

# SEM-Pasifika Training and Assessment in Ruango, Kimbe Bay, West New Britain, PNG

Use of the SEM Pasifika Guidelines to  
Understand Socio-economic Conditions and  
Impacts of Marine Resource Management within  
the Ruango Community

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NA07NOS4630016. All photos by PNGCLMA.

## 1. Introduction

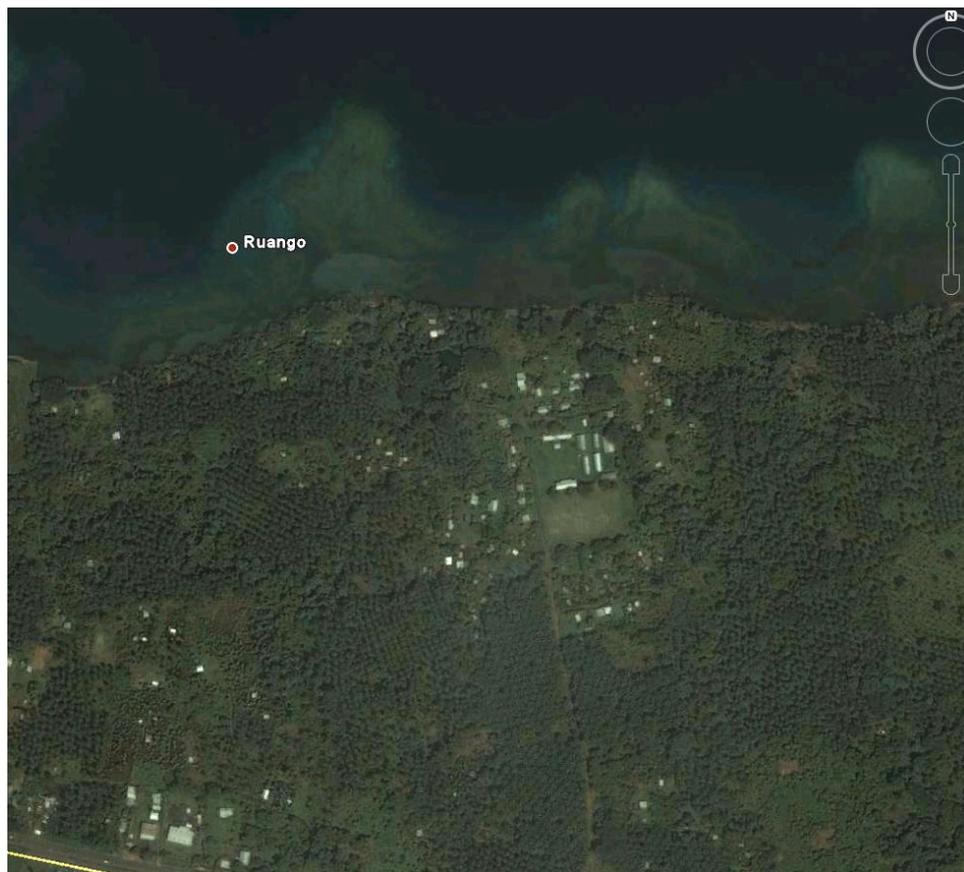
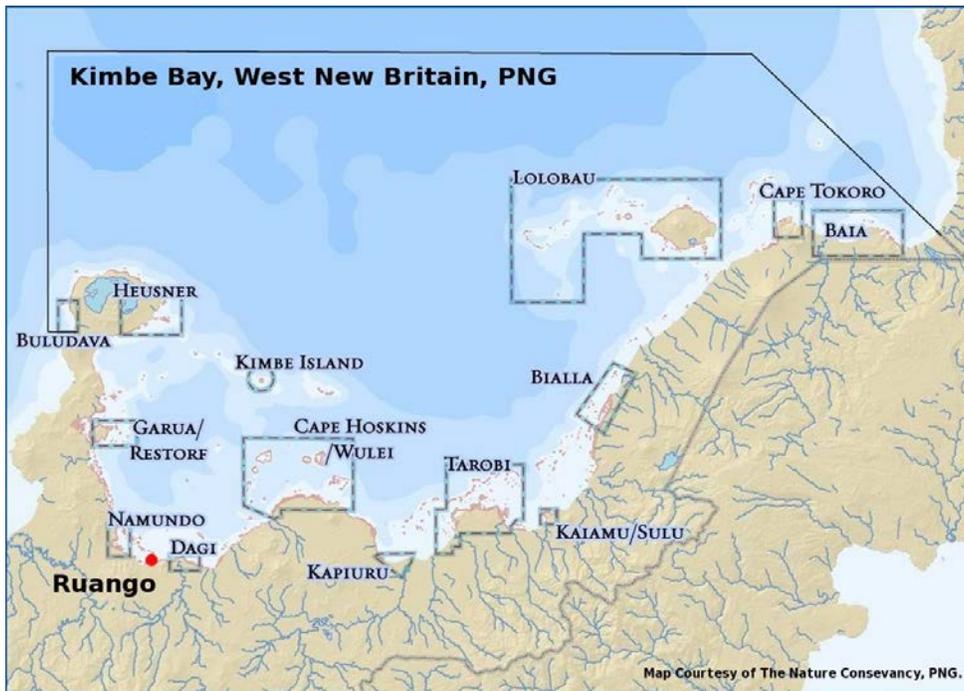
A Socio-economic Monitoring – Pasifika (SEM-Pasifika) training was organized and conducted by team members of the Papua New Guinea Centre for Locally Managed Areas (PNGCLMA) as part of a training project trialing newly established socio-economic monitoring or “SocMon” guidelines in PNG. These guidelines, a collaboration between the South Pacific Regional Environment Program (SPREP), the NOAA Socio-economic Monitoring program and other groups, were published to provide basic guidance to nearshore marine and coastal zone managers in socio-economic assessment and monitoring. This report documents the results of a training workshop, organized in Kimbe Bay, PNG from 21-27 October 2009, in which participants received training in the SEM-Pasifika methods and, with the guidance of facilitators, conducted socio-economic monitoring planning, data collection, data analysis, and communication activities within the Ruango Village community. This training workshop and data collection activity established a socio-economic monitoring baseline for the Ruango community and was a follow-on event to an initial training workshop for conservation practitioners held in May 2008 in Paramana, PNG.

## 2. Background and Site Description

Kimbe Bay is located on the north coast of the island of New Britain, Papua New Guinea’s largest island in the Bismarck Archipelago (See Maps 1 and 2). The island's landscape is dominated by rainforest-covered volcanic cones that rise steeply out of the water close to shore, four of which are active. Located on the western coast of Kimbe Bay, Kimbe (or Kimbe Town as it is sometimes referred) is the capital of the province of West New Britain. Kimbe is an active port town and one of the fastest growing towns in the region. Kimbe is a center of many industries including oil palm, cocoa, logging and coconut plantations. Many of these products are shipped using Kimbe's main port. The biggest industry in West New Britain and Papua New Guinea itself is New Britain Palm Oil Limited, or NBPOL, which produces palm oil used in cooking oil, and a key ingredient in many cosmetics, food products and, most recently, biofuel for motorized vehicles. The company also has a cattle station which is used as food for the region.

The marine ecosystem of Kimbe Bay is well known for its diverse coral reefs and other marine habitats — mangroves, seagrasses, deep ocean waters and seamounts that attract fishers and tourists alike. Thousands of residents in the broader area utilize the bay’s marine resources for sustenance and in support of livelihood activities, as well as by maintaining gardens, crops, and livestock. Like many coastal areas throughout the world, Kimbe Bay’s marine resources are at risk from overfishing, sedimentation and the effects of climate change. To address overharvesting from local residents, several villages in the area have established community-managed marine protected areas, or what are known as “locally managed marine areas”, as a tool to manage reef resources and allow them to recover. Run-off and sedimentation caused by commercial palm crops, small-scale forestry, and other land-use practices, including village gardens and urban and infrastructure developments, also threaten the bay's marine environment.

Maps 1 and 2. The Location of Ruango Village, West New Britain, PNG and Some Topography Features



Ruango is a community located just a few miles outside Kimbe Town within the Talasea district of West New Britain province. Urban settlement is increasing as local residents and recently relocated migrants are attracted to employment in the Kimbe area. One of West New Britain's largest hotels is also located in the vicinity. The Ruango community has an extensive marine area that is managed traditionally under customary tenure practices. Within their traditional waters is a shipping channel used for local and regional transportation. Lighthouses built on the reefs enable safe passage for the ships; payment is made to the community for these lighthouses.

Residents and some community leaders have expressed concern about the marine environment and the degradation and decline of marine resources within the area they own and manage. However, while some suggestions have been made by local leaders on how best to address local problems, consensus within the larger community has been difficult to achieve. To address these concerns, particularly that of overharvesting, a clan leader of Ruango has recently agreed to setting aside four of the nearby coral reefs as *tambu* areas. *Tambu* areas are customary seasonal or semi-permanent no-take areas. However, there has been little community support or respect for these decisions, and these *tambu* areas still suffer from persistent threats of overharvesting of resources as before.

The Ruango Village community was selected as a site for training and piloting the use of the SEM-Pasifika guidelines because of the combination of resource management issues and the recent implementation of management strategies. In stakeholder consultations, community members also expressed a desire understand the larger impact of management strategies and future actions. The site was also identified as a priority because it is currently supported by conservation NGOs active in the area, which increases the likelihood for on-going support and continuation of site-monitoring activities. The training workshop included 4 trainers/facilitators and 24 participants from Ruango and other Kimbe Bay communities.

**Photo 1. Participants of the SEM-Pasifka Training Workshop in Ruango Village, West New Britain, PNG**



### 3. Methodology

As part of the training and assessment workshop, participants used the guidance of the SEM-Pasifika manual (available on the SocMon website at [www.socmon.org/download.ashx?docid=A0000003799](http://www.socmon.org/download.ashx?docid=A0000003799) 1) to identify and articulate: 1) any relevant management objectives for the local marine area, 2) assessment objectives and 3) the survey site area and indicators that would be used during the assessment training and data collection exercise. The workshop organizers consulted with the community leaders and stakeholder groups when requesting permission to hold the workshop in Ruango. These consultations yielded preliminary information on issues in the area, as well as general priorities for the assessment as identified by various stakeholder groups. An assessment plan was prepared that included a schedule, team assignments, and data collection forms for key informant and household surveys (included in Appendix). Specific training was conducted with the participants on the various SEM-Pasifika approaches presented in the earlier SEM-Pasifika training workshop held in Paramana, PNG in May 2008. With the guidance and supervision of the trainers, field teams collected data within the Ruango community setting. Data forms were returned to the workshop location and reviewed for consistency and errors, providing feedback to the participants in the process. The Information was then summarized and analyzed by workshop trainers and participants, key findings identified, and the results summarized and presented back to the various stakeholder groups, including a section of the community.

#### Assessment Goal

It was determined by workshop participants and support partners that the goal of this particular socio-economic assessment and overall site-monitoring activities at Ruango, Kimbe Bay, would be to *“provide the resident community, decision makers, and interested stakeholders with information useful for better understanding of local conditions and the impact of resource management activities on the lives of community members.”* It is hoped that increased community and stakeholder understanding and awareness resulting from assessment and site-monitoring activities will lead to greater support for present and future marine management strategies. A secondary goal of this particular assessment was to compare and contrast the SEM-Pasifika approach to the socio-economic monitoring approach as described within the Locally Managed Marine Network’s monitoring guide or “Learning Framework”<sup>1</sup> an approach that some of the PNG team of trainers and facilitators already had experience with.

#### Site Management Goal

A general coastal concern of local residents and managers is the maintenance of locally utilized marine resources within nearby fishing grounds. Therefore, the management goal of the Ruango Locally Managed Marine Area can be summarized as: *“to manage coastal marine resources sustainably for the benefit and use of present and future generations.”* More specific

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<sup>1</sup> This comparison is provided elsewhere in the final project report that presents overall results and findings of the project: “Enhancing the Role of Socio-economic Monitoring in the Conservation of Coral Reefs in Papua New Guinea,” supported by NOAA’s National Ocean Service (NOS) International Program Office (IPO), Award NA07NOS4630016.

management objectives for the management of the marine areas in the Ruango vicinity have been proposed together by the resident community and supporting partners.

### Assessment Objectives

For this socio-economic assessment, three specific objectives were identified and selected:

**Objective 1:** Develop a general baseline of information regarding the community and its use and understanding of the coastal and marine environment.

**Objective 2:** Determine the level of reliance or dependence on marine resources

**Objective 3:** Determine particular education and awareness needs within the community

**Objective 4:** Determine the level of community support and interest in establishing and managing marine protected areas

### Assessment Indicators

Given the setting, site management goals, and above assessment objectives, the following assessment indicators from the SEM-Pasifika Guide (with manual identifier code in brackets) were selected by the workshop participants, with advice from local community members and workshop facilitators.

#### Household indicators

1. Population Size, Number Of Households, And Household Sizes [D1]
2. Age [D4]
3. Marital Status [D5]
4. Sex [D6]
5. Education And Literacy [D7]
6. Ethnicity/Clan [D8]
7. Religion [D9]
8. Occupation [D11]
9. Sources Of Household Income [D12]
10. Material Style Of Life/Household Economic Status [D13]
11. Perceived Threats To Coastal And Marine Resources [T3]
12. Awareness Or Rules And Regulations [M11]
13. Management Successes And Failures [M14]
14. Management Credibility [M15]
15. Perceived Resource Condition [T2]
16. Attitudes Towards Coastal And Marine Resources [C11]
17. Enforcement [M12]
18. Compliance [M13]
19. Benefits Of Management [M17]

#### Key informant indicators

1. Coastal And Marine Activities [C1]
2. Gender Roles And Responsibilities In Coastal And Marine Activities [C9]
3. Market Of Coastal And Marine Goods And Services [C8]
4. Knowledge Of Coastal And Marine Resources [C10]
5. Coastal And Marine Goods And Services [C2]

## Data collecting methods

Following the development of the assessment plan, indicators list, and survey instruments, surveys were conducted within randomly-selected households in the village. Workshop participants were divided into four (4) data collection groups of six (6) each with a facilitator/trainer. These groups were further divided into pairs of working teams within each group. It was originally proposed that all households were to be sampled; however, because of time limitations, the team decided to choose a smaller sample size of 47 of 100 households. While not statistically representative of the entire population, the results may still provide a useful understanding of the local population<sup>2</sup>.

Key informant interviews of knowledgeable fishermen and older resource owners were also conducted during this time. In sum, a total of 10 key informants were interviewed.

**Photo 2. Participants Presenting Analysis of Results of Socio-economic Assessment of Ruango Village**



## 4. Results

Findings for the selected indicators from household survey and key informant interviews are provided below.

### Household Survey Results

#### 1) Population Size, Number of Households, and Household Size [D1]

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<sup>2</sup> This number is above the sample size of 25 for a population of 100, as recommended by Bunce, L. and Pomeroy, R. 2003. Socio-economic Monitoring Guidelines for Coastal Managers in Southeast Asia, p 10.

Within Ruango Village, 47 of about total 100 households in were surveyed. Within this sample, the assessment counted a total of 244 adults and children living within these households, producing an average of roughly 5 people per household in the area. For overall population size, national census information for the area was not available and an estimate of total population in the area was not attempted based on this information, due to the non-statically representative sampling employed.

## 2) Age [D4]

The age groups presented in Table 1 were used to characterize the age of the Ruango community. Analysis of the data indicates that majority of respondents (27%) are in 26-49 age groups.

**Table 2. Distribution of Age Categories within the Ruango Community.**

| Age Groups | Count | %    |
|------------|-------|------|
| 0-5        | 41    | 16.8 |
| 6-10       | 31    | 12.7 |
| 11-15      | 25    | 10.2 |
| 16-20      | 33    | 13.5 |
| 21-25      | 24    | 9.8  |
| 26-49      | 65    | 26.6 |
| over 50    | 19    | 7.8  |
| Don't know | 6     | 2.5  |

## 3) Marital Status [D5]

The distribution of marital status within the population is shown in Table 2. The majority (63%) of Ruango residents are single and 31% are married.

**Table 3. Marital Status of Population of Ruango Community**

| Marital status | % responses |
|----------------|-------------|
| Married        | 31.2        |
| Single         | 62.5        |
| Divorced       | 0           |
| Widowed        | 6.3         |

## 4) Sex [D6]

From analysis of the population data, 48% of the residents were females; 52% of the respondents were males (Table 3).

**Table 4. Gender**

| Gender | %     |
|--------|-------|
| Male   | 52.46 |
| Female | 47.54 |

## 5) Education and Literacy [D7]

Additional it was found that, of the 210 of Ruango residents old enough to attend school, approximately 52% have completed at least 6 years of education and 12% have 11 or more years (Table 4). Eighteen percent of the population had completed 1 to 5 years of education, while 17% indicated that they had received no formal education.

**Table 5. Formal Education**

| Years of Education | %     |
|--------------------|-------|
| 1-5 years          | 18.10 |
| 6-10 years         | 52.38 |
| 11+ years          | 11.90 |
| No Education       | 17.62 |

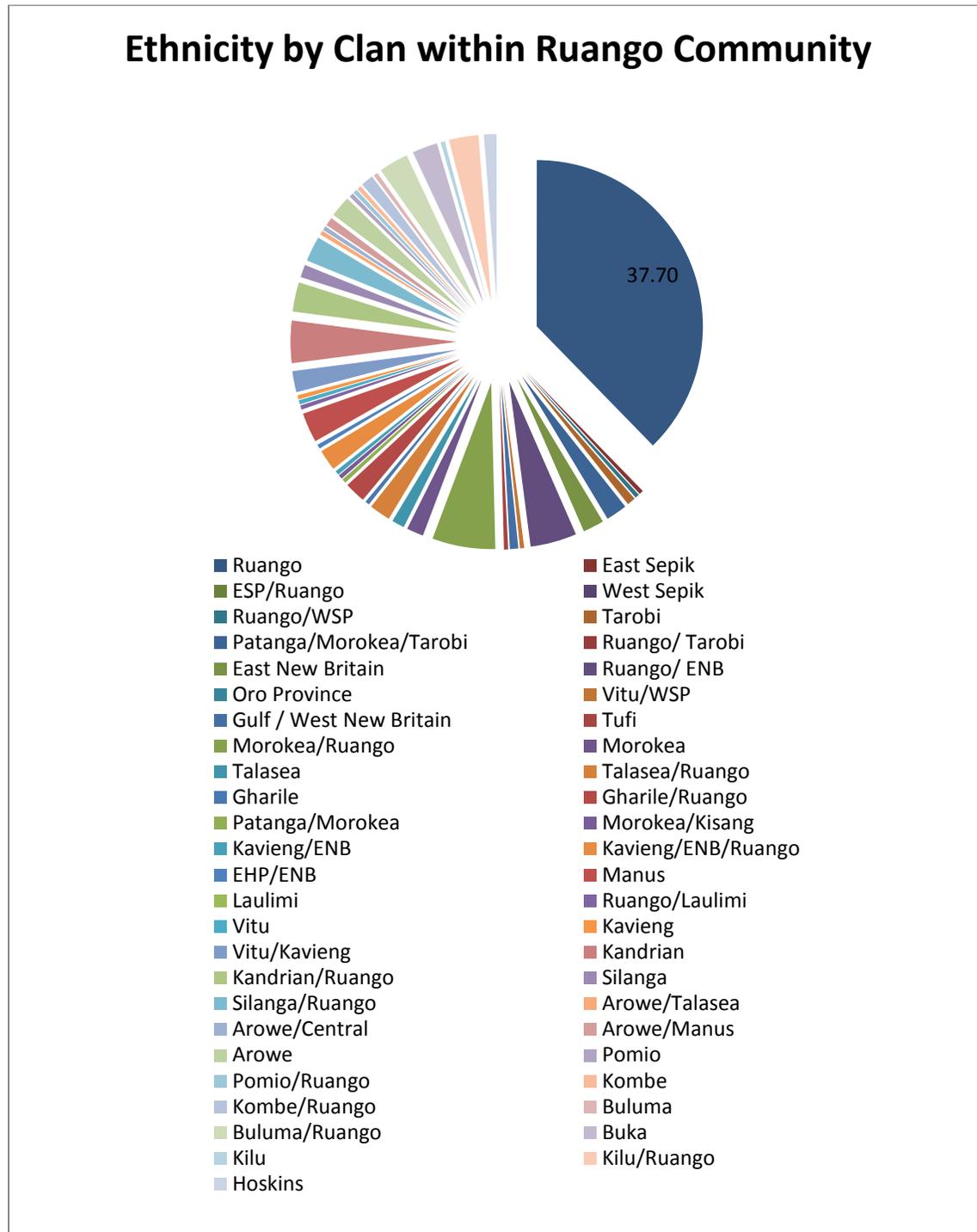
### 6) Ethnicity / Clan [D8]

Broadly, ethnicity within the survey population was uniform – comprised of 100% Melanesian Pacific Islanders indigenous to New Guinea. To further classify individuals the assessment team collected information based on provincial categories closely related to cultural groups and geographic land boundaries<sup>3</sup>. Taking into account these additional classifications, the Ruango population comprised of 49 different ethnic groupings, with the majority (38% of the total respondents) being solely from Ruango, who are the local people from the area (Figure 1). Other major ethnicity/cultural groups recorded included those from Moroakea/Ruango (6%), Ruango/ ENB (5%), Kandrian (4%), Manus (3%), Kilu/Ruango (3%), and Buka (2%).

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<sup>3</sup> Note: Individuals from Ruango were classified as a single category and Non-Ruango people were groups respectively as different specific categories. Different combination of ethnic groups were also considered as different categories.

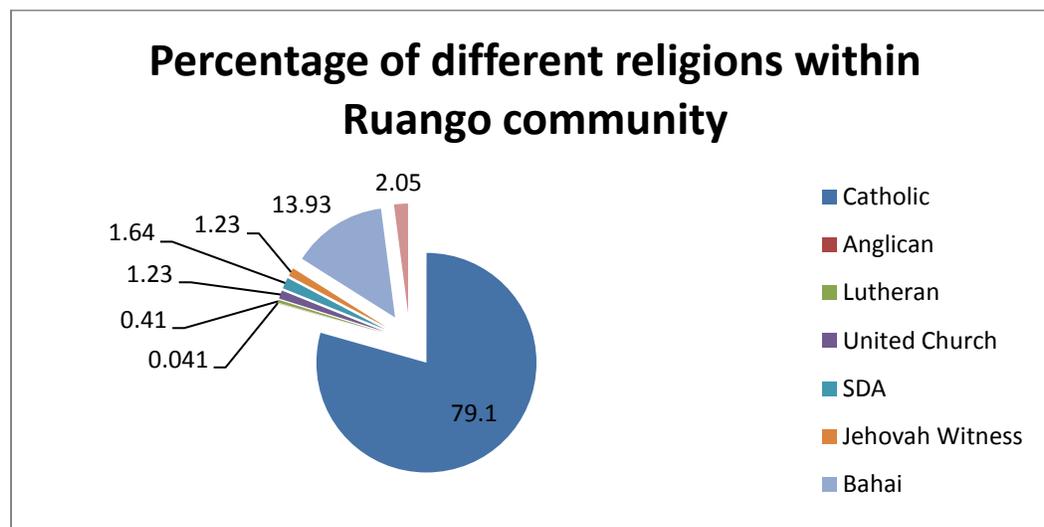
Figure 1. Ethnicity by Clan Groups in Ruango Community



## 7) Religion [D9]

The majority of the respondents of Ruango belonged to the Catholic faith (79%), followed by Bahai (14%) and then others (Figure 2).

Figure 2. Percentage of Different Religions in Ruango Community



## 8) Occupation [D11]

Table 5 shows that at least 30% of the community identify themselves as students, followed by farmers (18%), housewives (13%), and individuals with regular employment (12%). Those unemployed within the population were identified at 11%. This and other demographic information can be used to more effectively target communication awareness programs within the community.

Table 6. Occupations within the Community

| Occupation in the community | % of household members |
|-----------------------------|------------------------|
| Formal Employment           | 11.89                  |
| Subsistence Farmer          | 17.62                  |
| Housewife                   | 12.7                   |
| Unemployed                  | 11.07                  |
| Student                     | 30.33                  |
| Missionary                  | 1.23                   |
| Not applicable / Not of Age | 15.16                  |

## 9) Sources of Household Income [D12]

Primary and secondary sources of income for the Ruango village community are displayed in Table 6 below. The major primary source of cash income for the community is selling cocoa and marketing of other garden crops (both at roughly 20% of responses). Marketing other garden crops was the highest response of secondary income sources at 31%, followed by Cocoa at

19%. These results indicate that there is more reliance on the land resources for both primary and secondary income sources, as compared to selling caught fish at the fish market, which is 12% of primary source of income responses and 8% of secondary source of income responses.

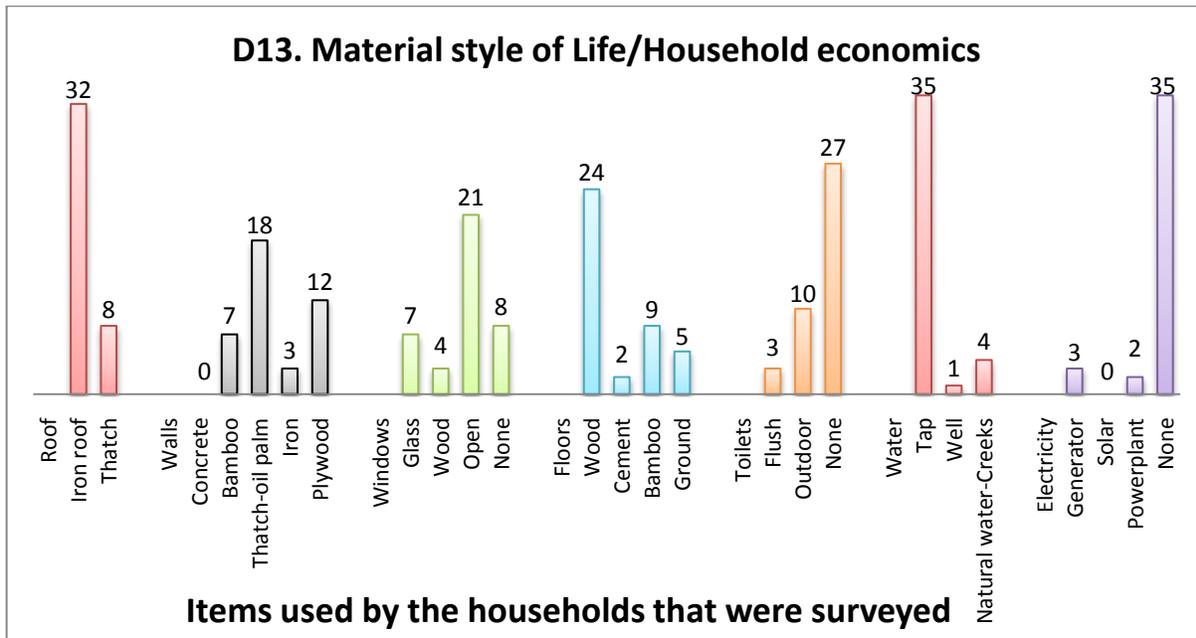
**Table 7. Primary and Secondary Sources of Income**

| Category                     | A<br>(Primary<br>source) | %<br>responses | B<br>(Secondary<br>source) | % responses |
|------------------------------|--------------------------|----------------|----------------------------|-------------|
| Cocoa                        | 10                       | 20.4           | 9                          | 18.8        |
| Market (other vegie crops)   | 10                       | 20.4           | 15                         | 31.3        |
| Formal Employment            | 8                        | 16.3           | 4                          | 8.3         |
| Oilpalm work                 | 7                        | 14.3           | 2                          | 4.2         |
| Selling Catch at Fish market | 6                        | 12.2           | 4                          | 8.3         |
| Garden food                  | 3                        | 6.1            | 3                          | 6.3         |
| Copra                        | 2                        | 4.1            | 4                          | 8.3         |
| Small Business               | 1                        | 2.0            | 2                          | 4.2         |
| Coconut/Kulau Market         | 1                        | 2.0            | 2                          | 4.2         |
| Other/Misc.                  | 1                        | 2.0            | 2                          | 4.2         |
| House market                 | 0                        | 0.0            | 1                          | 2.1         |

#### 10) Material Style of Life/Household Economic Status [D13]

For the indicator of Material Style of Life and Household Economic Status, observations of characteristics of homes were made during 40 of the 47 household interviews. An accounting of these observations is presented below in Figure 3. The observations indicate that majority of the houses in Ruango are semi-permanent and have iron roofing, oil palm thatch walls, and wood for floors. Most houses do not have sanitation facilities, either flush toilets or outhouses; however, there is access to running tap water from the urban water supply. A large majority of the houses have no electricity. Additional observations of households during interviews indicate that many the community members do not generally own expensive items, such as automobiles or home appliances.

Figure 3. Material Style of Life/Household Economics in Ruango



### 11) Perceived Threats to Coastal and Marine Resources [T3]

Table 7 shows the assessment results for the indicator of perceived threats to coastal and marine resources. Respondents were asked to list three of the major threats to coastal and marine resources. The most frequently mentioned were: Poison Rope (with 18%), Littering (11%), and Oil spills (8%) and Destructive Fishing Methods (8%), followed by the Construction of Seawalls (7%) and Plantation Runoff (7%). However, it is noted that in the categorization of different threats, many potentially similar threats (e.g. overharvesting, and misuse of marine resources) were listed separately (shown in Table 8), and therefore this may have split votes among common topics.

Table 8. Ranked Perceived Threats to Coastal and Marine Resources

| Perceived Threats To Coastal and Marine Resources | % noted this problem |
|---|----------------------|
| 1. Poison rope                                    | 18%                  |
| 2. Littering                                      | 11%                  |
| 3. Oil spills                                     | 8%                   |
| 4. Destructive fishing methods                    | 8%                   |
| 5. Seawall construction                           | 7%                   |
| 6. Plantation Runoff                              | 7%                   |
| 7. Other  | 42%                  |

**Table 9. Perceived Threats to Coastal and Marine Resources (Full List)**

| <b>T3. Perceived Threats To Coastal and Marine Resources</b> | <b># noted</b> |
|--|----------------|
| Poison rope  | 26             |
| Littering  | 16             |
| Oil spills   | 12             |
| Destructive fishing methods                                  | 12             |
| Seawall construction   | 10             |
| Plantation runoff  | 10             |
| Shipping Pollution   | 9              |
| Dynamite   | 6              |
| Factory  | 6              |
| Logging  | 5              |
| Undersize nets   | 5              |
| Decrease in number of invertebrates                          | 4              |
| Human Disposal   | 3              |
| Chemicals  | 3              |
| Population Increase  | 3              |
| Overharvesting   | 3              |
| Misuse of marine resources                                   | 3              |
| Sewerage   | 2              |
| Poaching   | 2              |
| Resettlement   | 2              |
| Coral breaking   | 2              |
| Forest   | 1              |
| Shoreline erosion  | 1              |
| Anchorage  | 1              |
| Selling of land  | 1              |

Table 9 shows the level of perceived impact (high, medium, and low) for five of the top threats identified above. High level of perceived negative impacts were indicated for: Poison Rope, Littering, Oil spills and Seawall Construction. The use of destructive fishing methods was generally perceived to be of medium impact.

**Table 10. Perceived Level of Impact for 5 Threats to Coastal and Marine Resources**

| <b>Perceived Threats To Coastal and Marine Resources</b> | <b>Level of impact (% of responses)</b> |               |            |
|--|---|---------------|------------|
|  | <b>High</b>                             | <b>Medium</b> | <b>Low</b> |
| 1. Poison rope   | 92%                                     | 4%            | 4%         |
| 2. Littering   | 58%                                     | 25%           | 17%        |
| 3. Oil spills  | 92%                                     | 8%            | 0%         |
| 4. Destructive fishing methods                           | 22%                                     | 56%           | 22%        |
| 5. Seawall construction                                  | 67%                                     | 33%           | 0%         |

## 12) [Awareness on Rules and Regulations \[M11\]](#)

Table 10 shows the perception of the existence of rules for various coastal and marine activities common to the area. In each case, a majority of respondents noted that management rules did not exist for each of the mentioned coastal and marine activity, when in fact rules for these activities in some form do exist. Affirmative responses that supported the existence of rules were most associated with general fishing (43%) and beche-de-mer harvesting (34%). Understanding the community's level of understanding of rules and regulations is important for developing awareness programs. Education is the foundation for compliance; therefore, it is important for managers to identify which rules and regulations are unfamiliar to the community so that the awareness program can target these.

**Table 11. Percentage of responses of rules and regulations**

| <b>Do Rules Exist?</b>  | <b>"Yes"</b>   | <b>"No"</b>    | <b>Don't Know</b> |
|-------------------------|----------------|----------------|-------------------|
| <b>Activities</b>       | <b>% Noted</b> | <b>% Noted</b> | <b>% Noted</b>    |
| Fishing                 | 42.6           | 57.4           | 0                 |
| Mangrove Harvest        | 21.3           | 78.7           | 0                 |
| Residential Development | 25.5           | 70.2           | 4.3               |
| Beche-de-mer            | 34.0           | 55.3           | 10.6              |
| Trochus                 | 17.0           | 72.3           | 10.6              |
| Tourism                 | 17.0           | 83.0           | 0                 |

## 13) [Management Successes and Failures \[M14\]](#)

Results shown in Table 11 below represent a summary of responses to questions regarding management successes and failures. For this indicator, households were asked to respond to the question, "What two things do you think have(/have not) worked well for coastal management in the community." In their review, data collection teams noted some of the most frequent responses. However because of the diversity of responses, arranging responses into categories and quantitatively analyzing the results was not conducted.

**Table 12. Management Successes and Failures**

| (+)  | (-)  |
|--|--|
| <b>Things that have been positive or that have worked well in regards to management:</b> | <b>Things that have been negative or not worked so well in regards to management :</b> |
| <b>Most frequent responses:</b>  |  |
| Increase in fish stock, shells and other marine resources                                | Poaching by outsiders  |
| Future generations will have marine resources  | Lack of awareness  |
|  | Lack of Cooperation/Participation by LMMAC   |
| <b>Other Responses:</b>  |  |
| Fish come near the shoreline   | Low level of compliance, People not abiding by laws, low law enforcement               |
| Awareness has increased  | <i>Tambu</i> wasn't long enough  |
| Threats have been reduced such as the use of Poison Rope and poaching                    | Not big area of mangroves  |
| Enforcing penalties and fines  | Using of poison rope   |
| Community support  | Coastal littering  |
| Cooperation by LMMAC   | Lack of community support  |
| Coastal Clean-up   | "Don't care attitude"; Disrespect  |
| Respect for 2 areas set aside  | No proper resources to maintain <i>tambu</i> areas                                     |
| Initiative of the existing committee   | Manpower   |
| Recovery of degraded systems and resources   | Decreasing in the number of fish and other marine resources                            |
| More Materials can be obtained   | Unhealthy marine environment   |
| Healthy Marine environment   |  |

#### 14) Management Credibility [M15]

Regarding the topic of "Management Credibility", the assessment team evaluated this indicator slightly different from the SEM-Pasifika guide. Instead of focusing on the credibility of one organization responsible for management of an area, we asked the question: "What is the credibility and legitimacy of the many local institutions possibly involved with coastal and marine management issues in the area?" Table 12 below shows a ranking of those institutions noted with the highest credibility. These are: (1) Village court officials, (2) Ward Councilor, and (3) the Liklik Kristian Komuniti (LKK) President. The more creditable the arrangements are to the stakeholders, it is believed the better chances there are for sustainability of the management program and compliance with management measures. It is suggested that supporting organizations and partners should work through and with these management bodies with high credibility when engaging with the community in any projects or programs to increase the likelihood of program success.

**Table 13. Management Credibility**

| Different management groups / governing bodies | Credibility Rating Index |
|--|--------------------------|
| 1. Village court officials                     | 25.53                    |
| 2. Ward Councilor                              | 21.28                    |
| 3. LLK President                               | 14.89                    |
| 4. Church leaders                              | 14.89                    |
| 5. Ward Development committee                  | 10.64                    |
| 6. Village elders                              | 6.38                     |
| 7. ILG   | 6.38                     |
| 8. Village Committee                           | 4.26                     |
| 9. School Board                                | 4.26                     |
| 10. Women's group                              | 2.13                     |
| 11. Youths                                     | 2.13                     |
| 12. LMMA Committee                             | 2.13                     |
| 13. Community Leader                           | 2.13                     |

15) Perceived Resource Condition [T2]

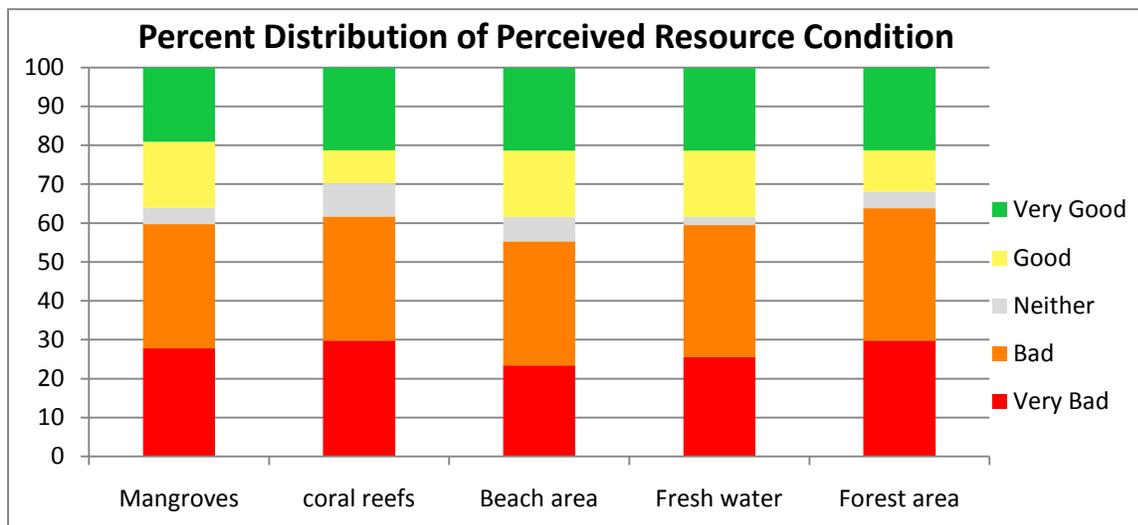
Table 13 describes the household responses of perception regarding questions of the condition of nearby coastal resources.

**Table 14. Perceived Resource Condition**

| Resource    | % of Responses for Perceived Conditions |       |         |       |           |
|-------------|---|-------|---------|-------|-----------|
|             | Very bad                                | Bad   | Neither | Good  | Very Good |
| Mangroves   | 27.8%                                   | 31.9% | 4.2%    | 17%   | 19.1%     |
| Coral Reefs | 29.8%                                   | 31.9% | 8.5%    | 8.5%  | 21.3%     |
| Beach Area  | 23.4%                                   | 31.9% | 6.3%    | 17%   | 21.3%     |
| Fresh Water | 25.5%                                   | 34%   | 2.1%    | 17%   | 21.3%     |
| Forest Area | 29.8%                                   | 34%   | 4.3%    | 10.6% | 21.3%     |

Another way to represent these results is presented in Figure 4 below, which shows the percent distribution of perception in a bar graph.

**Figure 4. Percent**



Responses to questions of resource condition tended to be more negative (“bad” or “very bad”) than positive (“good” or “very good”). Responses for the combined categories of “bad” and “vary bad” made up between 54% (for beach areas) and 64% (for forest areas) of overall household responses. The resource condition “bad” was the most noted in all categories.

### 16) Attitudes towards Coastal and Marine Resources [C11]

Respondents were also asked to either agree or disagree with certain statements in attempt to better understand general attitudes towards coastal and marine resources. In this series of questions, statements (a), (c), (d), and (e) in Table 14 below are statements that, if agreed to, indicate positive attitudes towards coastal and marine resources. Statements (b) and (f) are statements that if agreed to indicate negative attitudes towards the same.

The results show that most respondents agree with positive statements of values or attitudes towards the marine environment. The only statement with a mixed response was that related to the establishment of a *tambu* area, or seasonal protected area nearby the village, with 53.2% in support of voting in favor of a *tambu* area, and 42.6% showing support for voting against the nearby creation of a *tambu* area. This response has encouraged the team to attempt to identify other approaches to marine management with the community and to work more on education and awareness activities that focus on communicating the benefits and limitations of on seasonal closures as traditionally practiced in the area and other variations of marine protected areas.

**Table 15. Attitudes towards Coastal and Marine Resources**

| Statements  | Agree (%) | Disagree (%) | Don't Know (%) |
|---|-----------|--------------|----------------|
| a. It is an important part of our culture to have a healthy marine environment      | 97.9      | 0            | 2.1            |
| b. It doesn't matter what happens to our marine environment                         | 17        | 78.7         | 4.3            |
| c. I enjoy going out on a boat and watch fish swim around the coral reef            | 97.9      | 0            | 2.1            |
| d. My family's health and well-being is linked to the health of our marine habitats | 95.7      | 4.3          | 0              |
| e. It is important that all community members look after their reefs                | 100       | 0            | 0              |
| f. I would not vote for a <i>tambu</i> area near my village                         | 42.6      | 53.2         | 4.3            |

### 17) Enforcement [M12]

Table 15 indicates responses related to the issue of enforcement of existing management rules and regulations. Results show difficulties with enforcement in the area, with responses tending towards low (27.7%) and no enforcement (53.2%) of national and local management rules and regulations.

**Table 16. Enforcement Responses**

|                              | % responses    |                 |                      |                  |                  |
|------------------------------|----------------|-----------------|----------------------|------------------|------------------|
|                              | No enforcement | Low Enforcement | Moderate enforcement | High enforcement | Full enforcement |
| <b>Number of respondents</b> | 25             | 13              | 4                    | 3                | 2                |
| <b>% of respondents</b>      | 53.2           | 27.7            | 8.5                  | 6.4              | 4.3              |

**18) Compliance [M13]**

Compliance of management rules was perceived as nil (42.6%), followed by low (27.7) as the next most frequent response (Table 12).

**Table 17. Compliance Responses**

|                              | % responses   |                |                     |                 |                      |
|------------------------------|---------------|----------------|---------------------|-----------------|----------------------|
|                              | No Compliance | Low compliance | Moderate compliance | Good Compliance | Excellent compliance |
| <b>Number of respondents</b> | 20            | 13             | 8                   | 1               | 5                    |
| <b>% of respondents</b>      | 42.6          | 27.7           | 17.0                | 2.1             | 10.6                 |

These important, but perhaps not that surprising, results will help the community and supporting partners focus on the development of improved compliance and enforcement strategies.

**19) Benefits of Management [M17]**

Household members were asked to respond to statements related to the benefits of management activities within coastal and marine environments. Table 17 shows the results for statements related to material or cash benefits and another statement related to non-material benefits possibly resulting from management activities in coastal regions. Most respondents responded favorably to both questions. The combined responses of “Agree” and “Strongly Agree” were noted in 83% of responses with the statement related to material benefits (statement a), and 89% for the statement related to non-material benefits (statement b).

**Table 18. Responses Related to Benefits of Management of an Area**

| <b>Statement</b>   | <b>Strongly agree (%)</b> | <b>Disagree (%)</b> | <b>Neither (%)</b> | <b>Agree (%)</b> | <b>Strongly agree (%)</b> |
|--|---------------------------|---------------------|--------------------|------------------|---------------------------|
| a.) I will gain material benefits (e.g., fish, cash, etc.) if I have a management area (LMMA) established in your community                        | 10.6                      | 0                   | 6.4                | 42.6             | 40.4                      |
| b.) My household will get non-material benefits (e.g., good health, capacity development, social collaboration) from coastal management activities | 6.4                       | 0                   | 4.3                | 51.1             | 38.3                      |

## Key Informant Information

### 1) Coastal and Marine Activities [C1]

The Table 18 lists the marine and coastal activities commonly mentioned for the Ruango area. In addition, the table indicates the noted response when key informants were asked to differentiate the general purpose of these activities between for home consumption or for sale. The findings indicate that there is generally a greater reliance on resources for local consumption for sustenance than for selling resources for income within the community.

**Table 19. Common Coastal and Marine Activities and Relation to Personal Use/Consumption and Income or Sale**

| Marine and Coastal Activities   |                   |                            |
|---|-------------------|----------------------------|
|   | % own consumption | % sale (income generating) |
| Fishing (e.g., Mackerel, silverfish, tuna, red emperor, reef fish)  | 50                | 50                         |
| Collecting shells, invertebrates, and other marine species (e.g., Shells, Octopus, Turtle, Shell Money, Clamshell, Crayfish, Sting ray) | 60                | 40                         |
| Collecting Beche-de-mer   | 80                | 20                         |
| Collection of Salt for Cooking  | 100               | 0                          |
| Transport   | 100               | 0                          |
| Recreation  | 100               | 0                          |

The importance of these results is that it identifies the priority species of fish, invertebrates, and other species that community members rely on for both subsistence and cash purposes. Beche-de-mer was separated from other invertebrates because of its particular market.

### 2) Gender Roles and Responsibilities in Coastal and Marine Activities [C9]

Gender roles and responsibilities were considered to assess the division of coastal and marine activities and responsibilities in the area according to sex. Understanding the division of activities and responsibilities according to sex groups would help managers better understand resource users, particularly their traditional and local roles and related social changes. This information can help managers and decision makers to address the specific needs of men and women and how management strategies or proposed rules may affect members of the community differently.

The team attempted to collect information on gender roles within the community, but no conclusions could be drawn from the data presented.

### 3) Market of Coastal and Marine Goods and Services [C8]

Market of goods and services is the identification of the market and location in which each coastal and marine product produced from the site is primarily sold, such as local, regional, national and/or

international markets. Table 20 lists the location of key markets for goods provided by key informant interviews.

**Table 20. Primary Markets and Market Location**

| Market       | Location of markets     |
|--------------|-------------------------|
| Fish         | Local community         |
|              | Urban centre-Kimbe      |
|              | Roadside-Local          |
| Beche-de-mer | Local fish buyer        |
|              | PNG Corp-National buyer |

The orientation of the market of coastal and marine goods and services is useful for determining the overall impacts of management on communities in the site, particularly livelihood, marketing, production and food security. For example, since the livelihood and income of people in the study area is linked to markets, it is useful to determine where goods and services produced in the area are sold. In this analysis we can see that most goods are marketed and consumed locally, with the one exception being beche-de-mer (sea cucumber), which is both consumed and sold locally, yet is also destined to national distributors and market destinations in Asia.

#### 4) Knowledge of Coastal and Marine Resources [C10]

Within the SEM-Pasifika guide, environmental knowledge refers to local understanding of the facts and issues related to local marine and coastal environment. It is a knowledge that is comes from stakeholder experience, observation, beliefs, and perception of cause and effect. Higher levels of environmental knowledge can lead to collaboration of stakeholders which, in turn, allows for management success as people are more likely to understand how the natural ecosystem works and how to protect and manage the environment. On the contrary, low level of environmental knowledge may lead managers to develop educational materials and outreach activities to create environmental awareness or correct misconception.

Table 20 presents information on a series of questions that were intended to indicate the general level of Knowledge of Coastal and Marine Resources of conditions and issues around Ruango. The correct answer to statements 1, 2, 4 should be “true”, while seemingly correct answers to the remainder statements (3, 5, 6, and 7) are “false”.

**Table 21. Knowledge of Coastal and Marine Resources**

| <b>True or False Statements:</b>  | <b>% true</b> | <b>% false</b> |
|---|---------------|----------------|
| 1. Coral is a living animal   | 100           | 0              |
| 2. Seagrass beds provide habitat for baby fish  | 100           | 0              |
| 3. Fishing poison does not affect the coral reef  | 20            | 80             |
| 4. Mangrove trees protect our community from storms and big waves                       | 100           | 0              |
| 5. Coral bleaching is a sign of healthy reefs   | 20            | 80             |
| 6. Runoffs from oil palm does not affect the marine resources                           | 20            | 80             |
| 7. Disposal of plastic bags and other garbage in the sea do not harm the marine animals | 20            | 80             |
| 8. There are some changes taking place in the marine environment                        | 100           | 0              |

From the results indicated in the table, it is reasonable to assume that the 10 key informants have a generally good understanding of ecological systems and key environmental issues in the area.

### 5) Coastal and Marine Goods and Services [C2]

For each of the general coastal and marine activities of the area identified above, Table 19 presents some of the key goods and services that the marine environment provides and where these goods and services are generally located. Knowledge of the uses and location of these areas and resources are important for present management and future planning purposes. Therefore, if management of a particular area or resource was an option for consideration by the community, these geographic areas may be ones in particular to focus more attention on.

**Table 22. Location of Marine Goods and Services**

| <b>Marine and Coastal activities</b> | <b>Coastal and marine goods and services</b> | <b>Location of coastal and marine activities</b> |
|--------------------------------------|--|--|
| Fishing                              | Mackerel                                     | Deep Sea   |
|                                      | Silverfish                                   | Deep Sea   |
|                                      | Tuna   | Deep Sea   |
|                                      | Red emperor                                  | Inshore and offshore reef                        |
|                                      | Reef fish                                    | Inshore and offshore reef                        |
| Collecting shells/invertebrates      | Clamshell                                    | Seagrass   |
|                                      | Beche-de-mer                                 | Beach  |
|                                      | Octopus                                      | Inshore and offshore reef                        |
|                                      | Shell Money                                  | Beach  |
|                                      | Turtle                                       | Inshore and offshore reef                        |
| Other marine resources               | Sting ray                                    | Inshore and offshore reef                        |
| Transport                            | Transportation                               | Road, paths, beach and by boat                   |
| Recreation                           | Enjoyment                                    | Beach and inshore waters                         |

## **5. Conclusion and Recommendations**

### **Conclusion:**

The findings appear to indicate that respondents have good knowledge of the marine and coastal resources surrounding the community and their importance. Informants noted that, while marine resources were an important component of resident livelihood, a greater proportion of

livelihood generation originated from terrestrial sources and activities than marine. Regarding livelihood generated from the marine environment, responses indicate that in general there is an equal reliance on fish and other marine resources for sustenance and cash income purposes. Respondents appear to understand that the marine resources and ecosystems that support them are facing numerous threats as well, many of which have high impacts. The results suggest that the community perceives that new or increased management of the marine area has the chance to bring about positive impacts on their livelihoods, and this is important for them. Respondents believe that having increased management activities within the area will 1) help to provide an increase in marine resource stocks, and 2) increase positive attitudes of the community towards management of the area in general.

Some form of marine management structure was in place; however, respondents viewed it as not very effective, especially view from the perspective of compliance and enforcement both of which were seen as very low. Some of the reasons for this ineffectiveness were suggested as originating from: 1) a general lack of awareness in the marine systems and issues of all those involved (2) a lack of co-operation and participation by area's management committee, 3) a "don't care" attitude held by a majority of the population, and 4) lack of community support. There is also an indication in the responses that suggestion that people are not fully aware of the rules or regulations on many marine activities, such as harvesting of beche-de-mer and trochus and the use of mangroves.

It is indicative from the results that the community is aware and knowledgeable about local threats in the area and their impacts it as on the marine environment. The findings suggest that the community is concerned about these threats and is in need of learning how to these threats and their impacts can be mitigated or controlled.

### **Recommendations:**

Based on the above findings, the following recommendations from the assessment team are suggested:

(1) An Education and Awareness Program should be developed that would be targeted to focus the following:

- To enable people to be more aware of their natural surroundings and appreciate its existence for the services it provides. Thus, the suggestion is to provide information on basic marine ecology and biology, and some of the findings from this socio-economic assessment on the use and reliance on natural resources and potential threats to those resources. This may help to address the "no-care" attitude within the community and stakeholder groups since it is hoped that the information, if shared in an appropriate and accessible manner, will influence the way people think, feel, and act. As the impact of threats to the marine environment are known by scientists and conservationists, and are also perceived by local community members, threats such as destructive fishing and

land-based activities appear to be the key issues to share information on, as well as ways management strategies or approaches that may reduce or mitigate the threats.

- As the findings (although not claiming to be statistically representative) indicate that 43% of the interviewed households would not vote for a tambu nearby, while 53% are in general support of the idea, it would be strategic to share of information about the benefits and principles of increased marine management and management tools so that leaders and community are well-informed to make appropriate decisions.
- As the results indicate that there is little to no knowledge of some regulations and rules governing marine and coastal activities. This finding should be shared with the management committee, government agencies, and local NGOs so that information on this topic can be communicated to community members and stakeholder groups as well. Then relevant agencies would be better able to enforce the laws that regulate fisheries and the general environment with greater effectiveness.

- (2) The proposed Education and Awareness Program should be appropriate for the education level and culture of the target audience within the community. The average age is 34 years and at least 50% of the population has completed 6 years of education or an equivalent of grade 8. The language and content of materials used, therefore, should be designed so that it is understood by the majority of the target audience, in order to effectively communicate and influence people's attitude towards the marine and coastal environment.
- (3) Awareness programs should also be designed to target the different audience groups such as religious groups as well as different genders, as appropriate. The assessment findings indicate that the community is made up of, and sometime segregated by, specific groups, such as the clan and religious groups that exist there. Different groups also sometimes use and/or affect different resources. An awareness program that is designed should target and appeal to the various groups so that everybody is adequately informed, through all divisions.
- (4) Working through the right authority, the community can and should request assistance from organizations that can help mitigate threats and work with them towards some form of improved management structure, strategy and/or actions. The assessment findings indicate that there are existing governing bodies in place with a degree of authority and legitimacy to plan and undertake management actions, as well as enforcement management rules and decisions. It was learned during the assessment that previous requests to set up locally managed marine areas originated from some community leaders, but never gained the full community support and respect to move forward with and fully implement the idea. Requests for assistance through supporting partners can work within the appropriate channels of authority to assist in areas, such as community organizing and participatory planning, to help management programs become more successful.
- (5) Upon request, appropriate alternative management tools and/or approaches should be discussed with community members and leaders. As the responses indicate that there is roughly equal support for and against the establishment of a *tambu* area nearby the community, perhaps there are other approaches that are more appropriate to meet the

community's management goals that are supported by a greater percentage of the population. Alternatively, further discussion and education with community members about the function of a *tambu* area, locally managed marine area, or other type of protected area may increase the awareness and support for these approaches.

**Photo 3. Participants Receiving Certificates at the Conclusion of the Ruango SEM-Pasifika Training and Assessment Workshop**



**APPENDIX**

**SEM-PASIFKA**

**Key Informant Survey Form**

**RUANGO, KIMBE BAY, PNG**

Location:

Specific Location:

Date of interview:

Name of Interviewee:

Name of Interviewer:

Name of recorder:

*Please introduce yourselves before the survey*

**C1.** Yu save usim solwara long wanem kain rot? Givim tupela tasol.

**C2.** Wanem ol samting (goods and services) yupela kisim long marine resources blong yupel.

**C3.** Wanem methods and means of services ikamap long ol marine resources blong yupela.

| C1. Marine and coastal Activities | C2. Coastal and marine goods and services | C3. Harvesting methods and means of services |
|-----------------------------------|---|--|
| 1. Fishing                        |   |  |
|                                   |   |  |
|                                   |   |  |
| 2. Tourism                        |   |  |

|         |  |  |
|---------|--|--|
|         |  |  |
| 3. etc. |  |  |

### C5. Dependence on Coastal and Marine Goods and Services

| C1. Marine and coastal Activities | C2. Coastal and marine goods and services | C5. Proportion of Dependency |                            |
|-----------------------------------|---|------------------------------|----------------------------|
|                                   |   | % Own consumption            | % Sale (Income generation) |
| 1. Fishing                        |   |                              |                            |
|                                   |   |                              |                            |
| 2. Tourism                        |   |                              |                            |
| 3. Aquaculture                    |   |                              |                            |
| 4. Etc.                           |   |                              |                            |

### C6. Types and level of Use by Outsiders

| C1. Marine and coastal Activities | C2. Coastal and marine goods and services | C6. Types of Use by Outsiders | C6. Level of use by Outsiders |
|-----------------------------------|---|-------------------------------|-------------------------------|
| 1. Fishing                        | Grouper                                   |                               |                               |
|                                   | Octopus                                   |                               |                               |
| 2. Tourism                        | Hotel development                         |                               |                               |
|                                   | Recreational fishing                      |                               |                               |
| 3. Aquaculture                    | Prawns                                    |                               |                               |

### C7. Monetary Value of goods and services

| C1. Marine and coastal Activities | C2. Coastal and marine goods and services | C7. Monetary Value |
|-----------------------------------|---|--------------------|
| 1. Fishing                        |   |                    |
|                                   |   |                    |
| 2. Tourism                        |   |                    |
|                                   |   |                    |
| 3. Aquaculture                    |   |                    |

### C8. Market of Coastal and Marine Goods and Services

|   | C8. Monetary Value |            |         |
|---|--------------------|------------|---------|
| C2. Coastal and marine goods and services | % international    | % national | % local |
| Grouper                                   |                    |            |         |
| Octopus                                   |                    |            |         |
| Hotel development                         |                    |            |         |
| Recreational fishing                      |                    |            |         |
| Diving                                    |                    |            |         |
| Prawns                                    |                    |            |         |

### C9. Gender Roles and Responsibilities in Coastal and Marine Activities

|                                   | C9. Gender Roles and responsibilities                       |     |  |
|-----------------------------------|---|-----|--|
| C1. Marine and coastal activities | Sex and age group (specify children, adult or older people) |     | Explanation (why are activities carried out by only males or females?) |
| <u>Extractive</u>                 | Women   | Men |  |
| Fisheries                         |   |     |  |
| Hook and line                     |   |     |  |
| Trap                              |   |     |  |
| Collection at low tide            |   |     |  |
| <u>Non-extractive</u>             |   |     |  |
| Tourism                           |   |     |  |
| Hotel                             |   |     |  |
| Taxi                              |   |     |  |
| Fish trading                      |   |     |  |

## ST2: Stakeholder Participation in Management

| Coastal Activities      | Stakeholder Participation (Yes/No) | In what way |
|-------------------------|------------------------------------|-------------|
| Fishing                 |                                    |             |
|                         |                                    |             |
| Tourism                 |                                    |             |
|                         |                                    |             |
| Coral Harvesting        |                                    |             |
|                         |                                    |             |
| Mangrove Harvesting     |                                    |             |
|                         |                                    |             |
| Residential Development |                                    |             |
|                         |                                    |             |



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D12: Sources of Household Income

Wanem rot famili bilong yu save kisim moni long em? Long ol dispela wanem tupela I important? (If they provide a list, then get the two most priority). Put A on the most important and B on the second important one.

- 1.
- 2.
- 3.
- 4.
- 5.

**D13: Material style of Life/Household Economic Status**

Household materials and supplies (Do this by observation).

Type of roof: (a) iron roof (b) thatch (c) \_\_\_\_\_

Type of walls: (a) concrete (b) bamboo (c) thatch (oil palm ) (d) iron (e) plywood

Windows: (a) glass (b) wood (c) open (d) none

Floors: (a) wood (b) cement (c) bamboo (d) ground

Toilets: (a) flush (b) outdoor (c) none

Water: (a) Tap (b) well (c) natural water- running (creeks)

Electricity: (a) generator (b) solar (c) power plant (d) none

List other household items that you are able to see.

- 1.
- 2.
- 3.
- 4.
- 5.

**Coastal and Marine Activities**

**C11: Bai mi tok out long ol sampela tingting na bai yu bekim sapos yu wanbel or no wanbel long ol dispela toktok mi givim.**

| Attitude statements   | Agree | Don't know | Disagree |
|---|-------|------------|----------|
| a) It is an important part of our culture to have a healthy marine environment      |       |            |          |
| b) It doesn't matter what happens to our marine environment.                        |       |            |          |
| c) I enjoy going out on a boat and watching fish swim around the coral reef         |       |            |          |
| d) My family's health and well-being is linked to the health of our marine habitats |       |            |          |
| e) It is important that all community members to look after the reefs               |       |            |          |
| f) I would not vote for a tambu area near my village                                |       |            |          |

**C13: Alternative and Supplementing livelihoods**

Q1: What are some ways in which you make money?

a) \_\_\_\_\_ , b). \_\_\_\_\_

c) . \_\_\_\_\_

**Threat:**

**T2: Perceived Resource Condition**

What are the conditions of the resources below compared to 10 years ago?

| Resources   | Percent respondents that described resource condition as: |        |           |       |            |
|-------------|---|--------|-----------|-------|------------|
|             | 5=Very Good   | 4=Good | 3=Neither | 2=Bad | 1=Very bad |
| Mangroves   |   |        |           |       |            |
| Coral Reefs |   |        |           |       |            |
| Beach area  |   |        |           |       |            |
| Fresh water |   |        |           |       |            |

|             |  |  |  |  |  |
|-------------|--|--|--|--|--|
| Forest area |  |  |  |  |  |
|             |  |  |  |  |  |
|             |  |  |  |  |  |

**T3: Perceived Threats to Coastal and Marine Resources**

What do you see as the top five (5) major threats to your coastal and marine resources and their level of impact? (Rate: High/medium/low/none).

|              |  |  |  |  |  |
|--------------|--|--|--|--|--|
| Threats      |  |  |  |  |  |
| Impact Level |  |  |  |  |  |

**T4: Perceived Coastal Management Problems.**

Q1: What are the 2 major problems in the way that coastal and marine resources are being looked after (managed)?

i. \_\_\_\_\_

ii. \_\_\_\_\_

**Management:**

M11: Awareness of Rules and Regulation

Do you have rules for the following activities?

| <b>Activities</b>       | <b>Rules exist?</b> |
|-------------------------|---------------------|
| Fishing                 | Yes/no              |
| Mangrove harvest        | Yes/no              |
| Residential Development | Yes/no              |
| Berche-de-mer           | Yes/no              |
| Trochus                 | Yes/no              |
| Tourism                 | Yes/no              |

**M12: Enforcement**

Q1. Do you have rules or laws in the community concerning your environment?

---

Q2: On a scale of 1-5 ( 1= no enforcement, 5= full enforcement), to what extent are the rules and regulations are enforced?

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|                     |                    |                        |                   |                  |
|---------------------|--------------------|------------------------|-------------------|------------------|
| 5= Full enforcement | 4=High Enforcement | 3=Moderate Enforcement | 2=Low Enforcement | 1=No Enforcement |
|                     |                    |                        |                   |                  |

**M13: Compliance:**

To what extent do people comply with these rules and regulations?

|                    |                   |                       |                  |                 |
|--------------------|-------------------|-----------------------|------------------|-----------------|
| 5= Full compliance | 4=High Compliance | 3=Moderate Compliance | 2=Low Compliance | 1=No Compliance |
|                    |                   |                       |                  |                 |

**M14: Management Successes and Failures:**

What two things do you think have worked well for coastal management in the community?

1. \_\_\_\_\_ ; 2. \_\_\_\_\_

What two things do you think have not worked well for coastal management in the community?

1. \_\_\_\_\_ ; 2. \_\_\_\_\_

**M15: Management Credibility:**

List the types of governing bodies that exist in your community?

- a
- b
- c
- d
- e

Level of Credibility:

*1= body does not have authority*

*2= body has authority, but not the means and /or history of acting on this authority*

*3= body has authority and the means to act on their authority, but not the demonstrated history of doing so.*

*4= body has institution and the means and history of demonstrating their ability to act on their authority ( has high credibility)*

On scale of 1-4, state level of authority from each governing body in the community.

| Body    | a | b | c | d | e |
|---------|---|---|---|---|---|
| Ranking |   |   |   |   |   |

**M17: Benefits of Management**

1. I will gain material benefits if I have a management area (LMMA) established in your community.

| <b>1= Strongly Disagree</b> | <b>2=Disagree</b> | <b>3=Neither Agree or Disagree</b> | <b>4= Agree</b> | <b>5= Strongly Agree</b> |
|-----------------------------|-------------------|------------------------------------|-----------------|--------------------------|
|                             |                   |                                    |                 |                          |

My household will get non-material benefit (good health, good education etc) from coastal management

| <b>1= Strongly Disagree</b> | <b>2=Disagree</b> | <b>3=Neither Agree or Disagree</b> | <b>4= Agree</b> | <b>5= Strongly Agree</b> |
|-----------------------------|-------------------|------------------------------------|-----------------|--------------------------|
|                             |                   |                                    |                 |                          |