100.0	

A question was raised about the level of agreement regarding the reefs. One hundred percent of the respondents agreed that it was important that all community members look after the reefs. Also, all respondents agreed that the health of marine resources was important to their health and well being. This shows a very high awareness and understanding of the importance of the reefs and its resources to the people. In addition, 93% of the respondents supported Ngemai being a legislated MPA which is very positive.

Important threats

The respondents identified "erosion or sediment" and "trash" as the two most important threats that were affecting the coastal and marine resources. There was a 92% of the respondents who were aware of sea level rise and identified "erosion of land or beach" and "negative affect to taro patches" as the two major impacts of the sea level rise at Ngiwal State.

Participation in aquaculture activities

More than half of the surveyed head of households, 68%, found that there was no one in their households who was interested in being involved in aquaculture. However, those were interested, 32%, were mostly interested in clam farming (90%) over the other types of aquaculture.

Participation in tourism activities

Surprisingly, 88% of the respondents identified that their households were not willing to participate in tourism activities or development.

Most appropriate/effective outreach

Radio and phone calls were identified as the most appropriate and/or effective way to reach households.

6. CONCLUSION AND RECOMMENDATIONS

The results show that a great percentage of the Ngiwal households depend greatly on marine resources for consumption. With this in mind, and the general perception of fish and most invertebrate as “bad”, major efforts should be concentrated on the sustainable management of the important edible marine resources. Even though the households were not quite clear on management effectiveness and the perception of the need for an enforcement program, majority of them were very aware of the different rules and regulations that were already in placed. In addition, there was a great level of awareness of the connection between the health of the marine resources to the health and well being of the people. Also, all respondents agreed that it is important for all community members to look after the reefs. The major threats of erosion or sediment and trash that affect coastal and marine resources are indicators that management needs to address. Another threat that needs to be addressed is the sea level rise. Impacts include land or beach erosion and the negative affect on taro patches. There was a low interest in aquaculture and tourism activities possibly because of little awareness of the types of sustainable developments that can be developed to improve livelihood.

It is recommended to do another socio-economic study and include better collection on key informant interviews and focus group discussions. Because key informant and focus group discussions were not well collected in this study, a number of assessment objectives were not met therefore the next study should not be done as a training to avoid similar case.

In order to track changes in perception, the management of the Ngiwal's protected areas should implement a socio-economic monitoring program. Continuous monitoring will enable the management to evaluate their conservation efforts through these protected areas and whether adaptive management is needed. It is important to know that conservation and management of marine resources are practiced for the people of Ngiwal therefore it is crucial to understand their perceptions of the resources that they own. Furthermore, it is advised to continue to have regular consolations with the community members to ensure that their needs and wants are heard. A monitoring plan is available and is recommended to be used for the next study that should take place between the year 2013 and 2015.

7. INTELLECTUAL PROPERTY RIGHTS

This report is the property of Palau International Coral Reef Center and the data itself is sensitive and should not be shared without the permission from both the Nigwal State Government Office and the Palau International Coral Reef Center. However, the summary results are not sensitive and can be included in this final report. The hard copies of the surveys will be kept with Palau International Coral Reef Center for confidentiality.

8. REFERENCES

[1]The Nature Conservancy, “Ngiwal State Protected Areas and Natural Resource Management Plan 2010-2015”. (2010).

9. APPENDICES

Appendix 1: Copy of the household survey
Appendix 2: Basic statistics for household survey questions
Appendix 3: Team members and affiliations

Appendix 1: Copy of household survey

Ngiwal State Protected Areas Household Survey

Date: _____ Place of interview _____ Interviewer: _____Note taker: _____

Survey #_____ Sechal *(Male)* ___ Redil *(Female)*___

1. Ng telal chad a kiei ertial blai lobengkem? (*How many people are in your household?)*_____
2. Ng tela ngariou a rekrir ra 18? (*How many people are under 18)?*_____
3. Ngera urerem? (*What is your job?)*_____
4. *Ngera ikel kmal uchul a kerrekerngel a blim el ngii a udoud, kall me a lechub eng usbechel er a blai lokiu a ngidi el chad el kiei er a blim? **Molilt** (*What are the main livelihood sources for your household for both cash income generation and household consumption/use? **Check all that apply.)***

Osisebellel a udoud (*Sources of household livelihood) {Molilt (Check all that applies)}*	**4a. Osisebel a udoud (*Household cash income*)**	**4b. Usbechel er a blai me a lechub eng kall (*Household use & consumption*)**
1) Ureor (*Salary from employment)*		[redacted]
2) Nga er a chei- uldimokl er a omelai el cheled (*Fishing-including collecting invertebrates)*		
3) Nga er a sers (*Farming)*		
4) Omeruu/omdechem/omoes el charm er a beluu el kall (H*unting edible land animals)*		
5) Okerullel a charm el kall (*livestock)*		
6) Ngesu el udoud el ngar er a ikrel a delengcheklem el diak el uldimukl er a udoud er a siukang (*Money received from relatives that are not in household but not including customary contributions)*		[redacted]
7) Klalo el mekedmokl el lokiu a chim -storyboard, oruikl, olbiungel me a lmuut el bebil (*Handicrafts)*		
8) Ousiobai- stoang, lengiil el blai (*Private business owners – stores, rents*)		[redacted]
9) Pension/social security		[redacted]
10)Nga er ngii a ngodech (*Others, please specify)*_____		

5. Ngera er a ikal bo kumasech a bedochel el mo sebecherir a rechad er a blai el mo medengei a subed el kirel a omengereomel? Ak mo masech aika el beldukl e rriou eke mo ngitlii a imong. *(What means of outreach/communication is most effective to reach the household? I will read you a list and you choose one.)*

   a. Okiu a radio*(Radio)*____
   b. Okiu a TV *(Televison)*____
   c. Okiu a omerous el babier ra obliil *(Flyers to households)*____
   d. Simbung *(Newspapers)*____
   e. Ou meeting ra beluu *(Meeting with the public)*____
   f. Babier el mo bereked er a obis er a state (*Posters for state office)*_____
   g. kuk di ngodech (*Other, please specify):*_____

6. Ngerang aikel erul tekoi malechub eng ngomeruul el kmal meklou a telmellel elme er a debed? (*What are the 2 most important threats that are affecting our coastal and marine resources)*
   1._____

   2._____

7. *Ngar er ngii a klaodengei er kau el kirel a llach er a ikal bo kumasech el basio? (*Are you aware of any rules and regulations regarding the following areas?)*
   a. Ngemai CA Choi(*yes)*____Diak(*no)*_____
   b. Bkul a tab el mora bkul a ngerair Choi(*yes)*____Diak(*no)*_____

8. Ak mo chemuiu a bebil er a tekoi e kau ouchais el kmo ke kongei, ng diak, me a lechub eng diak modengei. *(I will read a list of statements and you will tell me weather you agree, disagree, or don't know.)*

Beldukl el tekoi (*Statements)*	Kongei *(Agree)*	Diak mkengei *(Disagree*)	Diak kudengei *(Don't know)*
A) Ng klou ututelel a rechad er a beluu a lomes e longetmokl er a debed. (*It is important that all community members look after the reefs.)*			
B) A ungil oketmeklel a debed a sebechel smisichii a ungil ulkerruil a bedenged. (*The health of our marine resources is important to our health and well being)*			
*C) A kuldubech er a chesmerel a Ngemai el ngii a basio er a omengeriomel el lokiu a llach. (*I support Ngemai being a legislated MPA.)*			

9. Ng bekord el telal klebesei a lousbech er ngii a rechad er a blim el nga er a chei a eled er elecha el taem? (*About how often do your household members harvest inverts these days?)*
    1. Bek el sils (*Every day*)_____
    2. Elolem me a lechub eng mekesai er a elolem er a ta el sandei (*6 or less per week*)_____
    3. Tang el mo edei er a ta el buil(*1-3 times per month*)_____
    4. Erung el mo edei er a ta el rak (*2-3 times a year*) _____
    5. Diak a nga er a chei (*No one harvests inverts*)_____
    6. Kuk di ngodech el taem(*Others, please specify)*:_____

10. Me mocholt aikel eim el meklou a ututelel el cheled el me er a blim. E ak mo oker el kirel a ututelel el me er a blim. *(Please tell me the 5 most important types of invertebrates for your household.)*

10a. Bedengel a cheled (*Type of invertebrates*)	10b. Tiang klou a ututelel kirel a? (*Are they important for the following?)* 1 = kall er a blai (*household consumption)* 2 = oteruul (*sale)* 3 = ngii lerung (*both)*
1	
2	
3	
4	
5	

11. Ng bekord el tela el klebesei a lousbech er ngii a rechad er a blim el nga er a chei a ngikel er elcha el taem? (*About how often do your household members fish these days?)*
    1. Bek el sils (*Every day*) ____
    2. Elolem me a lechub eng mekesai er a elolem er a ta el sandei (*6 or less per week*)____
    3. Tang el mo edei er a ta el buil(*1-3 times per month*)____
    4. Erung el mo edei er a ta el rak (*2-3 times a year*)____
    5. Diak a nga er a chei (*No one fishes for fish*)____
    6. Kuk di ngodech el taem(*Others, specify*):_____

12. Me mocholt aike el kleim el meklou a ututelel el ngikel el me er a blim. E ak mo oker el kirel a ututelel el me er a blim. *(Please tell me the 5 most important types of fish for your household.*

12a. Bedengel a ngikel *(Type of fish)*	12b. Tiang klou a ultutelel kirel a? (*Are they important for the following?)* 1 = kall er a blai *(household consumption)* 2 = oteruul (*sale*) 3 = ngiil lerung (*both)*
1	
2	
3	
4	
5	

13. Ngarngii a chad er a blimiu el soal mo meruul er a sers er a daob? **Alsekum eng diak ebora #15.** *(Does anyone in your household want to be involved in aquaculture? **If no, skip to #15.)***

a. Choi *(Yes*)_____ b. Diak *(No*)_____

15. Meng ngera er a ikal charm er a daob el bo kumasech a soam el mo omkeroul? **Molilt** *(Which of the following resources are you interested for aquaculture? **check all that applies)***

a. Eremrum *(Seacucumbers)*____
b. Ngimes (*Seacucumber*)_____
c. Kim (*Clam)*____
d. Ngduul (*Mangrove clam*)_____
e. Kikoi*(Mussel)* _____
f. Cherchur (*Shrimp)*____
g. Aol (*Milkfish)*____
h. Kuk di ngodech (*Others, please specify):*_____
i. Diak el soak*(not interested)*____

14. Ngarngii a chad er a blimiu el soal mo soiseb ra tekoi er a klekangkodang? **Alsekum eng diak e bora #17. (***Does anyone in your household want to be involved in tourism developments? **If no, skip to #17.)***

a. Choi *(Yes)*_____ b. Diak *(No)*_____

16. Meng ngera er a ika el lomeruul el bo kumasech a soam el mo meruul el kirel a klekangkodang? **Molilt (***Which of these tourist activities would you like to be involved in? **Check all that applies**.)*

a. Ou kayak (K*ayaking)*_____
b. ou snorkel*(Snorkeling)* _____
c. Ou hike(*Hiking*)_____

d. Osengel a beluu (*Land tour)*_____
e. Lengiil el blai (*Hotels/motels)*_____
f. Restorangd *(Restaurant)*_____
g. Stoang ra internet (*Internet café)*_____
h. Annai (*Tour guide)*_____
i. Melchelbakl lou tank {ex: Ngibtal}(*Diving, ex: Ngibal)* ____
j. Kuk di ngodech (*Others, please specify):*_____

17. Omomdasuo ea state er a Ngiwal ngousbech a otutel a llach el kirel a rokui el ngikel me a cheled er a Ngiwal? (*Do you think the state of Ngiwal needs an enforcement program for marine resources)*
    a. Choi (*Yes*)____ b. Diak *(No)*____

18. Ng uangerang a orretel a ureor er a Ngiwal el kirel a eled me a ngikel er a debel a Ngiwal? (*How effective is the management of Ngiwal marine resources)*

    1. Ngoureor *(Effective)* ____
    2. Ng diak loureor *(Not effective)*____
    3. Diak kudengei *(Don't knowr)* ____

19. Kemla melchesuar a delchel a daob el kmo ng mla mo er bab?**Alsekum eng diak ebora #21.** (*Have you noticed any sea level rise? **If no, skip to #21)***
    a. Choi (*Yes)* ____ b. Diak (*No)*____

20. Ngera telmellel a delchel a daob el mla mo er bab? (*What are the impacts?)*

_____

_____

21. Ngera uldesuem el kirel a teletelel aika el bo kumasech el ngar er a daob?
(What are your perceived conditions on the following marine resources?)

Marine resources	Kmal lungil (*Very good)*	Ungil *(Good)*	Mekngit *(Bad)*	Mal mekngit (*Very bad)*	Kal lungil ma kal mekngit *(Neither good or bad)*	Diak kudengei (*Don't know)*
Ngikel *(Fish)*						
Merangd *(Corals)*						
Char *(Seagrass)*						
Chelechol *(Beach)*						
Chercherul a daob (*Turbidity)*						
Eremrum *(Seacucumbers*)						
Ngims *(Seacucumbers)*						
Molech *(Seacucumbers)*						
Mermarch *(Seacucumbers)*						
Sekesaker *(Seacucumbers)*						
Kim *(clams)*						
Ibuchl (S*ea urchins)*						
Keburs (*Mangroves)*						
Kuk di ngodech (*Others, please specify):*						

Appendix 2: Basic statistics for household survey questions

Ngiwal State Protected Areas Household Survey

Date: _____ Place of interview _____ Interviewer: _____Note taker: _____

Survey #_____ Sechal *(Male)* ___ Redil *(Female)*___

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	33	55.0	55.0	55.0
	female	27	45.0	45.0	100.0
	Total	60	100.0	100.0	

1. Ng telal chad a kiei ertial blai lobengkem? (*How many people are in your household?)*_____

Q1.No.HHppl					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	8.3	8.3	8.3
	2	13	21.7	21.7	30.0
	3	13	21.7	21.7	51.7
	4	12	20.0	20.0	71.7
	5	9	15.0	15.0	86.7
	6	2	3.3	3.3	90.0
	7	3	5.0	5.0	95.0
	8	1	1.7	1.7	96.7
	9	1	1.7	1.7	98.3
	11	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

2. Ng tela ngariou a rekrir ra 18? (*How many people are under 18)?*_____

Q2.under18					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	26	43.3	43.3	43.3
	1	12	20.0	20.0	63.3
	2	13	21.7	21.7	85.0
	3	4	6.7	6.7	91.7
	4	4	6.7	6.7	98.3
	5	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

3. Ngera urerem? (*What is your job?)*_____

Q3.JobREGROUPED					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	education	7	11.7	11.7	11.7
	farmer	1	1.7	1.7	13.3
	government	16	26.7	26.7	40.0
	health	1	1.7	1.7	41.7
	hotel	1	1.7	1.7	43.3
	housewife	1	1.7	1.7	45.0
	market	1	1.7	1.7	46.7
	pastor	1	1.7	1.7	48.3
	retail	1	1.7	1.7	50.0
	retired	7	11.7	11.7	61.7
	self employed	2	3.3	3.3	65.0
	unemployed	21	35.0	35.0	100.0
	Total	60	100.0	100.0	

4. *Ngera ikel kmal uchul a kerrekerngel a blim el ngii a udoud, kall me a lechub eng usbechel er a blai lokiu a ngidi el chad el kiei er a blim? **Molilt** (*What are the main livelihood sources for your household for both cash income generation and household consumption/use?* ***Check all that apply.)***

Osisebellel a udoud (*Sources of household livelihood)* *{Molilt (Check all that applies)}*	**4a. Osisebel a udoud (*Household cash income*)**	**Both cash & use/consumption**	**4b. Usbechel er a blai me a lechub eng kall (*Household use & consumption*)**
1) Ureor (*Salary from employment)*	(N=35) 32.4%	------	----------
2) Nga er a chei- uldimokl er a omelai el cheled (*Fishing-including collecting invertebrates)*	(N=3) 2.8%	(N=15) 34.9%	(N=28) 31.1%
3) Nga er a sers (*Farming)*	0	(N=13) 30.2%	(N=23) 25.6%
4) Omeruu/omdechem/omoes el charm er a beluu el kall (H*unting edible land animals)*	(N=2) 1.9%	(N=2) 4.7%	(N=29) 32.2%
5) Okerullel a charm el kall (*livestock)*	(N=8) 7.4%	(N=4) 9.3%	(N=3) 3.3%
6) Ngesu el udoud el ngar er a ikrel a delengcheklem el diak el uldimukl er a udoud er a siukang (*Money received from relatives that are not in household but not including customary contributions)*	(N=15) 13.9%	---------- ---------- ----------	---------- ---------- ----------
7) Klalo el mekedmokl el lokiu a chim - storyboard, oruikl, olbiungel me a lmuut el bebil (*Handicrafts)*	(N=3) 2.8%	(N=6) 14.0%	(N=7) 7.8%
8) Ousiobai- stoang, lengiil el blai (*Private business owners – stores, rents*)	(N=6) 5.6%	---------	----------
9) Pension/social security	(N=31) 28.7%	---------	----------
10)Nga er ngii a ngodech (*Others, please specify)* <u>*Marketing buuch, kebui, lemon; land rental*</u>	(N=5) 4.6%	(N=3) 7.0%	

5. Ngera er a ikal bo kumasech a bedochel el mo sebecherir a rechad er a blai el mo medengei a subed el kirel a omengereomel? Ak mo masech aika el beldukl e rriou eke mo ngitlii a imong. *(What means of outreach/communication is most effective to reach the household? I will read you a list and you choose one.)*

   a. Okiu a radio*(Radio)*____(**N=15) 25.4%**
   b. Okiu a TV *(Televison)*____**(N=11) 18.6%**
   c. Okiu a omerous el babier ra obliil *(Flyers to households)*____**(N=9)15.3%**
   d. Simbung *(Newspapers)*____**(N=0) 0%**
   e. Ou meeting ra beluu *(Meeting with the public)*____ **(N=9) 15.3%**
   f. Babier el mo bereked er a obis er a state (*Posters for state office*___**(N=3) 5.1%**
   g. kuk di ngodech (*Other, please specify):*
   through telephones or people_____ (N=12) 20.3%
   [missing (N=1) 1.7%]

6. Ngerang aikel erul tekoi malechub eng ngomeruul el kmal meklou a telmellel elme er a debed? (*What are the 2 most important threats that are affecting our coastal and marine resources)*
   1. **Erosion/sediment (N=23) 24.2%**
   2. **Trash (N=20) 21.2%**
   Others (N=52) 54.7%

7. *Ngar er ngii a klaodengei er kau el kirel a llach er a ikal bo kumasech el basio? (*Are you aware of any rules and regulations regarding the following areas?)*
   a. Ngemai CA
   Choi(*yes)***N=52, 86.7%** Diak(*no)* **N=8, 13.3%**

   b. Bkul a tab el mora bkul a ngerair
   Choi(*yes)***N=53, 88.3%** Diak(*no)***N=7, 11.7%**

8. Ak mo chemuiu a bebil er a tekoi e kau ouchais el kmo ke kongei, ng diak, me a lechub eng diak modengei. *(I will read a list of statements and you will tell me weather you agree, disagree, or don't know.)*

Beldukl el tekoi (*Statements)*	Kongei *(Agree)*	Diak mkengei *(Disagree*)	Diak kudengei *(Don't know)*
A) Ng klou ututelel a rechad er a beluu a lomes e longetmokl er a debed. (*It is important that all community members look after the reefs.)*	**(N=60) 100%**	**0**	**0**
B) A ungil oketmeklel a debed a sebechel smisichii a ungil ulkerruil a bedenged. (*The health of our marine resources is important to our health and well being)*	**(N=60) 100%**	**0**	**0**
*C) A kuldubech er a chesmerel a Ngemai el ngii a basio er a omengeriomel el lokiu a llach. (*I support Ngemai being a legislated MPA.)*	**(N=56) 93.3%**	**(N=3) 5%**	**(N=1) 1.7%**

9. Ng bekord el telal klebesei a lousbech er ngii a rechad er a blim el nga er a chei a eled er elecha el taem? (*About how often do your household members harvest inverts these days?)*
    7. Bek el sils (*Every day*)_____**(N=1) 1.7%**
    8. Elolem me a lechub eng mekesai er a elolem er a ta el sandei (*6 or less per week*)_____**(N=10) 16.7%**
    9. Tang el mo edei er a ta el buil(*1-3 times per month*)___**(N=18) 30.0%**
    10. Erung el mo edei er a ta el rak (*2-3 times a year*) _____**(N=7) 11.7%**
    11. Diak a nga er a chei (*No one harvests inverts*)_____**(N=22)36.7%**
    12. Kuk di ngodech el taem(*Others, please specify)*:

1/year, when the tide is good (N=2) 3.3%

10. Me mocholt aikel eim el meklou a ututelel el cheled el me er a blim. E ak mo oker el kirel a ututelel el me er a blim. *(Please tell me the 5 most important types of invertebrates for your household.)*

10a. Bedengel a cheled (*Type of invertebrates*)	10b. Tiang klou a ututelel kirel a? (*Are they important for the following?)* 1 = kall er a blai (*household consumption)* 2 = oteruul (*sale)* 3 = ngii lerung (*both)*
1	
2	
3	
4	
5	

Top 5 Invertebrates	**Frequency**	**Percent**
1. Kim	31	22.8
2. Oruer	22	16.2
3. Eremrum	14	10.3
4. Ngims	14	10.3
5. Emang	10	7.4
Others	45	33.1
Total	136	100.0
Missing		
Do not eat fish (N=60)	12	20.0

Invert Importance Frequencies

		Responses		Percent of
		N	Percent	Cases
Invert Importance[a]	HH consumption	116	85.3%	241.7%
	sale	2	1.5%	4.2%
	both (consumption/sale)	18	13.2%	37.5%
Total		136	100.0%	283.3%

11. Ng bekord el tela el klebesei a lousbech er ngii a rechad er a blim el nga er a chei a ngikel er elcha el taem? (*About how often do your household members fish these days?)*
    7. Bek el sils (*Every day*) ____**(N=1) 1.7%**
    8. Elolem me a lechub eng mekesai er a elolem er a ta el sandei (*6 or less per week*)____ **(N=22) 36.7%**
    9. Tang el mo edei er a ta el buil(*1-3 times per month*)___**(N=10) 16.7%**
    10. Erung el mo edei er a ta el rak (*2-3 times a year*)____ **(N=5) 8.3%**
    11. Diak a nga er a chei (*No one fishes for fish*)____ **(N=17) 28.3%**
    12. Kuk di ngodech el taem(*Others, specify*):

<u>1/year, 2/3months, depend on tide</u> (N=5) 8.3%

12. Me mocholt aike el kleim el meklou a ututelel el ngikel el me er a blim. E ak mo oker el kirel a ututelel el me er a blim. *(Please tell me the 5 most important types of fish for your household.*

12a. Bedengel a ngikel *(Type of fish)*	12b. Tiang klou a ultutelel kirel a? (*Are they important for the following?)* 1 = kall er a blai *(household consumption)* 2 = oteruul (*sale*) 3 = ngiil lerung (*both)*
1	
2	
3	
4	
5	

Top 5 Fishes	**Frequency**	**Percent**
1. Ngiaoch	29	11.7
2. Um	21	8.5
3. Kelsebuul	20	8.1
4. Masech	18	7.3
5. Mellemau	18	7.3
6. Itotech *(is included because of how close its frequency is to 4th and 5th fish)*	17	6.9
Others	125	50.4
Total	248	100.0
Missing		
Do no eat fish (N=60)	5	8.3

Fish Importance Frequencies				
		Responses		Percent of Cases
		N	Percent	
Fish Importance[a]	HH consumption	191	77.0%	347.3%
	sale	1	.4%	1.8%
	both (consumption/sale)	56	22.6%	101.8%
Total		248	100.0%	450.9%

13. Ngarngii a chad er a blimiu el soal mo meruul er a sers er a daob? **Alsekum eng diak ebora #15.** *(Does anyone in your household want to be involved in aquaculture? **If no, skip to #15.)***

a. Choi *(Yes*) **N=19, 31.7%** b. Diak *(No*) **N=41, 68.3%**

14. Meng ngera er a ikal charm er a daob el bo kumasech a soam el mo omkeroul? **Molilt** *(Which of the following resources are you interested for aquaculture? **check all that applies) (out of N=19, 31.7%)***

a. Eremrum *(Seacucumbers)*____**(N=3) 15.8%**
b. Ngimes (*Seacucumber*)_____**(N=2) 10.5%**
c. Kim (*Clam)*____**(N=17) 89.5%**
d. Ngduul (*Mangrove clam*)_____**(N=1) 5.3%**
e. Kikoi*(Mussel)* _____**(N=1) 5.3%**
f. Cherchur (*Shrimp)*____**(N=3) 15.8%**
g. Aol (*Milkfish)*____**(N=1) 5.3%**
h. Kuk di ngodech (*Others, please specify):*
those that bring in money (N=1) 5.3%
i. Diak el soak*(not interested)*____**(N=0) 0%**

15. Ngarngii a chad er a blimiu el soal mo soiseb ra tekoi er a klekangkodang? **Alsekum eng diak e bora #17. (***Does anyone in your household want to be involved in tourism developments? **If no, skip to #17.)***

b. Choi *(Yes)*_____**(N=7) 11.7%** b. Diak *(No)*_____**(N=53) 88.3%**

16. Meng ngera er a ika el lomeruul el bo kumasech a soam el mo meruul el kirel a klekangkodang? **Molilt (***Which of these tourist activities would you like to be involved in? **Check all that applies**.)*

out of N=7, 11.7%

a. Ou kayak (K*ayaking)*_____**(N=4) 57.1%**
b. ou snorkel*(Snorkeling)* _____**(N=1) 14.2%**
c. Ou hike(*Hiking*)_____**(N=3) 42.9%**
d. Osengel a beluu (*Land tour)*_____**(N=3) 42.9%**
e. Lengiil el blai (*Hotels/motels)*_____**(N=3) 42.9%**
f. Restorangd *(Restaurant)*_____**(N=3) 42.9%**
g. Stoang ra internet (*Internet café)*_____**(N=3) 42.9%**
h. Annai (*Tour guide)*_____**(N=1) 14.3%**
i. Melchelbakl lou tank {ex: Ngibtal}(*Diving, ex: Ngibtal)* ___**(N=2) 28.6%**
j. Kuk di ngodech (*Others, please specify):*
selling bentos and handicrafts (N=2) 3.3%

17. Omomdasuo ea state er a Ngiwal ngousbech a otutel a llach el kirel a rokui el ngikel me a cheled er a Ngiwal? (*Do you think the state of Ngiwal needs an enforcement program for marine resources)*

a. Choi (*Yes*)____**(N=53) 88.3%** b. Diak *(No)*____**(N=7) 11.7%**

18. Ng uangerang a orretel a ureor er a Ngiwal el kirel a eled me a ngikel er a debel a Ngiwal? (*How effective is the management of Ngiwal marine resources)*

Ngoureor *(Effective)* ____**(N=20) 33.3%**
Ng diak loureor *(Not effective)*____**(N=20) 33.3%**
Diak kudengei *(Don't know)* ____**(N=20) 33.3%**

19. Kemla melchesuar a delchel a daob el kmo ng mla mo er bab?**Alsekum eng diak ebora #21.** (*Have you noticed any sea level rise? **If no, skip to #21)***
a. Choi (*Yes)* ____ (N=55) 91.7% b. Diak (*No)*____(N=4) 6.7%
Don't know (N=1) 1.7%

20. Ngera telmellel a delchel a daob el mla mo er bab? (*What are the impacts?)*
Frequently mentioned impacts

1. **Erroded land/beach (N=32)**
2. **Negatively affects taro patches (N=22)**

21. Ngera uldesuem el kirel a teletelel aika el bo kumasech el ngar er a daob?
(What are your perceived conditions on the following marine resources?)

Marine resources	Kmal lungil (*Very good)*	Ungil *(Good)*	Mekngit *(Bad)*	Mal mekngit (*Very bad)*	Kal lungil ma kal mekngit *(Neither good or bad)*	Diak kudengei (*Don't know)*
Ngikel *(Fish)*	**N=6 10.0%**	**N=14 23.3%**	**N=24 40%**	**N=3 5%**	**N=7 11.7%**	**N=6 10%**
Merangd *(Corals)*	**N=0 0%**	**N=11 18.3%**	**N=22 36.7%**	**N=13 21.7%**	**N=2 3.3%**	**N=12 20%**
Char *(Seagrass)*	**N=1 1.7%**	**N=24 40%**	**N=20 33.3%**	**N=11 18.3%**	**N=0 0%**	**N=4 6.7%**
Chelechol *(Beach)*	**N=2 3.3%**	**N=9 15.0%**	**N=22 36.7%**	**N=22 36.7%**	**N=4 6.7%**	**N=1 1.7%**
Chercherul a daob (*Turbidity)*	**N=0 0%**	**N=6 10%**	**N=27 45%**	**N=20 33.3%**	**N=4 6.7%**	**N=3 5.0%**
Eremrum *(Seacucumbers*)	**N=1 1.7%**	**N=15 25%**	**N=18 30%**	**N=8 13.3%**	**N=2 3.3%**	**N=14 23.3%** **Never existed N=2 3.3%**

Ngims *(Seacucumbers)*	**N=2 3.3%**	**N=19 31.7%**	**N=18 30%**	**N=5 8.3%**	**N=1 1.7%**	**N=15 25%**
Molech *(Seacucumbers)*	**N=7 11.7%**	**N=18 30.0%**	**N=20 33.3%**	**N=6 10.0%**	**N=2 3.3%**	**N=7 11.7%**
Mermarch *(Seacucumbers)*	**N=7 1.7%**	**N=29 48.3%**	**N=11 18.3%**	**N=3 5%**	**N=3 5%**	**N=7 11.7%**
Sekesaker *(Seacucumbers)*	**N=2 3.3%**	**N=4 6.7%**	**N=9 15%**	**N=4 5.7%**	**N=3 5%**	**N=28 46.7% None(never existed N=9, 15% No answer N=1, 1.7%**
Kim *(clams)*	**N=1 1.7%**	**N=18 30.0%**	**N=27 45.0%**	**N=6 10.0%**	**N=7 11.7%**	**N=1 1.7%**
Ibuchl (S*ea urchins)*	**N=1 1.7%**	**N=8 13.3%**	**N=30 50.0%**	**N=16 26.7%**	**N=3 5.0%**	**N=2 3.3%**
Keburs (*Mangroves)*	**N=7 11.7%**	**N=16 26.7%**	**N=11 18.3%**	**N=8 13.3%**	**N=8 13.3%**	**N=10 16.7%**
Kuk di ngodech (*Others, please specify):*						
Rechiil Out of 4 people	**(N=2) 50%**	**(N=0) 0%**	**(N=1) 25%**	**(N=1) 25%**	**(N=0) 0%**	**(N=0) 9%**
Ebei Out of 1 person	**(N=1) 100%**	**(N=0) 0%**	**(N=0) 0%**	**(N=0) 0%**	**(N=0) 0%**	**(N=0) 0%**
Esechuul Out of 1 person	**(N=1) 100%**	**(N=0) 0%**	**(N=0) 0%**	**(N=0) 0%**	**(N=0) 0%**	**(N=0) 0%**
Esechol Out of 2 people	**(N=1) 50%**	**(N=0) 0%**	**(N=0) 0%**	**(N=1) 50%**	**(N=0) 0%**	**(N=0) 0%**

Appendix 3: Team members and affiliations

Name	*State/Organization*	*Status*
Elizabeth Ngirmekur	Ngardmau	Trainee and team member
Cyrus Renguul	Ngardmau	Trainee and team member
Sekund Kintaro	Ngchesar	Trainee and team member
Christa Eldebechel	Ngchesar	Trainee and team member
Sofla Orukei	Ngiwal	Trainee and team member
Benina Yobech	Ngiwal	Trainee and team member
Erico Malone	Peleliu	Trainee and team member
Rachel Hosei	Peleliu	Trainee and team member
Dawnette U. Olsudong	PICRC	Trainer assistant
Noelle W. Oldiais	PICRC	Trainer
Supin Wongbusarakum	TNC	Trainer