

Small-scale-fisheries related Socio-Economic Survey of New Ireland Province, Papua New Guinea



NATIONAL FISHERIES AUTHORITY



July 2005



© Copyright Coastal Fisheries Management and Development Project and the Papua New Guinea National Fisheries Authority, 2005.

All rights for commercial/for profit reproduction or translation, in any form, reserved. CFMDP and NFA authorise the partial reproduction or translation of this material for scientific, educational or research purposes, provided that CFMDP and NFA and the source document are properly acknowledged. Permission to reproduce the document and/ or translate in whole, in any form, whether for commercial/for profit or non-profit purposes, must be requested in writing.

Report prepared by
Ursula Kaly

Contributors

Garry Preston
Joel Opnai
David Burgess

Team Managers

Joel Opnai
John Aini

Reviewers

John Ben
Colleen Peacock-Taylor



◀ *Enumerators*

Ashley Barol
Ben Logai
Daniel Sau
Elsie Pangongo
Emmanuel tamba
Gerald Logai
Jenny Passingan
John Igua
Johnson Elijah
Kilangis Komet
Manaon David
Rakum Tumaleng
Sandra Marahang

This report was funded by

National Fisheries Authority &
Asian Development Bank

through the Coastal Fisheries Management & Development Project

Database design & construction

David Burgess

Data entry

Delian Kotoveke
Tracy Manau
Belinda Buken

Produced by

Gillett, Preston & Associates Inc.
Tautai Ltd.

CONTENTS

Introduction	5	HH-Q52 Community fishing rules and enforcement.....	52
Approach and Methods.....	6	HH-Q53 Knowledge of changes in resources	53
Results	12	HH-Q58 Participation in the community	54
Weaknesses in the Survey	15	HH-Q59 Influencing community decisions	55
Analyses by question.....	16	HH-Q60 Decision-making.....	56
Household Survey	16	Focus Group Survey.....	57
HH-Q7 People in household	17	FG-Q1-Q2 Group details	58
HH-Q8 Age & Gender.....	17	FG-Q3-Q4, Q7 Group structure and history	59
HH-Q9-Q11 Occupations & Education	18	FG-Q6 Objectives.....	60
HH-Q12 Land ownership	20	FG-Q8 Income opportunities	61
HH-Q13 Public transport.....	21	FG-Q9 Most common sources of income.....	62
HH-Q14 Vehicles & Boats	22	FG-Q10 Roles in fishing & collecting.....	63
HH-Q15 Costs of schooling	23	FG-Q12 People restricted in fishing / collecting	64
HH-Q17-Q18 Malaria.....	24	FG-Q13 Increasing income from fishing.....	65
HH-Q20 Meals of seafood	25	FG-Q17 Concerns for natural resources	66
HH-Q22 Changes in fishing & collecting activities.....	26	FG-Q18 Abundance of seafoods.....	67
HH-Q23 Important seafoods for subsistence & sale.....	27	FG-Q19 Future abundance of seafoods.....	68
HH-Q24 Timing of fishing / collecting activities.....	28	FG-Q20 Income opportunities from marine environment	69
HH-Q26-Q27 Fishing effort.....	29	FG-Q21 Is management needed?.....	69
HH-Q28 Catches	30	FG-Q22 Control over marine areas.....	70
HH-Q29 Use of ice.....	31	FG-Q23 Control over resources	70
HH-Q30 Costs of fishing	32	FG-Q24 Management of resources.....	71
HH-Q31 Seafood processing	33	FG-Q25 Expectations of management.....	71
HH-Q32 Income from fishing	34	FG-Q26 Education	72
HH-Q33 Income from all sources	34	FG-Q27 Health	72
HH-Q34 Loans.....	35	FG-Q30 Social problems.....	73
HH-Q35 Contributions from different sources of income.....	36	FG-Q31 Control of money	74
HH-Q36 Costs of living	37	FG-Q32 Women in fishing / collecting.....	74
HH-Q39 Disposal of seafoods not sold.....	39	FG-Q36 Changes in the environment	75
HH-Q40-Q42 Past, present and future catches.....	40	Key Informant Survey	76
HH-Q43 Factors affecting catches.....	43	KI-Q1 Cost of items	77
HH-Q45 Solving problems with fishing	44	KI-Q7 Population growth	78
HH-Q46 Role in addressing problems with fishing	46	KI-Q9 Illness	79
HH-Q47 Changes in the environment.....	47	KI-Q11 Schooling	79
HH-Q48 Reef tenure	48	KI-Q12 Involvement in fishing	80
HH-Q49 Access to resources	49	KI-Q18 General community concerns	80
HH-Q50 Fishing rules	50	KI-Q19 Fisheries issues	81
HH-Q51 Effectiveness of rules	51	KI-Q20 Improving fishing.....	82
		KI-Q37 Alcohol and drugs	83
		KI-Q38 Clan conflicts.....	84
		KI-Q39 Resolving clan conflicts.....	84
		KI-Q41 Increasing women's involvement in Fisheries.....	85
		Annex 1. Timetable for Socio-economic Survey	86

ACRONYMS & TERMS

ADB	Asian Development Bank
CBM	Community-based management
CFMDP	Coastal Fisheries Management & Development Project
EU	European Union
FAD	Fish-aggregating device
GIS	Geographic information system
GPA	Gillett, Preston & Associates
GPS	Global Positioning System (using Garmin Gecko)
LLG	Local-level Government
MBP	Milne Bay Province
MP	Morobe Province
NFA	National Fisheries Authority
NGO	Non-Government Organisation
NIP	New Ireland Province
PNG	Papua New Guinea
SDA	Seventh Day Adventist
UPNG	University of Papua New Guinea
VDC	Village Development Committee
VPC	Village Planning Committee
WDC	Ward Development Committee
WFG	Women's Fellowship Group



Group met in Sivasat

INTRODUCTION

Background

The purpose of this report is to present the findings of socio-economic surveys undertaken in New Ireland Province in late 2004 as part of NFA's Coastal Fisheries Management and Development Project (CFMDP). This report is the first of a series focused on fish catches, market sales, buyers and socio-economic surveys designed to characterise small-scale fisheries and to monitor project outcomes in New Ireland (NIP), Morobe (MP) and Milne Bay (MBP) Provinces of Papua New Guinea.

Characterisation of small-scale fisheries and its role in these three provinces forms a part of the CFMDP being implemented by the National Fisheries Authority (NFA) with loan funding provided from the Asian Development Bank (ADB) (1925 PNG-SF). The overall aim of the CFMDP is to contribute to the reduction of poverty in rural areas through increasing, or preventing a further decline in the incomes of coastal communities. This will be done by promoting improved management of resources and by creating sustainable earning and employment opportunities for coastal communities, including mechanisms that improve access to information on fisheries, and through the construction of wharves, jetties and other social infrastructure.

This part of the project comprises surveys undertaken by enumerators employed by the CFMDP, and the collation of existing historical data being collected by the Provincial Fisheries Office and by buyers under the conditions of their fishing and processing licences. The data collected and/or collated includes:

1. Surveys of marine products landed by small-scale fishers, usually using 'banana boats' (open outboard-powered fibreglass dories)
2. Surveys of deepwater and pelagic fishes landed by small-scale fishers and people involved in the European Union (EU) scheme for purchasing longer-range vessels (the so-called 'Ducklings') (The Rural Coastal Fisheries Development Project)
3. Surveys of marine products sold at local markets and their relative importance in relation to other items sold, including direct surveys of marine products purchased by buyers
4. Existing buyer receipts retained by the Provincial Fisheries Office
5. Purchasing data collected by buyers and NFA

6. Household surveys examining socio-economic conditions and contribution of small-scale fisheries undertaken in the northern LLGs of NIP
7. Focus Group and Key Informant surveys undertaken in conjunction with the household surveys.

These surveys and data collections are being undertaken to provide basic information on the relative importance of fisheries to the livelihoods of people in NIP. They were also designed to provide information on the types and quantities of marine organisms being collected / caught in the province with a view to assessing the status of the resources and to identify threats and opportunities for the future.

Aims of CFMDP Socio-economic surveys

These surveys were designed to access information from individuals and groups through interviews and meetings conducted with randomly-selected people who could inform us of their lifestyles, livelihoods and opinions on the issues that affect them. The purpose of the surveys was to:

- Establish existing baseline socio-economic conditions in the northern parts of NIP, particularly as they may relate to benefits derived from small-scale fisheries;
- Monitor direct and indirect benefits / effects of the CFMDP at the village and household level in northern NIP; and
- Collect information relevant to designing an appropriate Community-based management strategy for individual villages, and villages in the province in general.

Project management is being provided by Gillett, Preston & Associates Inc. and Tautai Ltd.

APPROACH AND METHODS

Design of the study

A total of 20 wards selected within 3 LLGs in the northern part of New Ireland Province (Figure 1) were visited by teams of trained enumerators between 17th August and 13th October 2004. The study focused surveys at the level of wards because of the great dispersion of people into small numbers of households in many villages throughout the province. This is a similar approach to that used by the PNG National Census. The number of wards surveyed was not distributed evenly among LLGs, but apportioned roughly according to the total population present in each. This resulted in 4 wards being surveyed in Kavieng Urban LLG, 6 in Lovongai (New Hanover) and 10 in Tikana (Figure 2). For each ward, enumerators spread their sampling among the villages and isolated houses located within the ward boundary, collecting information on the position of each sample location.

Within each ward, surveys were undertaken of 3 groups of people:

- Households (30 per ward, total of 600 interviews).
- Focus Groups - NGOs, Youth / Fishermen's / Women's Groups (5 per ward, total of 100 interviews).
- Key informants - LLG representatives, Community Leader, others (5 per ward, total of 100 interviews).

This design yielded a total of 800 interviews across all wards and LLGs. These 3 groups of people were separately approached in an effort to obtain detailed information at the same time as an overview and the special interests of identifiable groups of people.

Several options for the sampling framework were considered prior to the study to

ensure that the design could meet the needs of the project. Most of the considerations referred to optimizing the household level surveys in an effort to ensure the aims of the survey could be adequately examined. These included a consideration of: (i) distribution of sampling effort among LLGs and wards; (ii) repeated measures vs random sampling; (iii) the number of households to be sampled for an optimal design; and (iv) the sampling period.

Distribution of sampling effort

There are two main approaches that could have been used for distributing sampling effort in household surveys. The first, using proportional sampling, places more effort in areas with the highest populations and can be used to optimise for a good overall picture of socio-economic conditions. Sampling in this case is more focused on population centres and is often used for population census. The second approach calls for equal sampling effort in all wards, is geographically based and is often used for detecting change through time.

We chose to use the *equal sampling effort* strategy in which sampling effort is equally distributed among wards (same number of households per ward, regardless of number of villages or population size). This method is best suited for detecting changes through time and ensures that people in remote / low density areas are represented in a similar way as those in population centres. With a project focus on poverty alleviation, we considered it important that the conditions being experienced by people in remote areas should be adequately represented.

REPEATED MEASURES VS RANDOM SAMPLING

Sampling of households through time can be accomplished either by using a 'repeated measures' or a 'random sampling' design, each having different properties in terms of sampling outcomes. Repeated measures sampling designs require that the specific households randomly selected during this first survey are sampled again in the second survey (at the end of the project). These designs can be associated with better precision in the results obtained for some kinds of

► Figure 1: New Ireland Province showing approximate locations of the 3 LLGs included in this survey.



▼ Figure 2: Distribution of sampling effort for the socio-economic surveys in NIP. Values in the table indicate the number of questionnaires completed at each site and for each type of survey.



LLG	WARD	Household	Focus Group	Key Informant
KAVIENG	Bagail	30	5	5
	Kavieng	30	5	5
	Kulangit	30	5	5
	Maion	30	5	5
LOVONGAI	Lovongai	30	5	5
	Lungatan	30	5	5
	Meteselen	30	5	5
	Tsoi	30	5	5
	Umbukul	30	5	5
	Ungalik	30	5	5
TIKANA	Belifu	30	5	5
	Enang	30	5	5
	Kafkaf	30	5	5
	Kaselok	30	5	5
	Lamusmus	30	5	5
	Leon	30	5	5
	Lokono/Bagatare	30	5	5
	Nonovaul	30	5	5
	Panamana	30	5	5
	Paruai	30	5	5
		600	100	100

surveys. There are however, several disadvantages of using this approach to sampling for our purposes: (i) the total exposure to households over the entire survey (now and at the end of the project) is limited to the same 600 households, reducing generalisation (in random sampling up to 1200 households could be sampled); (ii) people may react to the survey and give answers they would not have with less exposure, depending on their attitude. We intend to minimise this (but not eliminate, as there will still be a lot of communication within communities) by randomly sampling another subset of 600 houses at the end of the survey; and (iii) the households surveyed during the first sample may not all be available by the final survey, so some samples may be lost.

Under a random sampling design, households are selected independently at each survey. There may be overlap in the houses selected, but usually this is minimal and arises only by chance. This method measures change more generally among

households in wards, but does not track the specific outcome for any one household. Its benefits are in being more able to generalise outcomes and in minimisation of biases generated if people included in the survey react to the enumerators or the survey itself.

CHOICE OF WARDS, NUMBER OF HOUSEHOLDS AND SAMPLING PERIOD

The LLGs included in the design were all of those present in northern NIP. The more remote LLGs in the southern part of the province (Central New Ireland, Namatanai, Nimamar, Tanir, Murat, Konoagil) were not included for two reasons. The first was that they are generally too remotely located to interact regularly with the markets and facilities in Kavieng other than through buyer visits. The southern communities appear to be more closely linked economically with Lihir and Rabaul. The second reason was one of logistics. With increasing distance from Kavieng, the condition of roads declines, travelling times increases and support (medical, emergency, mechanical) for the field teams becomes difficult or non-existent.

Within each of the 3 selected LLGs, wards were selected haphazardly from those present to ensure good geographical spread. There are 19 wards in Lovongai, 4 in Kavieng Urban and 19 in Tikana LLGs. The selected wards are listed in Figure 2, and their locations shown in Figure 3.

The number of households interviewed in each ward (30) was selected to ensure good coverage of the ward without over-sampling the number of available households. Only households within 1km of the coast were surveyed. The total percentage of households interviewed averaged 15% of each ward, and varied between 2% (Kavieng Urban Ward, Kavieng Urban LLG) and 18% (Belifu Ward, Tikana LLG) of those available. Because most of the survey data collected by interview in households and groups is non-numerical in nature, we were unable to apply standard statistical optimisation techniques to determine the best number of sample units for good precision.

It is envisaged that the socio-economic surveys described in this report will be repeated at the conclusion of the project, in 2007. For this survey, results have been analysed to provide a snap-shot of socio-economic conditions as they relate to coastal fisheries now. After the second and final survey in NIP, we will focus more on indicators of change, particularly those that may show the effects of this project.

SAMPLING METHODS

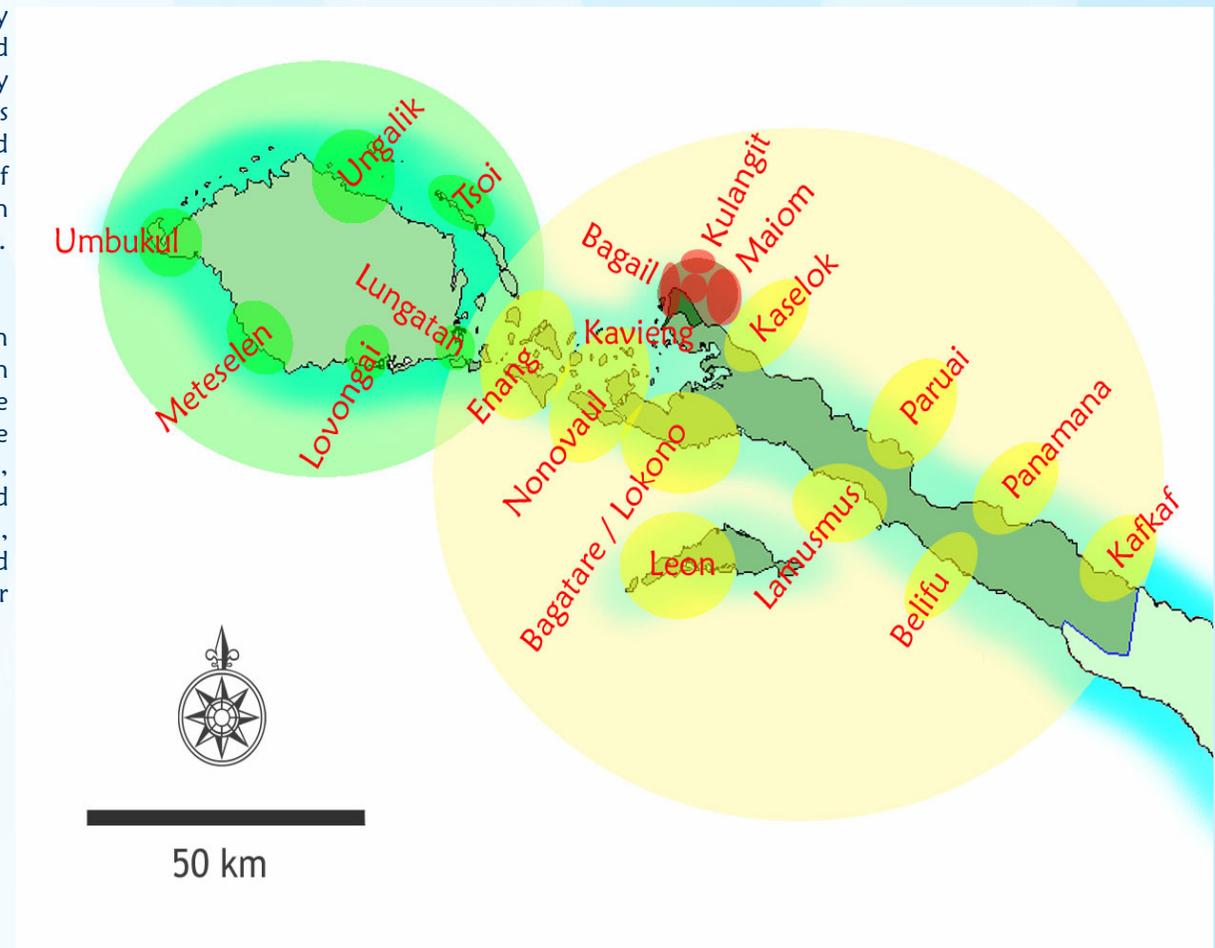
Questionnaires

The collection of socio-economic information was accomplished using guided interviews. With the assistance of an expert from the University of Papua New Guinea and an external reviewer we developed three separate detailed questionnaires that would be used by enumerators to gather information (Table 1).

Each survey was accompanied by introductory text to be used by enumerators to explain to people the purpose of the project and the interview to be conducted. At the end of each survey participants were also invited to ask questions or make comments in connection with the project, natural resources in general and their concerns. Although surveys were conducted at the scale of wards, many of the questions focused on conditions found in individual villages, the more important social unit for most people.

Survey forms were produced in English, with some Pidgin translations where necessary. The questions were conveyed in local Pidgin / local dialect at the time of each interview by the enumerators. The main topics covered by the surveys were focused on establishing a rapport with the interviewee(s), obtaining general information on social conditions, services, and resources available and being used, income levels and sources, perceptions on how resource levels might be changing, and traditional / existing forms of management (see Table 2 for overview of questionnaires used).

▼ Figure 3: Map of the 3 LLGs surveyed showing location and approximate boundaries of wards with (number of households). Ward names in red are those included in this survey: (a) Lovongai LLG; (b) Kavieng Urban LLG and (c) Tikana LLG. Maps are derived from the PNG Census GIS 2000.



▼ Table 1: Overview of survey questionnaires developed, their target individuals or groups and the number of questions posed.

Survey	Target(s)	Questions
Household Survey	Head of household + others present	62
Key Informant	Individual with standing in and/or knowledge of the	42
Focus Groups	Identifiable and/or registered groups of youth, women or fishermen	37

ENUMERATORS

All interviews of households, individuals and groups undertaken during this survey were carried out by locally-hired and trained enumerators. We trained 12 people who were already familiar with local conditions, customs and dialects during a short course held at the National Fisheries College in Kavieng (6-10 August 2004). The people selected for the course included some previously trained by us to undertake fish landing and market surveys, and included fisheries officers and observers. Participants were shown the design of the survey and the questionnaires to be used and invited to improve them based on their own experience working in villages. Through a combination of lectures, role-playing and mock-interviews the group worked through all of the questionnaires and refined them whilst becoming familiar with the approaches and etiquette to be used. An emphasis was placed on ensuring that all of the enumerators understood all of the questions and would ask them in the same way to reduce variance among them.

Successful participants were then signed onto a 7 week field schedule as our enumerators for carrying out interviews in all LLGs and wards included in the survey (see Annexe). Three concurrent teams of 3 people were deployed every week over the life of the survey to visit all sites. A team leader was selected for each team to ensure data were completely and properly collected and returned to us for incorporation into our database.

Indicators of change for comparison over time

In order to detect change in socio-economic conditions and the role of fisheries over the life of the CFMDP, we posed a series of *a priori* questions (hypotheses) against which data and responses collected at the first survey could be compared with those collected at the end of the project. These were designed in an effort to isolate as much as possible the effects of this project against other events occurring over the same time frame. We acknowledge however, that because we cannot establish control communities that would not hear of the project or react to it, there is likely to be

▼ Table 2: Details of the topics covered in each of the 3 questionnaires.

Topic	Questions on:	Number
Household Survey		
General information on the household	Persons living there, religion, village affiliations, occupations, education, land ownership, transportation used, health	19
Fishing	Consumption, fishing activities, changes over time, subsistence and market activities, seasonal fishing patterns, fishing effort and equipment, handling, income from fishing	13
Income (all sources)	Income, loans, contributions by members of the household, marketing options, market conditions	7
Fisheries management	Changes in catch over time, perceived reasons for any changes, changes in the environment, fisheries rules, role of women	16
Community	Participation, perceived ability to influence decision-making, information needs.	7
Key Informant Survey		
General	Information on the key informant, general features of the village and population	11
Fishing	Village involvement, fuel prices, distances to fishing grounds and markets	3
Income	Main sources for village, outside employment, changes in natural resources, general community concerns	4
Fisheries management	Issues, past community approaches to addressing them, effects of using these approaches, existing mechanisms of community communication and decision-making, conflicts, traditional management practices, tenure,	14
Village life	Education, organisations, basic services, problems and conflicts	7
Gender	Role of women and expected impacts if increased	3
Focus Group Survey		
Group type	Registration, affiliations, officers, activities	7
Differences among groups in village	Opportunities, participation, income, roles, restrictions	5
Resources & Income	Supply and marketing of marine products	8
Management of resources	Needs, tenure, control of resources	5
Community &	Education, medical, social issues	6
Trends & the future	Roles of women and youth, under- and over-utilised resources, environmental change	6

confounding of results. That is, even in communities not included in our CBM processes, word-of-mouth transfers of information are expected to occur. There are also likely to be widespread impacts of our and NGO contacts with communities through radio and other media over the life of this project.

In addition to positive influences on communities of the CFMDP, we acknowledged that there could also be negative influences. Therefore to provide an assessment of the project which is as unbiased as possible, we have included hypotheses of both types to be assessed after the second (final) survey as shown in the boxes.

Data storage and analysis

All data collected during the survey onto questionnaires by the enumerators were entered by trained data entry staff into a purpose-built Microsoft Access database. These data included numeric values (such as amounts of income in Kina) in addition to text replies to questions aimed at peoples' opinions on the issues that concern them. They also included numeric data on votes given by individuals with differing opinions during group consultations.

All data were exported into separate Excel "flat files" for analysis. These were Excel spreadsheets which contained the resulting data for a particular question (the dependent variables), together with all of the header information (independent variables) on which an analysis would depend (e.g. LLG, Ward, date etc). Numeric data were usually analysed directly, but text information was read by the analyst, interpreted and re-coded into separate concepts so

that frequencies of certain types of ideas could be examined. In this way, non-numeric text information were converted to numeric responses. All data were then summarised using Pivot tables in Excel, either as frequencies or averages across the survey, or by breaking down responses by LLG and Ward. All of the "flat files" and reprocessed data are held by the project and can be made available to interested parties.

Overall patterns of similarities and differences among LLGs and Wards were assessed using a multivariate cluster analysis of selected questions (the numeric ones) in the household survey data. This technique was applied using questions 7-8, 11-13, 15, 18, 20, 23, 26, 28, 30, and 32-36. This and other standard statistical analyses were done using Statsoft Statistica Version 7. All graphs presented in this report were drawn either using Excel or Statistica.

INDICATORS OF POSITIVE CHANGE

1. Income from fishing increases
2. Income from other activities (marketing vegetables, buai (betel nut), crafts) increases as the local economy is stimulated through increased fishing incomes
3. The market for fisheries increases so that more people can participate and derive their income from fishing / collecting
4. People are more aware of resource issues and how to address them
5. People are more aware of sustainable development issues and the need to optimise livelihoods in a way that ensures the future
6. People are enabled to protect and manage their own resources
7. Management plans are established in villages
8. There is some way to assess whether management is leading to improvements / benefits that people can see
9. There is increased access to education and medical facilities through better incomes
10. Community activities and benefits increase
11. Increased income goes to women who use it to improve quality of life for the family
12. Other opportunities for income generation are made possible through project initiatives such as training, better management, etc.

INDICATORS OF NEGATIVE CHANGE

1. More income leads to more problems with alcohol and buai
2. Increased women's participation leads to family problems if traditional roles are disrupted
3. Resource depletion
4. Increased damage to ecosystems that support fisheries
5. The project increases prospects for people already participating in fisheries, but does not increase opportunities for poor families (benefits not equally distributed and do not target poverty)
6. The fisheries market saturates and those already participating can no longer derive sufficient income from fisheries
7. There is a drain of people from villages through increased centralised employment opportunities
8. The fisheries legislation confuses stakeholders in determining who has the right to control resources
9. Alternative income generation opportunities result in a negative impact on reefs (e.g. anchors, tourists)
10. FADS (fish-aggregating devices) cause safety problems due to fishers going further offshore.

RESULTS

The results given in this section concern overall patterns observed and are summarised under topic headings incorporating information from the 3 types of interviews. The results of individual questions under each of the Household, Focus Group and Key Informant surveys are given in the sections that follow. Not all questions were analysed, either because data were incomplete, or because there was evidence the question was misunderstood. In some cases, questions were better answered by households, and the responses given by Focus Groups or Key Informants added little to the results.

In many cases, the total number of responses given in a given question is less than the number of interviews done because data were missing, incomprehensible or did not answer the question (the number of valid responses 'n' is given for each). This generally was a problem in only a few percent of cases, so is not considered significant to the overall result on a question-by-question basis.

For reasons of privacy, the identity of all persons interviewed during this survey has been withheld. All responses described below are the opinion of those interviewed and may not accurately reflect a given situation. We considered people's *perceptions* the most important results of the survey and a shift in these an important outcome of the project. For example, although we may know that fisheries regulations for sea cucumbers exist, a lack of knowledge of them by interviewees indicates that there is scope for improving public awareness.

Overall results across all LLGs and Wards

Overall, the surveyed population is characterised by moderate numbers of people living in households (<6 on average), with a gender ratio which is significantly unequal and biased towards males (Table 3). The population is young, with 56% being aged from 0-20 years of age, and only 7% of the population over 60. Education levels are generally low, with 93% of the population attaining a Grade 10 or lower education level. Very few of the people present in the survey area (3%) accessed college, technical or university levels of education. Most people own their land, many by customary mechanisms, and 28% with a formal title. The average cost of schooling a child in the area is K 364 per year and the average number of cases of malaria in households is 8 per year, with most household members having at least one case per year.

The average household income is K 5,820/year, while average household costs are K 6,864/year. Some households have formal loans from financial institutions, averaging K 1,477, but many households are dependent on assistance from their family or clan members (wantoks) to cover costs such as schooling. Most households in the area derive a part of their living from farming and fishing, a part of which operates on a cash basis. Cash income from farming, fishing, selling and employment is low, ranging between 27 and 111 Kina per month to a household.

Fishing is an important livelihood in the area, along with farming, selling and employment. Fishing contributes an average of just over K 100/month in cash income to each household involved in that activity. Seafoods are heavily used for consumption and for selling, with only small amounts used for giving to wantoks and community purposes (Table 3). There is evidence that catches are declining in the area, particularly of sea cucumbers and fishes (not necessarily in all areas). People believe that income from fishing could be increased through improving access to markets, better gear and technology and more training.

The main concerns raised about the state of marine resources were the use of destructive fishing techniques (derris roots and dynamite, as well as nets, night fishing and sometimes the use of spears). These concerns strongly correlate with awareness campaigns undertaken by Ailan Awareness (a local conservation NGO) over the past year or so. The outlook for the future of marine resources is not good. Many people believe that resources will continue to decline, while others believe they may increase if steps are taken to manage them.

► Table 3:
Summary of
indicative overall
results of the
surveys of
households,
focus groups
and key
informants
(n=800).
(Continued on
next page)

Characteristics of households	Results
HH7 Number of people in household	5.76
HH8 Number of males	4.18
HH8 Number of females	1.69
HH8 Gender balance	53% Male : 47% Female
HH8 Percent of the population in different age groups	Aged 0-10: 31%; 11-20: 25%; 21-30: 15%; 31-40: 13%; 41-50: 9%; >60: 7%
HH11 Education as cumulative percentages for different levels	Elementary=17%; Grade 6=57%; Grade 10=93%; Grade 12=95%
HH11 Education College, Technical & University	3%
HH12 Land ownership	89%
HH12 Who owns the land?	Individuals 11%; Families 32%; Clans 57%
HH12 Title held for land	28%
HH13 Cost of Public transport to usual places / trip	11.61
HH15 Cost of schooling / child / yr (K)	364.07
HH17 Cases of Malaria in household / year	7.91
HH18 Cost Malaria Treatment / case (adults) (K)	6.98
HH18 Malaria treatment	51% Hospital; 41% Aid post or clinic

People see themselves as only moderately involved in community activities, and with average power to influence community decision-making. The decision-makers in the communities are mostly the Village Planning Committee (VPC) and Community Leaders, with few communities (27%) seeing it as a whole community process. There is a range of social problems, including issues associated with use of alcohol and drugs, as well as clan and land disputes. Communities are generally concerned with law and order, education, health, water supply and income opportunities, but not many see fisheries as a major area for opportunity and community improvement.

► Table 3 (continued...) Summary of indicative overall results of the surveys of households, focus groups and key informants (n=800).

Characteristics of groups		Results	Women in fishing		Results
FG1-2	Number of each type of group interviewed	Fishers 5; Women 59; Youth 33	FG32	Women should become more involved in fishing	Yes 76%; No 17%
FG1-2	Registration	Registered 44%; Unregistered 56%			
FG6	Activities undertaken (ranked most important)	Community, Church, Sport & recreation, Promotion of women	FG32	Women should be more involved because:	Income would increase, there would be more fish for consumption, it would assist the family / clan / community
			FG32	Women should not become more involved in fishing because:	They will neglect other duties, it is against customs, they are not good at it
Fishing and collecting					
FG12	Groups of people sometimes restricted from fishing	Pregnant women, gardeners	Fisheries management		
HH20	Meals of seafood / week	3.89	FG17	Concerns about marine resources	Use of derris roots, reef condition, need for management and enforcement, pollution, dynamite and undersized fishing
HH22	Changes in fishing grounds driven by:	Declining catches 77%	FG18	Marine resources are abundant	Agree 55%; Disagree 40%
HH22	Reasons for changes in fishing grounds	Use of derris roots; Changes in tides / currents; Changes in reefs / corals	FG18	Reasons for thinking they are abundant	Sufficient to needs, easy to find, easy to catch
HH23	Uses of seafoods	Household 45%; Selling 34%; Wantoks 14%; Community 7%	FG18	Reasons for thinking they are not abundant	Declining, hard to find, undersized
HH26	Fishing & collecting trips / month	6.66	HH42	Reasons catches of seafoods might decline in future	Overfishing, too many fishers, use of derris roots, population growth
HH28	Seafoods caught / trip	17 kg; 15 pieces	HH42	Reasons catches of seafoods will improve or stay good in future	Good amangement, new gear / techniques / cooperation; has always been good
HH30	Costs / fishing trip (K)	18.99	HH43	Factors affecting catches (drivers)	Human population, attitudes, management, outsiders
HH31	Processing of seafoods	Yes 65%; No 7%	HH43	Factors affecting catches (activities)	Use of derris roots, use of dynamite, overfishing, netting, night fishing
HH31	Reasons for processing of seafoods	Preservation 66%; Appeal for sale 11%	HH43	Factors affecting catches (environment)	Pollution, coral / reef damage, climate / tide changes
HH32	Income / fishing trip (K)	65.51	HH45	Solving problems with fishing	Awareness / education, closures, control of areas and exclusion of outsiders, rules / laws, tambus, enforcement, ban destructive methods
FG13	Income from fishing could be increased by:	Establishing buyer nearby, improving gear / technology, training, more affordable transport	HH45	Who should solve fishing problems?	Community 40%; Fisheries 22%; Government 19%; Don't know 17%
Income and costs					
FG8	Income opportunities in the village	Market selling, fishing, farming	HH46	Role of individuals and households in addressing problems with fishing	Discuss, improve awareness, look after resources / environment, abide by rules, assist enforcement, not use destructive methods (especially derris roots)
FG9	Most common sources of income	Farming (cash crops, especially copra), fishing, market selling (general, buai, sago)	HH47	Changes in the environment	Damaged / dying reefs, erosion, declining fishing / collecting, coral reefs growing, changes in tides / currents
HH33	Monthly Income in household (all sources) (K)	485	HH48	Reef tenure?	Yes 36%; No 57%
HH34	Loans (formal lending institutions) (K)	1477	HH48	Type of control	Tambus, control of certain methods, exclusion of outsiders
HH35	Fishing income / month (K)	104	HH50	Fishing rules are effective because:	Community is involved; people have respect and good attitudes
HH35	Farming income / month (K)	134	HH50	Fishing rules are ineffective because:	People ignore rules and have bad attitudes; Rules are not enforced
HH35	Buai income / month (K)	27	HH52	Who / how are rules implemented?	Community Leaders 45%; Awareness 24%; Village Court 16%
HH35	Selling income / month (K)	28	HH53	Knowledge of changing resources	Very poor 5%; Poor 16%; Not sure 26%; Good 42%; Very good 11%
HH35	Employment income / month (K)	111	FG20	Other income opportunities from the marine environment	Diving tourism (royalties), surfing tourism, other unspecified tourism
HH36	Household costs / month (K)	572	FG21	Management is needed	Agree 89%; Disagree 8%
Community					
HH58	People's participation in the community	Very high 14%; High 23%; Average 43%; Low 13%; Very low 7%	FG24	Types of management actions needed	Ban derris root use, establish tambus / closures, protect reproductive individuals or spawning areas
HH59	Influence in community decision-making	Very high 12%; High 23%; Average 27%; Low 23%; Very low 15%	FG25	Outcomes expected of management	Plenty of resources, increased catches, increases in income, distance to travel to fishing grounds will decrease
HH60	Decision-makers	Village Planning Committee (VPC) 49%; Community Leaders 44%; Whole community 27%			
FG30	Social problems	Alcohol, drugs, clan disputes, land disputes			
KI18	General communities concerns as raised in meetings	Law & order, education, health, water supply, community development, income opportunities			
KI37	Problems arising because of alcohol and drugs	Community disturbance, fighting / violence, theft			
KI38	Clan conflicts	Yes 70%; No 27%			
KI38	Reasons for clan conflicts	Land disputes, boundaries, reef disputes, royalties			

General information on LLGs and Wards

The Wards surveyed tended to form several groups in terms of overall similarity, but these did not in general relate to the LLG to which they belonged.

Group 1. Most of the Wards in Lovongai were closely related in terms of structure of the household, gender, education, income and expenditure patterns. This group included Lungatan, Ungalik, Meteselen, Tsoi and Umbukul. Bagatare / Lokono (Tikana LLG) and Lovongai could also be considered closely related to this group. Lamusmus and Leon formed another closely related grouping with these Wards, with Kafkaf and Kaselok joining this group at a slightly greater linkage distance (less similarity). Bagail joins this group to form the first major cluster observed.

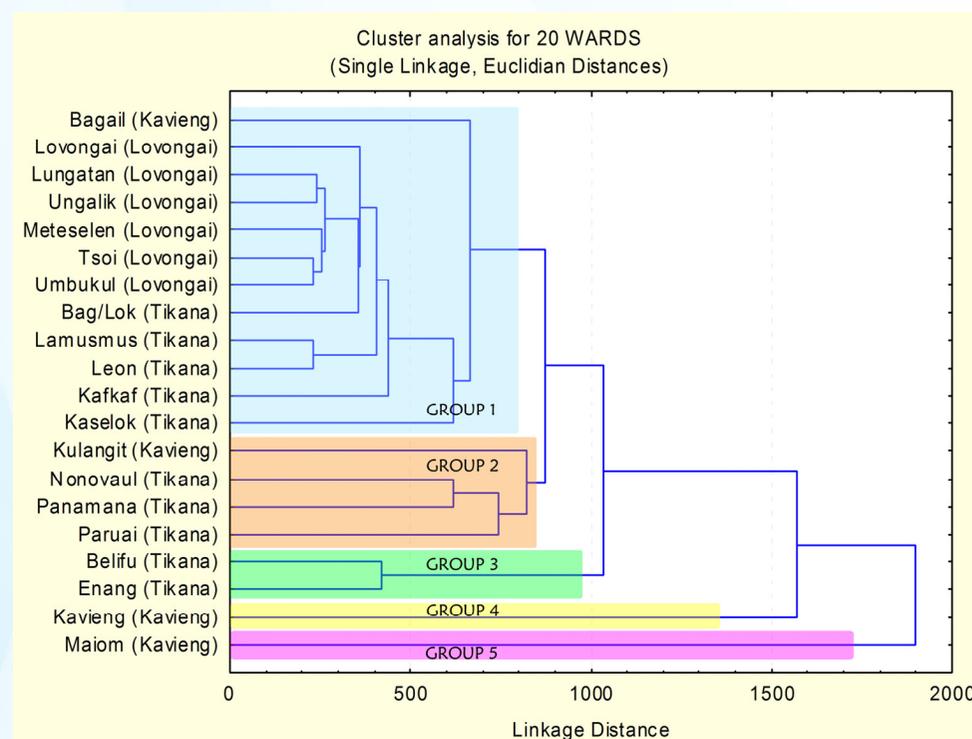
People living in Group 1 generally own their land and often hold a title for it, tend to have low education levels, though there are numbers of people with higher education, eat the most meals of seafoods per week, and pay the most for public transport. They have the second-highest rates of malaria per year of all clusters. Income is mostly from fishing, farming and Buai sales. People in these wards tend to derive the least income from employment, have the lowest costs of living and have the least loans from formal institutions.

Group 2. A second group of similar Wards is formed by Nonovaul, Panamana and Paruai (Tikana LLG) combined with Kulangit (Kavieng LLG). People in Cluster 2 have a high rate of land ownership, the largest proportion of the population with education only to Elementary level, the greatest monthly income from farming, more females in families than in other clusters of wards, and make the most fishing trips per month. People in these wards make the least income from selling in markets.

Group 3. This grouping of Wards is formed by Belifu and Enang, both of Tikana LLG. People living in these wards are characterised by having the most males in households, the highest number of college-educated people, and large numbers of people educated only to Grades 3 or 6. These wards also have the lowest monthly income (all sources), pay the least for medical treatment and schooling, and have the lowest costs associated with fishing.

Group 4. Kavieng Ward, Kavieng LLG is isolated from the first three clusters by a large linkage distance. Kavieng Ward is characterised as having high levels of land ownership, the highest levels of education across the survey area, and the highest density of people living in households. At the same time, people here tend to have the highest levels of income from all sources (including the highest levels derived from employment, fishing, buai sales and selling). They also have the highest costs of medical treatment, education and fishing. People in Kavieng tend to derive little of their income from farming and do not use fish extensively within the household for consumption or in community activities.

▼ Figure 4: Results of a cluster analysis of Wards based on numerical values obtained during the Household Survey. Wards have been grouped in terms of 47 variables (from 23 questions) to illustrate degree of similarity. In this graph, Wards most similar to each other are linked by shorter connections on the "Linkage distance" axis. Wards linked by long lines are less similar than those linked by short lines. For example, Tsoi and Umbukul are similar, while Maiom and Kavieng are very dissimilar in terms of the variables included.



Group 5. Maiom Ward, Kavieng LLG is alone and differs significantly from all other Wards surveyed. It is characterised by having the lowest density of people in households, but more females than most wards (except Group 2), and the largest number of people aged between 21-30 and the smallest number of people up to 10 years of age. Maiom has the highest overall costs of living and people there use the most of their fisheries products in the household, or give it to their Wantoks or the community. This ward has the lowest rate of fish use for sale. People in this Ward have the most formal debt (highest average value of loans). The average monthly income from fishing and collecting is lowest in this Ward, and people make the fewest fishing trips and eat the least number of fish meals per week. Their main income is from selling, buai and farming.

WEAKNESSES IN THE SURVEY

- Teams did not clarify answers well. In Focus Group surveys, marketing was collected as a form of income without further clarification of what this entailed. This led to lack of clarity in trying to assess whether people were on-selling goods produced by others or goods they had produced themselves (some of which should have been recorded under types of farming and fishing) (FGQ8-9). In roles of people in fishing (FGQ10) there was lack of clarity between spear-fishing while diving and while walking. The term ‘diving’ probably including spearfishing and at least the collection of crayfish. Although there was considerable emphasis placed on pursuing clarifications during the training of enumerators and during debriefing sessions throughout the survey, they were generally reluctant to ask the question “what do you mean by that?” Despite repeated attempts to improve rigor in the sampling we were unable to solve this problem.
- Some of the interviewers did not fill-in questions completely so that a “no”

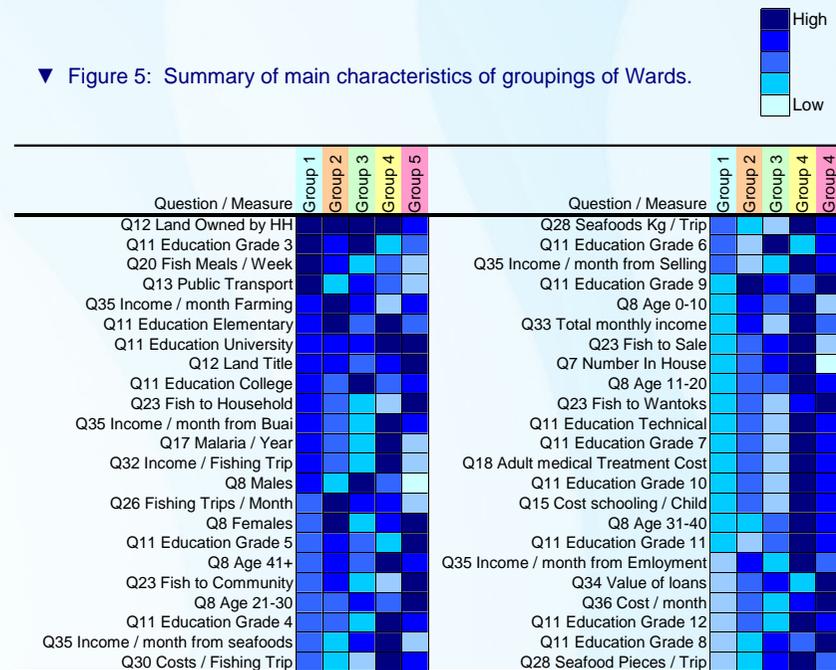
or “not applicable” or “don’t know” answer could not be distinguished from them simply not completing the form properly. It was stressed repeatedly during training and debriefing sessions that all parts of the questionnaire had to be filled in, even if the answers were negative. Despite this, there were many questionnaires with blank sections that could not be included in the analyses.

- Some questions were just not answered at all. It appears they were simply forgotten.
- In some cases, enumerators recorded answers that were irrelevant to the question asked. For example in the focus groups surveys (FGQ10) roles of members in the community in areas of life *other* than fisheries were recorded.
- Inappropriate shortcuts in recording data invalidated some information. The use of “as above” in a database context is not interpretable.
- Questions requiring units of measurement were often reported without their units. Rather than requiring enumerators to convert gallons to litres, hours per week to hours per month etc in the field, we allowed all quantities to be reported as given as long as the units used by the person interviewed were also recorded at that time. This approach was not successful. Enumerators often failed to record the units associated with a measurement, rendering some of the results unusable (e.g. HHQ9).

• Where examples of the kinds of answers being sought were provided on the questionnaires to assist and remind the enumerators, it was clear these were often read out to respondents. Answers were often almost entirely limited to the few options given as examples (e.g. HHQ9). This occurred despite repeated training, briefings and error checking. Short of going into the field with the teams, it appeared to be impossible to prevent enumerators from reading out options, thereby leading the answers.

- Key Informants were not good sources of numerical information about their villages. They seemed able to summarise attitudes and issues being discussed at meetings, but could not tell us how large their village was, how many people lived in it or what the annual growth rate of the population was.

▼ Figure 5: Summary of main characteristics of groupings of Wards.





Analysis of Survey Questions

Household Survey

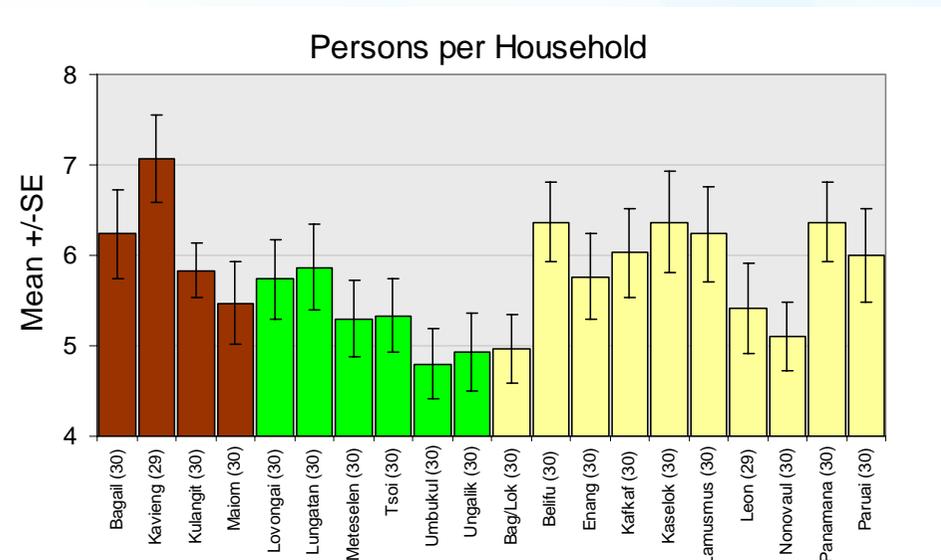
HH-Q7 NUMBER OF PEOPLE IN HOUSEHOLDS

HOW MANY PEOPLE LIVE IN THIS HOUSEHOLD AT PRESENT? IS THIS THE USUAL NUMBER OF PEOPLE WHO LIVE HERE? IF NOT, WHO ARE THE OTHERS AND ARE THEY LEAVING / COMING BACK?

The mean number of people in households across the survey was 5.8 people (SE=0.1). The mean number of people in Kavieng LLG tended to be higher than in Lovongai and Tikana, but variation among Wards was stronger (Figure 6). The highest number of people living in households was recorded in Kavieng Ward (7.1 +/-0.5), and the lowest number in Umbukul (4.8 +/- 0.4).

No information was given by those interviewed on people who might have been temporarily staying away from the household at the time of the survey.

▼ Figure 6: Number of people in households by LLG and Ward (n=598). Values are means +/- SE. Values in Brackets (n) are the number of replicates used to calculate each mean. ! Kavieng LLG ! Lovongai LLG ! Tikana LLG.

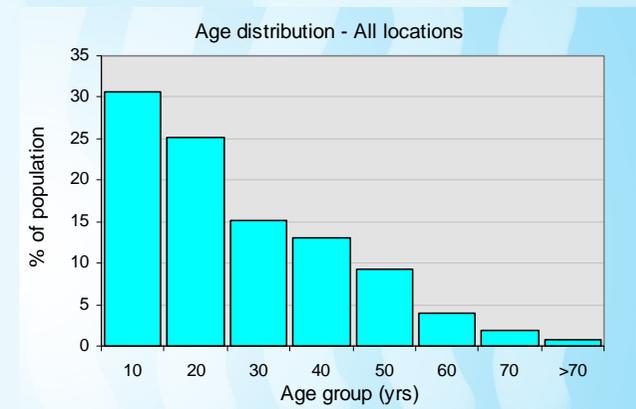


HH-Q8 AGE & GENDER

WHAT IS THE AGE AND GENDER OF ALL THE PEOPLE LIVING IN THIS HOUSEHOLD?

Although the survey reached 3,525 people, age information was collected for only 2,914 people during this survey. Many people did not know their age, or the spokesperson answering the survey did not know the ages of everyone living in the household.

Five people aged 90 years or more were found in the study, with the oldest person in Kasekok at age 94 years. Overall, 56% of the population was aged 20 years or younger, with only 7% of the population aged more than 50 years (Figure 7).

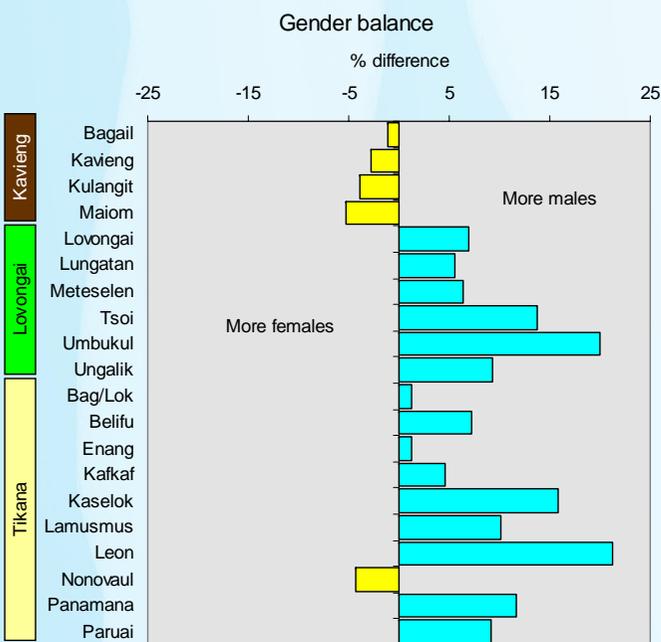
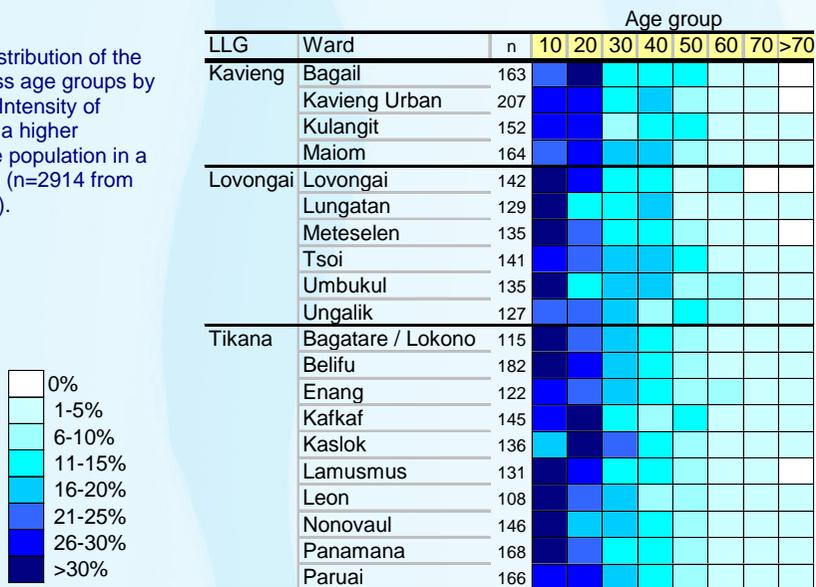


Wards in Lovongai and Tikana tended to have younger populations than Kavieng LLG (Figure 8). Ungalik Ward had the highest average age of people, while Lovongai Ward had the lowest average (19 years) and maximum ages (58 years) of all the Wards examined.

▲ Figure 7: Age distribution of population across all LLGS and Wards. Data are percent of the total sampled population in each age group (n=2914 from 439 households). Age categories show the upper limit of the age in each group (i.e. "20" means people from 11-20 years old).

Overall, the gender balance over the study area was biased towards more males than females (53 : 47%), with 6% more males than females in the population. In Kavieng LLG and Nonovaul Ward (Tikana), there are however, slightly more females than males (Figure 9). For all other Wards in Lovongai and Tikana, there tends to be a strong bias towards males, reaching a maximum of 21% more males in Leon Ward.

► Figure 8: Distribution of the population across age groups by LLG and Ward. Intensity of colour indicates a higher proportion of the population in a given age group (n=2914 from 439 households).

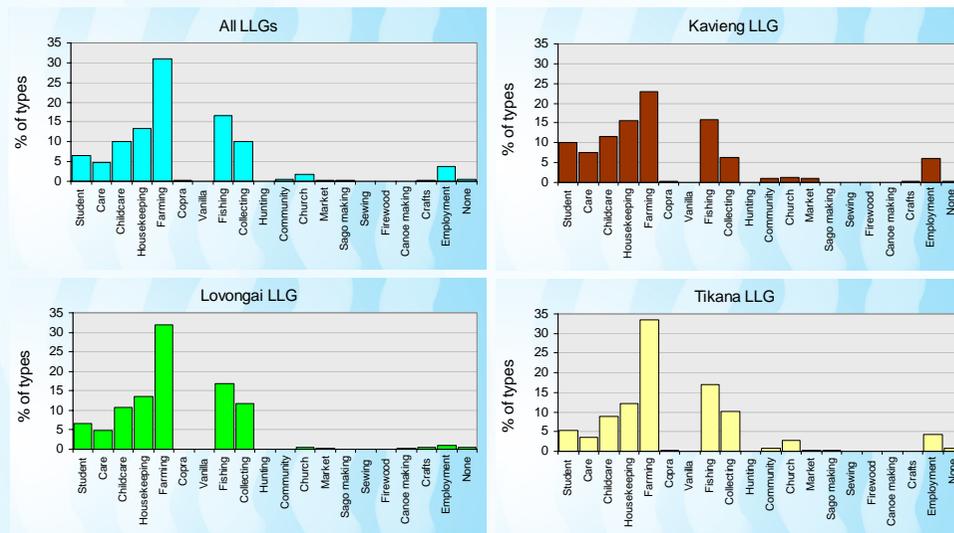


◀ Figure 9: Gender balance by LLG and Ward. Values are percent difference in the proportion of males : females in the population, with a positive value on the graph indicating more males than females (n=3454 from 587 households).

HH-Q9-Q11 OCCUPATIONS & EDUCATION

WHAT ARE YOUR OCCUPATIONS? WHAT PART OF YOUR TIME IS SPENT ON EACH ACTIVITY? WHAT IS YOUR HIGHEST LEVEL OF EDUCATION? WHAT ARE THE MAIN OCCUPATIONS AND LEVELS OF EDUCATION FOR ALL OTHER MEMBERS OF THE HOUSEHOLD? (INCLUDE SCHOOL CHILDREN).

The person interviewed in each household was on average engaged in a total of 5 occupations as part of his/her livelihood. The most common occupation across the survey was farming (including cash crops and garden produce) both for sale and home consumption (Figure 10). Fishing was the second most common occupation, with housekeeping, collecting and childcare being the next most common occupations. Paid employment accounts for less than 4% of the occupations reported by those interviewed, not a surprising result since many of the people were interviewed during the working day while those

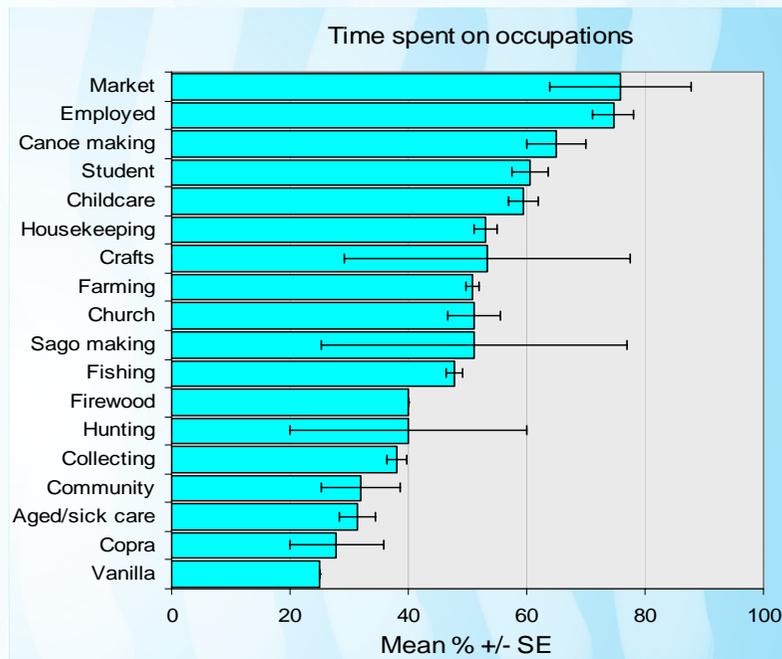


▲ Figure 10: Occupations of the person interviewed in each household. Values are percent of all occupations reported across the individuals interviewed (not the entire household) (n=3044 occupations across 591 households).

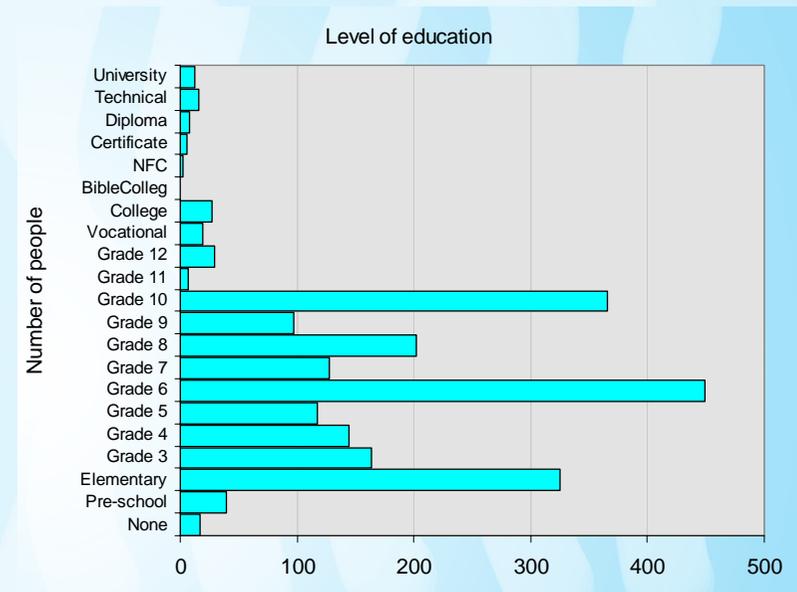
employed would have been out of the house. Although still heavily involved in farming and fishing, people in Kavieng LLG had a greater spread among types of occupations than those in Lovongai and Tikana. Among those people employed (n=39) were teachers, plantation workers, medical workers, the self-employed, church workers, drivers, police, magistrates and tradespeople.

In terms of the time spent on each of the types of occupations reported, the most time was spent on market selling (76% of the time) and formal employment (75%) (Figure 11). Copra (28%) and vanilla (25%) occupied the least of a person's time, while fishing (48%) and farming (51%) took about half of people's time.

93% of the population is educated to the level of Grade 10 or lower, with only 3.3% of the population having attained certificate, diploma or degree-level education (Figure 12). The peak of numbers of people with Elementary levels of education probably reflects the young population, and many of these should go on to increase their education levels. It is possible, however, that the peaks of numbers of people educated to Grade 6 and 10 represents real patterns in attendance and/or access to Primary and Secondary schools and their distribution within the project area.



▲ Figure 11: Percent of the time spent by interviewees on each of their occupations. Data are mean percent of the person's time +/-SE for main categories reported (n=2374 responses across 591 households).



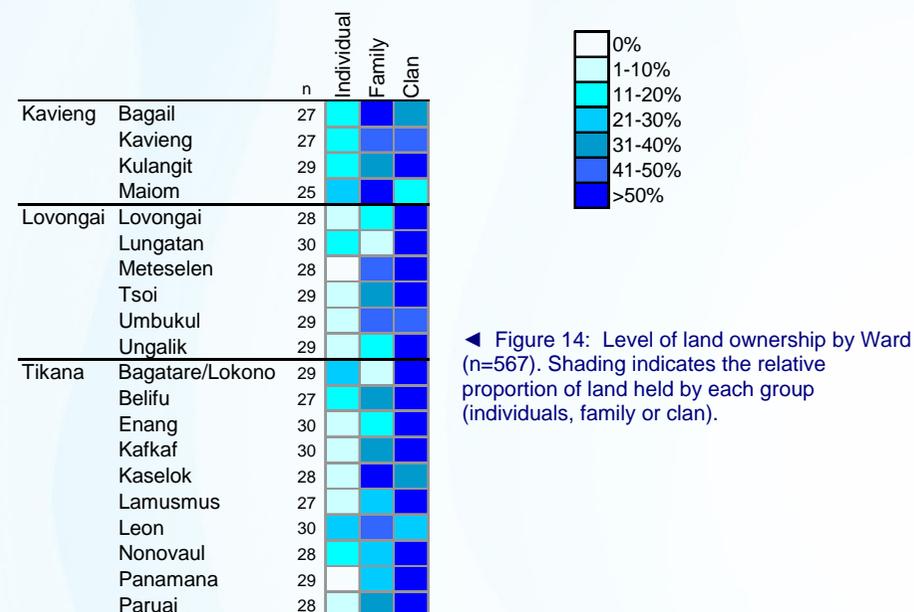
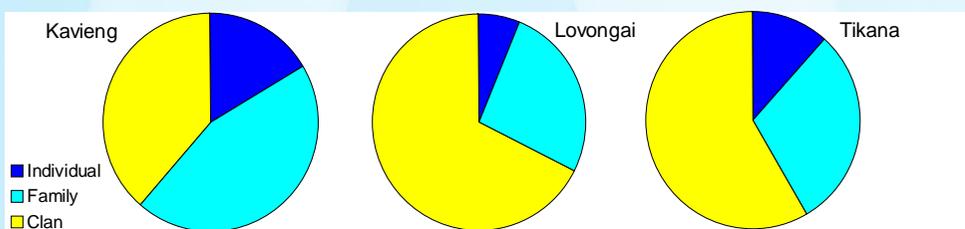
▲ Figure 12: Snapshot of maximum level of education held now by all members of the households surveyed. It is important to remember while viewing these results that at least some of those with low levels of attained education are still young and could not have attained higher levels to date (see age structure in HH-Q8). Even in the adult population, education may be on-going. These data are therefore a "snapshot" of education now found in the community, with the potential for increase in most of the age groups (n=2223 responses).

HH-Q12 LAND OWNERSHIP

DO YOU OR ANYONE IN THE HOUSEHOLD OWN LAND?. IS THE LAND HELD BY THE: CLAN / FAMILY / INDIVIDUAL? IS THERE A TITLE? IF NOT, PLEASE DESCRIBE HOW THE LAND IS HELD.

94.5% of the people interviewed said that they were in ownership of the land they occupied. Overall, 11% of people owned their land individually, 32% at the level of the family and 57% through the clan. The greatest individual and family ownership of land was in Kavieng LLG, while clan ownership was most common in Lovongai (Figure 13). By Ward, the highest levels of individual land ownership were in Leon (30% of households), Bagatare / Lokono and Maiom. The highest levels of family land ownership were in Kaselok (57%), Bagail and Maiom, while clan ownership was above 70% in 6 Wards and greatest in Ungalik (83%) (see also Figure 14). 96% of the land covered by the survey is considered owned under customary tenure and 73% is held without a formal title (Table 4).

▼ Figure 13: Level of land ownership in each LLG (n=567).



◀ Figure 14: Level of land ownership by Ward (n=567). Shading indicates the relative proportion of land held by each group (individuals, family or clan).

Types of land ownership	%	Frequency
Government	2	8
Church	0.6	3
Company	0.8	4
Customary	96	501
Without title	75	390
With title	21	111
To be purchased	0.4	2
Bought without title	0.2	1
Returned by Government to landowners	0.2	1
Don't know	0.2	1
Total	100	521

▲ Table 4: Summary of main types of land ownership within the survey area (n=521 responses).

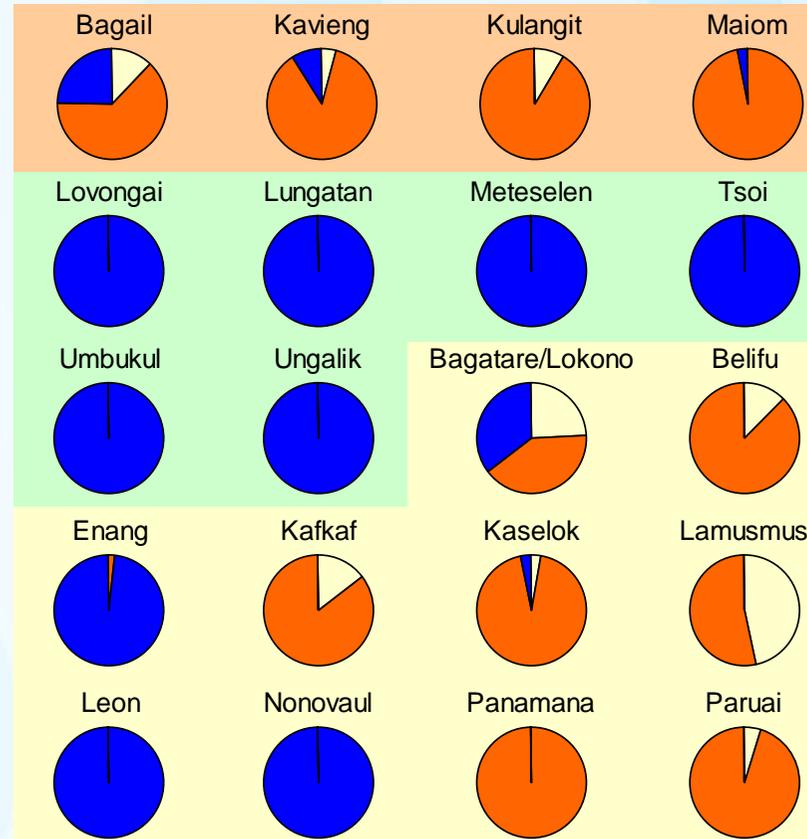
HH-Q13 PUBLIC TRANSPORT

DO PEOPLE IN THIS HOUSEHOLD USE PUBLIC AND HIRED TRANSPORT? USUAL DESTINATION FOR CAR (HIRED, TAXI) / BUS, PMV / BOAT (HIRED, FERRY); FREQUENCY (TOTAL TRIPS PER MONTH FOR HOUSEHOLD); COST (K).

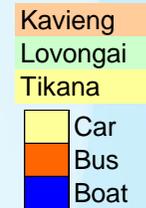
The most common form of transport used by people over the survey area was boat (48%) closely followed by Bus/PMV (44%). Very few people use car transport and no other forms were reported (but see HH-Q14 on vehicle ownership which includes bicycles). Forms of transport used appears to depend heavily on Ward, and less dependent on LLG. People in Lovongai LLG exclusively use boat transport, but this was also observed in Enang, Leon and Nonovaul Wards in Tikana LLG (Figure 15). Buses are heavily used in all remaining Wards, with highest dependence on buses in Panamana, Paruai, Kaselok and Maiom. Only two Wards, Bagatare/Lokono and Bagail tended to use all three forms of transport relatively evenly.

The number of trips made per month averaged 7 across the survey (+/-13 trips). People living in Kavieng LLG tended to be more mobile than those in Lovongai, with the fewest number of trips per month being undertaken in Tikana (Figure 16). People living in Kavieng, Maiom and Tsoi Wards averaged the greatest number of trips by public transport per month, while people in Meteselen, Ungalik and Kafkaf tended to undertake the fewest trips.

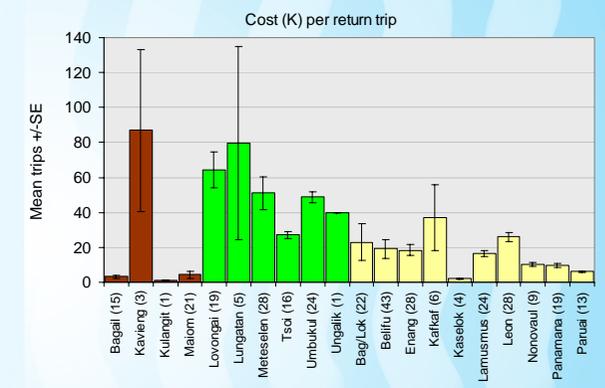
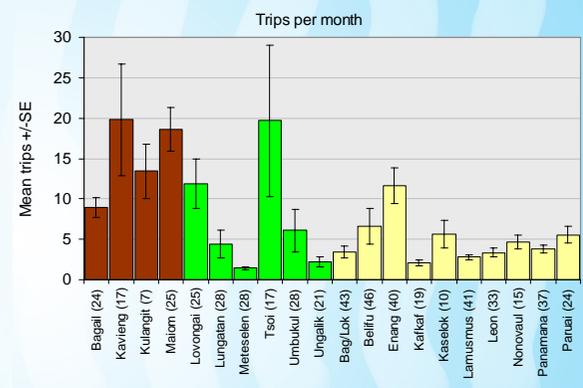
Costs of transport were high in Kavieng Ward and all Wards in Lovongai LLG (Figure 16). Some of the lowest transport costs were, however, also recorded in Kavieng LLG at Bagail, Kulangit and Maiom. This may be due to close proximity of most of the markets, goods and services accessed, though it is unclear why Kavieng Ward in the same LLG should have such high costs of public transport. Costs in Tikana LLG were generally the lowest recorded.



◀ Figure 15: Relative use of different forms of transport broken down by LLG and Ward (n=679)



▼ Figure 16: Trips per month and cost per return trip using all forms of transport by LLG and Ward. Data are means +/-SE for all forms of transport used in households showing (n) for each Ward. ! Kavieng LLG ! Lovongai LLG ! Tikana LLG (n=527 responses for trips per month and n=329 for cost per trip).



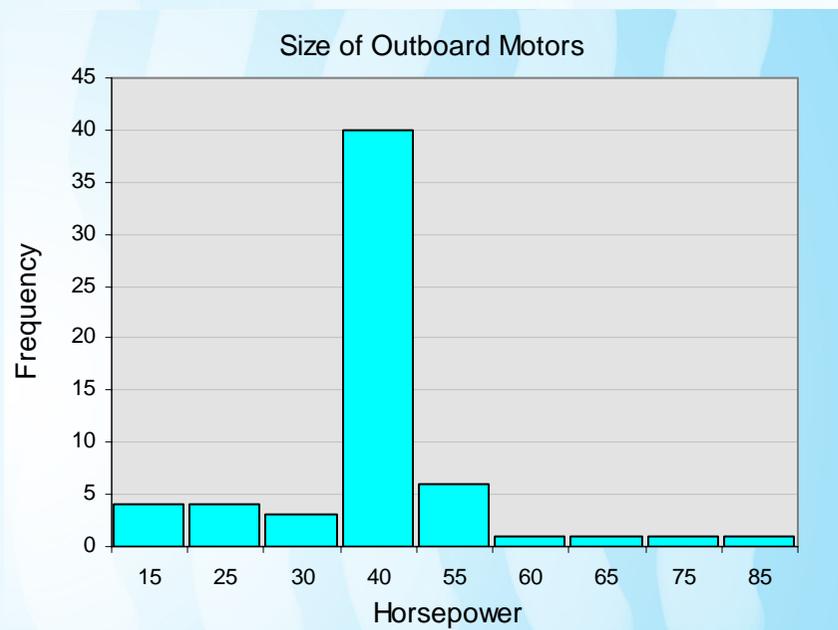
HH-Q14 VEHICLES & BOATS

HOW MANY CARS, BOATS, BICYCLES, CANOES OR OTHER FORMS OF TRANSPORT ARE OWNED BY THIS HOUSEHOLD? BY WHOM? WHAT IS THE SIZE OF BOAT AND MOTOR AND THE TYPE OF FUEL USED BY BOATS?

A total of 399 vehicles were reported owned by respondents to this survey across all LLGs and Wards. The most commonly owned vehicles were canoes, followed by banana boats and bicycles (Table 5). The average number of vehicles per household was 0.66 across the study area, with an average of 1.39 +/- 0.74 in households with any vehicles. The maximum number of vehicles in one household was 6; which in that household comprised 2 bicycles, 2 canoes and 2 banana boats. Surprisingly, no PMVs were owned by any of the interviewed households, despite the fact that many of them operate within the survey area.

Around 80% of all boats owned did not have a motor, including 23% of all banana boats. Among those with motors, the most common size was 40 hp (Figure 17), and ranged between 15 and 85 hp. 100% of these used “zoom” (petrol + oil 2-stroke) as fuel.

There were, surprisingly, no other types of land vehicles or boats recorded as owned within the survey area (such as tractors, trucks, workboats, barges). These results should be taken with caution: It is likely that enumerators did not adequately prompt people for other types of vehicles during the survey.



▲ Figure 17: Size of outboard motors owned in households (n=61).

	%	Frequency
Bicycle	16	64
Motorbike	0.5	2
Car	1	5
PMV	0.0	0
Canoe	63	252
Dinghy	0.3	1
Banana boat	19	75
Totals	100	399

	%	With motor	No motor
Canoe	2	98	
Dinghy	0	100	
Banana	77	23	

▲ Table 5: Details of vehicles owned by households in all LLGs and Wards. (a) Data are totals of vehicles owned and recorded in the survey, with % referring to relative proportions of vehicles of each type, regardless of household (n=399). (b) Percentage of boats with and without motor (n=315).

HH-Q15 COSTS OF SCHOOLING

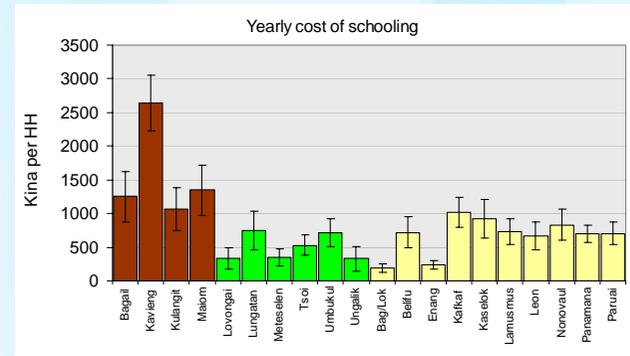
HOW MUCH DOES IT COST TO SEND ALL THE CHILDREN IN THE HOUSEHOLD TO SCHOOL EACH YEAR? (INCLUDE COST OF FEES, BOOKS, UNIFORMS, TRANSPORT, FUNDRAISING ETC). ARE YOU ABLE TO MEET THIS COST? IF NOT, WHAT DO YOU DO?

The average household cost of schooling across the surveyed area was K 981 per year (+/-SD=2677). The average cost of schooling per child per year was K 364 (+/-573), with the highest per child costs being reported in Kavieng and Maiom Wards (Figure 18). The lowest cost of schooling a child was recorded in Lovongai Ward where the highest level of schooling available is primary school.

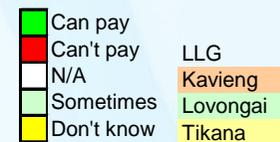
50% of households reported that they were able to meet the costs of schooling, while 17% reported that they could not meet the costs (Table 6). The perceived ability to pay for schooling varied among LLGs and Wards, with a larger proportion of people in Kavieng LLG and Panamana and Paruai Wards (Tikana LLG) reporting that they could pay than in other areas (Figure 19). People in Lovongai LLG and Nonovaul Ward reported the most difficulties in paying for schooling for their children.

Among the reasons people gave for their difficulties in paying for schooling were the low prices fetched for goods sold (cash crops etc), high living costs, rising school fees, too many children and high costs associated with wantoks. People reported a wide range of approaches to meeting school costs. A small number of people (around 7%, n=248) suggested that meeting school costs was a matter of commitment, priority and managing their income. Around 5% of people sought assistance from their relatives, 2 households from institutional loans and 2 reported cutting down on food and clothing to meet the costs. 12 households meet their costs by paying fees over a period of time, and 4 households by only paying for 1/2 of the fees. 5 households kept children at home because they could not pay schooling costs.

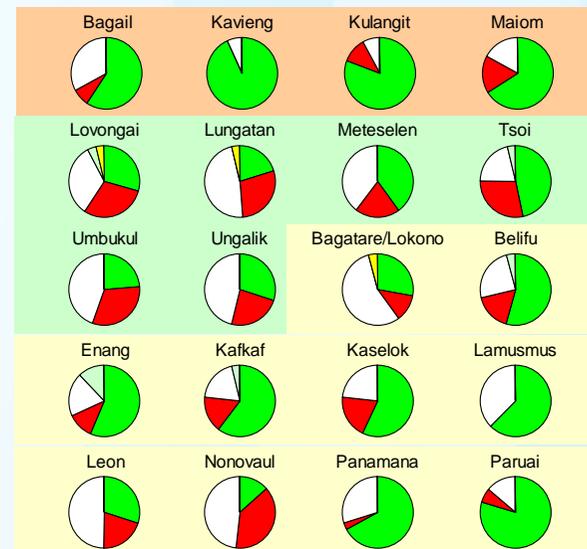
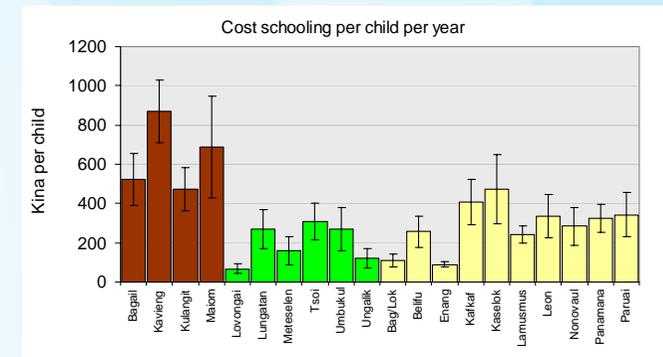
In order to meet the costs of schooling, households engaged in a range of income-generating activities, the most common of which were fishing (13%), copra (12%), garden produce (11%), buai sales (5%), employment (4%) and sago production (4%).



◀ Figure 18: Cost of schooling per household and per child for each LLG and Ward. Data are average costs (K) +/-SE for households that send children to school (i.e. excludes zero values reported by people who do not have children at school (n=384 and 346 respectively)).



▼ Figure 19: Ability to pay school costs by Ward and LLG (n=566).



▼ Table 6: Ability to pay for schooling costs across the survey (n=566).

	%	Freq
Can	50	282
Can't	17	97
N/A	31	177
Sometimes	1	7
Don't know	1	3
Total	100	566

HH-Q17-Q18 MALARIA

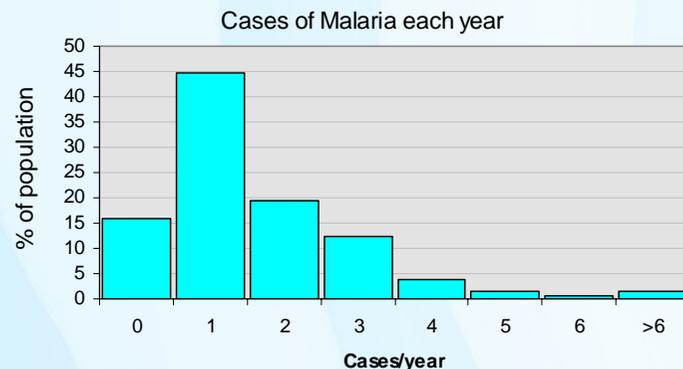
ON AVERAGE, HOW MANY TIMES PER YEAR DOES EACH OF THE HOUSEHOLD MEMBERS GET MALARIA?

Of 2,833 people for whom the frequency of Malaria cases per year was reported, 45% had one case per year, and 16% reported having no Malaria cases. Just under 8% of people were recorded as having 4 or more cases per year (Figure 20). 7 people reported having more than 20 cases of malaria per year, a result which is unlikely to be correct as it would result in perpetual debility due to the disease and an inability to detect the onset of each new case.

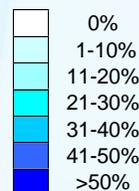
Cases of Malaria were most common in Bagail Ward and Lovongai and Tikana LLGs (except at Belifu), where most of the population experiences at least one case per year. In Kavieng, Kulangit and Maiom Wards between 36 and 51% of the population reported zero cases of Malaria on average per year (Figure 20).

Most people interviewed (92%) said that they and their family received treatment for Malaria through the hospital or their local Aid Post or Health Centre (Table 7). A small number (3%) either consulted a traditional healer or used traditional herbs at home. A few people went directly to the pharmacy or store, bought Artemether or other anti-malarials and administered treatment to themselves. 4 people either did not treat their Malaria or relied on prayer to recover from the disease.

The vast majority of people (96%) thought that the treatments they used (all included) were effective, while 1.4% reported that treatments were ineffective, and around 3% said that treatment effectiveness was conditional (Table 7).



▲ Figure 20: Number of cases of Malaria experienced by members of households per year for (a) all LLGs and Wards and (b) broken down by LLG and Ward. Values are percent of people in each frequency category (n=2833).



The main reasons given for why treatments were sometimes effective and sometimes not were not completing the course of drugs, not gaining access to the main hospital or larger Clinics if they were in remote areas, shortages of drugs and drugs being out of date.

The cost of treating a case of Malaria varied according to the services accessed and where. For treatment at a hospital or clinic, the average cost was around K 7 per adult per case of the disease (Table 8). If a person required admission to the main hospital, the cost was around K20, and testing for the disease cost around K 15. Medicine bought directly from the store costs an average of K 14-19 for a full treatment. Costs of treatment were generally higher in Kavieng LLG, averaging between K 8 and 50 per case for an adult. The lowest costs of treatment were in Lovongai LLG, where the cost for treating each case of Malaria was between 58 toea and K 2.73. People who used traditional treatments reported zero cost of treatment.

LLG	Ward	n	Malaria per year							
			0	1	2	3	4	5	6	>6
Kavieng	Bagail	123	0%	21-30%	11-20%	1-10%	0%	0%	0%	0%
	Kavieng	184	31-40%	21-30%	11-20%	1-10%	0%	0%	0%	
	Kulangit	176	31-40%	21-30%	11-20%	1-10%	0%	0%	0%	
	Maiom	165	31-40%	21-30%	11-20%	1-10%	0%	0%	0%	
Lovongai	Lovongai	157	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Lungatan	136	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Meteselen	151	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Tsoi	125	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Umbukul	119	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Ungalik	114	0%	21-30%	11-20%	1-10%	0%	0%	0%	
Tikana	Bagatare / Lokono	107	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Belifu	194	31-40%	21-30%	11-20%	1-10%	0%	0%	0%	
	Enang	113	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Kafkaf	113	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Kaslok	135	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Lamusmus	158	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Leon	160	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Nonovaul	116	0%	21-30%	11-20%	1-10%	0%	0%	0%	
	Panamana	188	0%	21-30%	11-20%	1-10%	0%	0%	0%	
Paruai	99	0%	21-30%	11-20%	1-10%	0%	0%	0%		

Malaria Treatment	%	Frequency
Hospital	50.7	305
Aid Post / Health Centre	41.4	249
Doctor	2.7	16
Traditional healer	1.7	10
Traditional treatment at home	1.7	10
Pharmacy	1.2	7
None	0.5	3
Prayer	0.2	1
Total	100	601



▲► Table 7: Treatments used by people surveyed for treating cases of Malaria and effectiveness of the treatment. For treatment, n=601 responses over 570 households and for effectiveness, n=612 responses over 568 households.

Effectiveness	%	Responses
Yes	89	545
No	1.3	8
Sometimes	2.6	16
If course completed		16
If go to hospital / larger centre		16
Drug shortage		9
Drugs old		1
Cured for short time only		1
Total		612

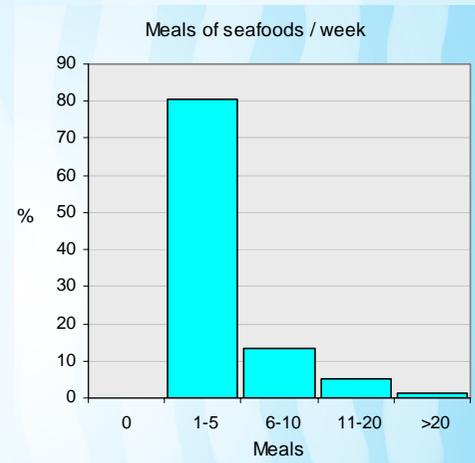
► Table 8: Average cost (Kina) for treatment of a case of Malaria in all LLGs and Wards (n=743 responses over 510 households).

Costs of treatment	Average cost (K)	SE	n	SD
Hospital / Post				
Adults	6.85	1.60	508	36.11
Children	0.57	0.05	183	0.64
Students	0.56	0.09	18	0.36
Old people	0.37	0.19	3	0.32
Doctor's fee	9.43	3.05	7	8.06
Admission fee	21.29	13.20	7	34.92
Testing	15.00	2.24	6	5.48
Traditional	0.00	0.00	4	0.00
Store bought medicine	14.57	2.52	7	6.65

HH-Q20 MEALS OF SEAFOOD

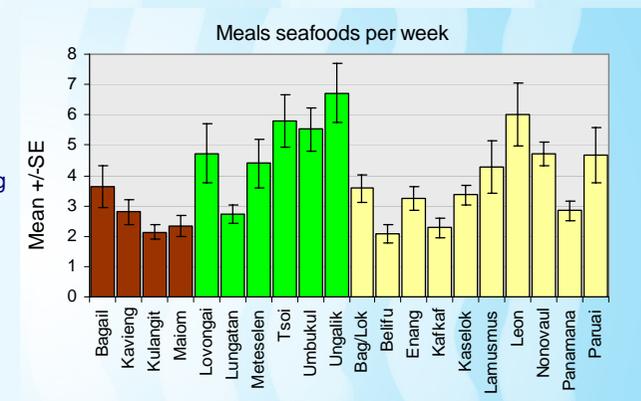
HOW MANY MEALS OF LOCALLY-CAUGHT SEAFOOD ARE NORMALLY EATEN IN THIS HOUSEHOLD EACH WEEK? (THINK ABOUT LAST 2-3 MONTHS)

The average number of meals of seafoods eaten in households per week across all LLGs and Wards was 4, and varied between 0 and 28. 80% of households ate between 1 and 5 meals of seafoods per week, and only 7 households ate greater than 20 meals of seafoods per week (Figure 21). People living in Lovongai Wards tended to have greater numbers of seafood meals than those in Tikana (except at Leon and Paruai), who in turn, had greater numbers of meals of seafoods than people in Kavieng LLG (Figure 22). The Wards with the fewest seafood meals per week were Kulangit, Maiom, Belifu and Kafkar.



► Figure 21: Percentage of households with different frequencies of seafood meals per week across the survey (n=559).

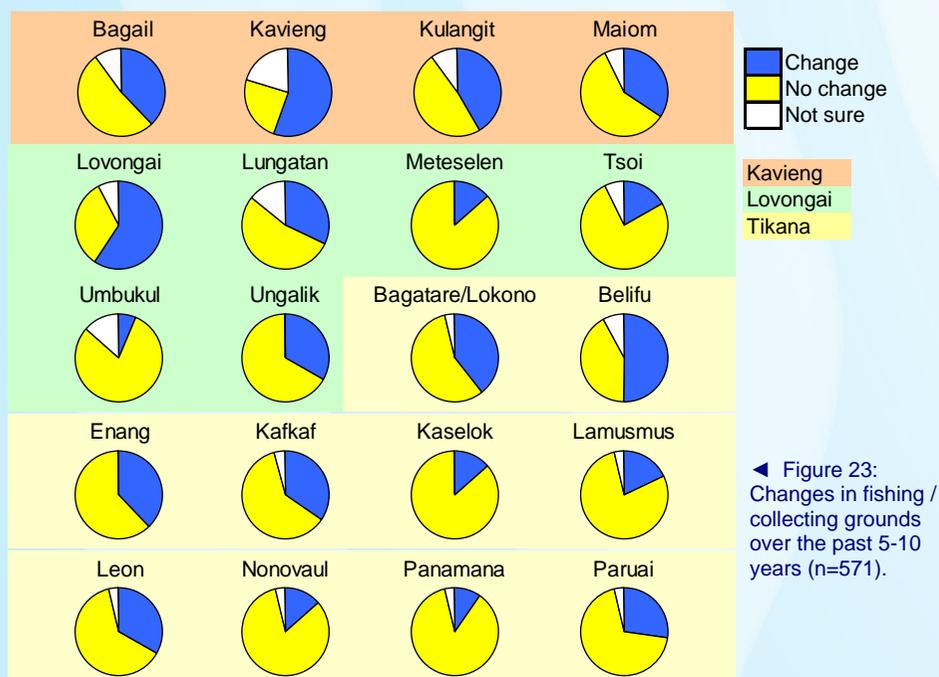
► Figure 22: Meals of seafoods eaten in households per week in each LLG and Ward. Data are means +/-SE (n=559). ! Kavieng LLG ! Lovongai LLG ! Tikana LLG.



HH-Q22 CHANGES IN FISHING & COLLECTING ACTIVITIES

HAS THERE BEEN ANY CHANGE IN THE LOCATIONS USED FOR FISHING OVER THE PAST 5-10 YEARS? DESCRIBE THE CHANGE AND REASONS WHY LOCATIONS ARE CHANGING.

30% of people interview thought that they had changed the locations of their fishing grounds over the past 5-10 years, while 64% said there was no change, and 6% were not sure. Changes were reported by a large number of people in Bagail, Kavieng, Kuangit, Lovongai, Belifu, Enang and Kafkaf Wards (Figure 23). The majority of people thought that there had been no changes in fishing grounds in Tikana and Lovongai LLGs (except at Lovongai Ward). The types of changes reported included variable or poor catches, “no” resources, a need for increased effort and small sizes of resources caught. Although not strictly related to the point of the question, people also reported that spawning sites were inactive and that there were changes in reef environments (Table 9). In



◀ Figure 23: Changes in fishing / collecting grounds over the past 5-10 years (n=571).

Types of changes	%	Frequency
Bad catches / no resources	77	74
Long hours needed for catch	2	2
Small sizes caught	3	3
Catch variable	8	8
Seasonal changes	2	2
Spawning sites inactive	1	1
Reef changes	6	6
Total	100	96

▶ Table 9: Types of changes in fishing grounds reported by people interviewed across all LLGs and Wards (n=96).

response to perceived changes in fishing grounds, 58 respondents (n=73) moved to new fishing grounds, while 4 changed to either a new stock or started utilizing different fishing methods. These strategies included moving to fishing in deeper water or to a change in target species. 11 respondents said that they would have liked to move to new fishing grounds, but could not use other areas either because they were owned by others, or because they did not have the required transport to get there.

110 people gave reasons for the changes, blaming fishing techniques, environmental damage, seasonal and permanent migrations of target species, management and human population concerns. The most common reasons given were: use of derris root (20%), changes in tides or currents (11%), changes in reefs / corals (10%), seasonal changes (8% - note that this response misses the point of the question which was focused on more long-term shifts observed), and too many fishers (7%). The full range of responses given is shown in Table 10.

▼ Table 10: Reasons given in rank order for reported changes in fishing grounds (n=110).

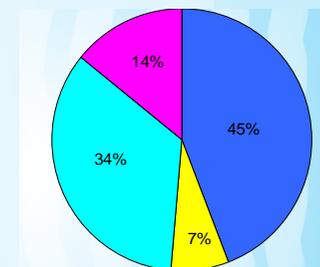
Reasons (ranked)	Frequency	Reasons (ranked)	Frequency
Derris	22	Bad fishing techniques by Asians	1
Tide / current changes	12	High price	1
Reef changes / coral	11	Removal of reef for road	1
Fish move with moon / seasons	9	Spawing sites changed	1
Too many fishers	8	Bad weather	1
Bait / tackle doesn't work	6	Dynamite	1
Fish moving to deep water	6	Fish shelter damaged	1
Overfishing	5	New reefs made by using stones to fish	1
use of nets	3	No food for organisms in area	1
Population increase	3	No control over areas / resources	1
New fishing technology / gear	2	Illegal fishing	1
Mangroves damaged	2	Outsiders fishing in area	1
Water turbid	2	Tenure not observed	1
Pollution (oil, bleach, detergents)	2	Human behaviour	1
Fish move	2	Not sure	1

HH-Q23 IMPORTANT SEAFOODS FOR SUBSISTENCE & SALE

RANK THE MOST IMPORTANT FISH SPECIES FOR SUBSISTENCE / SALE. ARE THEY THE SAME? (RANK WITH 1 BEING MOST IMPORTANT, USE 0 IF NOT IMPORTANT).

The most important seafoods for subsistence or sale were mixed reef fishes (32%) and sea cucumbers (12%) in terms of people targeting their catch in terms of species or species groups. Shellfish, *Trochus*, lobsters and Lutjanids (snappers) together accounted for another 24% of seafoods targeted by species or group (Table 11). It is therefore not surprising that in terms of activities, reef fishing and fishing by handline from a boat are the two most important, accounting for 53% of all fishing / collecting activities recorded. Collecting was the next most important activity accounting for 22% of all those recorded. Only 1 household reported undertaking derris root fishing. This is small given the amount of concern over the deleterious effects of this activity indicated by people elsewhere in the survey.

Seafoods caught / collected by members of the household were mostly used within the household (45%) and for selling to earn income (34%). That is, almost 80% of all seafoods were used for direct benefit to the household. The remaining seafoods were given to Wantoks (14%) or used in community activities (7%) (Figure 24). This pattern varied significantly among Wards, but there was no consistent pattern related to LLG. People in Lovongai, Meteselen, Umbukul, Belifu and Paruai used more than 50% of their catches directly in the household for food. People in Tsoi and Enang used more than 50% of their catches for selling. Seafoods were given to Wantoks most in Kavieng LLG, Bagatare / Lokono, Belifu, Kaselok, and Leon. Community uses were most important in Kulangit, Maiom, Ungalik and Leon.

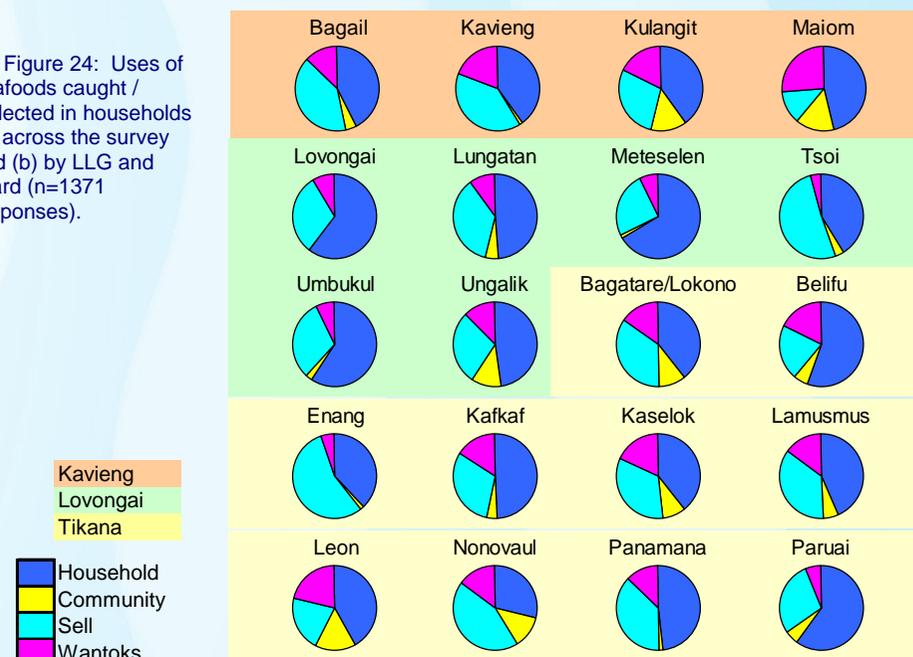


▼ Table 11: Rank order of the most important fishing / collecting species or activities in households. People usually reported their fishing activities either in terms of target species, or fishing activity. We did not require people to reorganise how they normally think of their activities, but allowed them to report them according to the way they normally considered them. Some people appeared to target particular species or groups of organisms, while others took whatever species were captured using a particular fishing method. Values are frequencies that a species or activity was used in the households interviewed. In some cases, people reported species and activities together, so the values in the table do not sum to the total number of responses (n=1371 responses across 564 households).

Species	#	Species	#
Reef fish	332	Kyphosids	12
Cucumbers	124	Scarids	9
Shellfish	64	Pekagics	7
Trochus	61	Acanthurids	6
Lobsters	59	Rainbow runner	6
Lutjanids	58	Barracuda	4
Crabs	47	Scads	3
Lethrinids	42	Haemulids	3
Trevally	39	Wrasses	2
Tuna	27	Goatfish	1
Serranids	25	Milkfish	1
Deepwater fish	23	Gerreids	1
Siganids	20	Triggerfish	1
Giant clams	17	Sharkfin	1
Mackerel	15	Squid	1
Mullet	13	Subtotal	1024

Activities	#
Reef fishing	208
Boat Handline / Bottom fishing	194
Collecting	164
Diving / Speargun	88
Trolling	69
Netting	33
Deepwater fishing	2
Canoe	1
Derris	1
Subtotal	760
Total	1784

► Figure 24: Uses of seafoods caught / collected in households (a) across the survey and (b) by LLG and Ward (n=1371 responses).



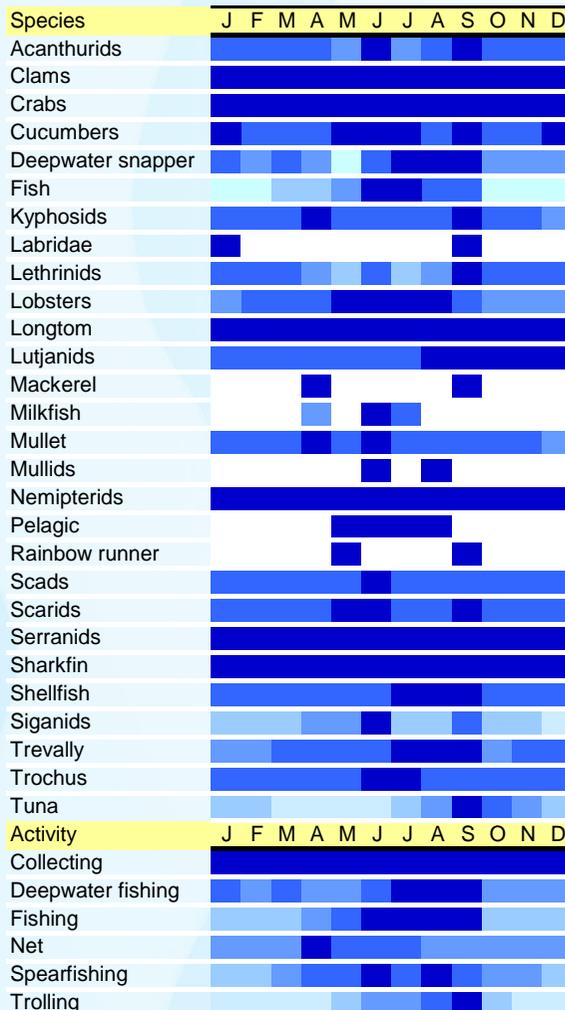
HH-Q24 TIMING OF FISHING / COLLECTING ACTIVITIES

IS THERE A SEASON DURING THE YEAR FOR EACH FISHING ACTIVITY? HOW LONG? WHICH MONTHS / MOON PHASES FOR WHICH SPECIES?

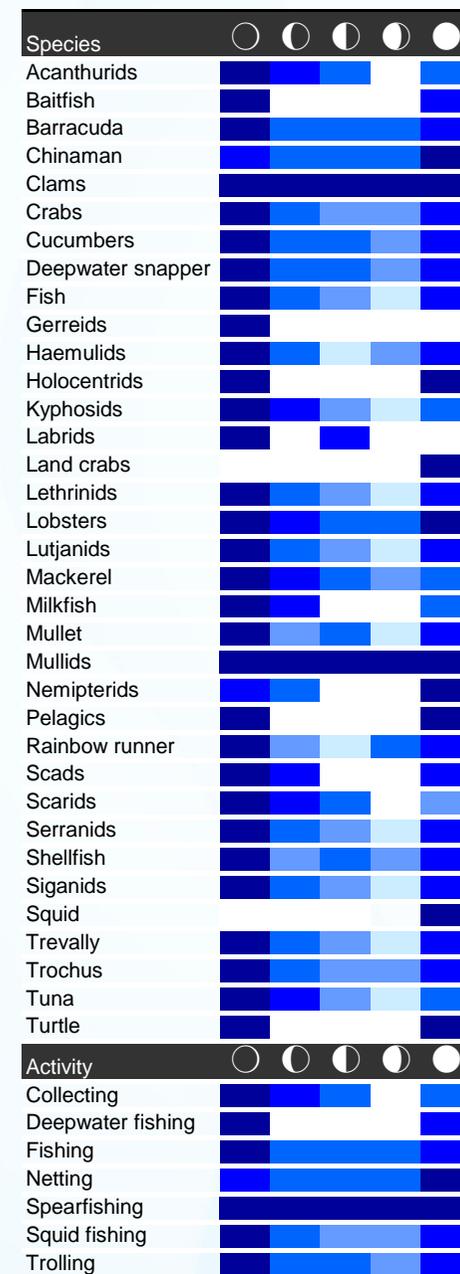
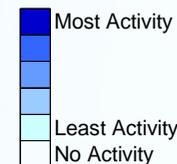
People reported a range of preferred seasons for their fishing and collecting activities, both in terms of months of the year and phases of the moon. Some target species or groups such as clams, crabs, longtoms, Nemipterids (whiptails), serranids (groupers) and sharks are fished all year around and do not appear to have a definite fishing season (Figure 25). In terms of activities, only collecting occurs equally all year around. For most other species and activities, there is a definite peak during the June-September period.

We interviewed people only regarding half of the moon cycle (waxing phases). Clams, mullids (goatfishes) and spearfishing occur at any time of moon phase (Figure 26), but for most other species, groups or activities, there is a large bias towards fishing during the new moon, and secondarily during the full moon. Very little fishing activity occurs during the third quarter moon.

► Figure 25: Distribution of fishing / collecting activities over the months of the year. Intensity of shading indicates focus on particular months (n=417 responses).



► Figure 26: Distribution of fishing / collecting activities over the waxing phases of the moon (n=1082 responses). Intensity of shading indicates focus on phases of the moon, with no colour (white) indicating no activity. ● New ● First quarter ● Half ● Third quarter ○ Full Moon.



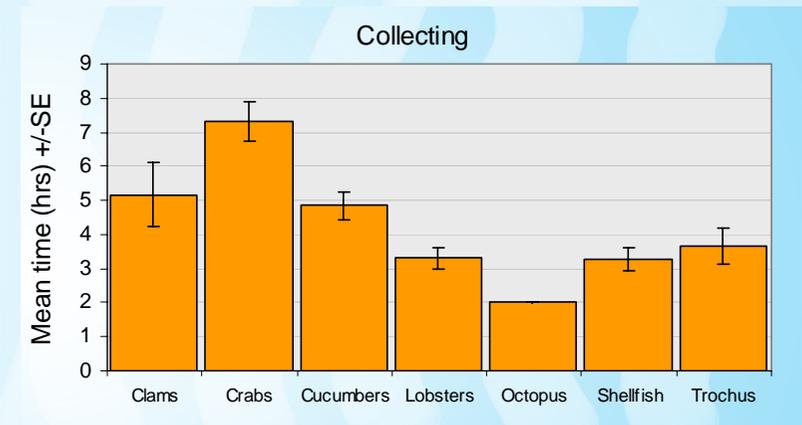
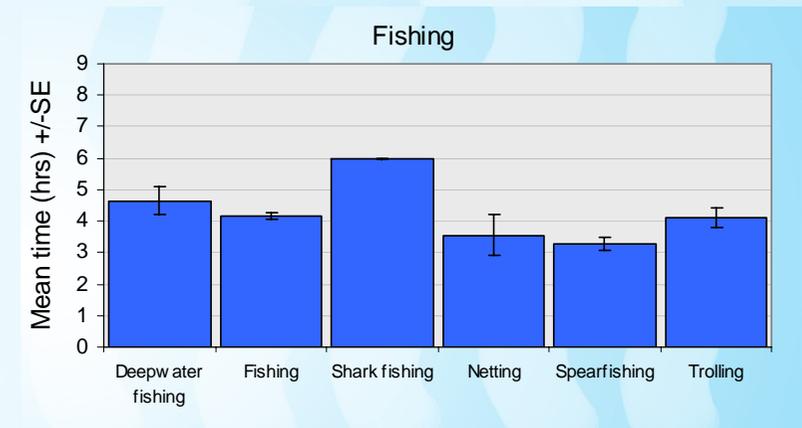
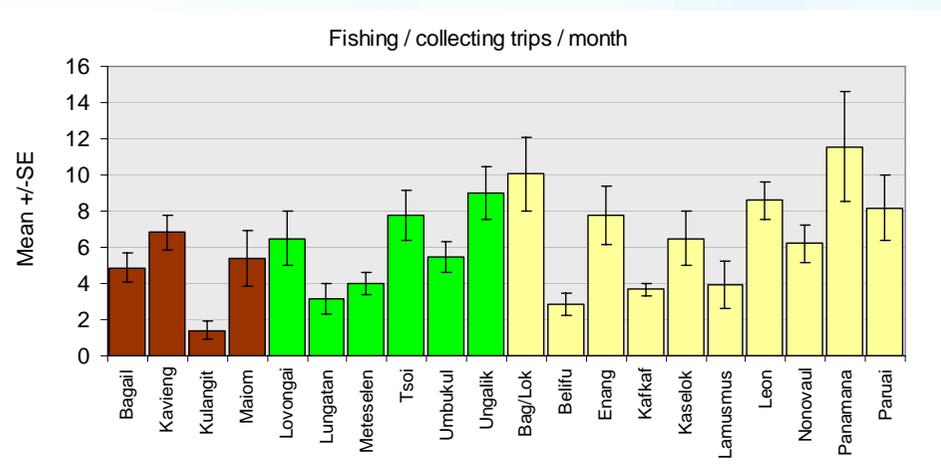
HH-Q26-Q27 FISHING EFFORT

HOW MANY FISHING TRIPS ON BOATS PER MONTH? HOW LONG (HOURS) DOES AN AVERAGE FISHING TRIP LAST? WHEN DURING THE DAY OR NIGHT DO YOU USUALLY FISH?

The average number of fishing trips in boats made per month across the entire survey is 6.6 per household (+/-6 SD). The number of trips made varies by Ward, with the most trips being undertaken in Panamana, Bagatare / Lokono and Ungalik Wards (Figure 27). Households in Kulangit and Belifu undertook the fewest fishing trips per month (mean of 1.4-2.8).

The overall average amount of time spent on fishing or collecting trips for the survey was 4 hours (+/- 2.6 SD). Crab collecting was on average the most time-expensive activity (Figure 28), with shark fishing possibly in second place (note n=1 for shark fishing), followed by clam and sea cucumber collecting. Spearfishing and octopus collecting appear to be the activities that require the least amount of time.

▼ Figure 27: Number of fishing trips on boats per month by LLG and Ward (n=334 responses). Data are mean number of trips +/-SE of estimated number of fishing trips undertaken in households each month (n=335). ! Kaviengi LLG ! Lovongai LLG ! Tikana LLG.



▲ Figure 28: Time taken for each fishing or collecting trip. Values are mean hours +/-SE taken for each trip (n=1039).

HH-Q28 CATCHES

WHAT IS THE AVERAGE CATCH PER TRIP IN NUMBERS OF FISHES, CUCUMBERS, SHELLS, CLAMS, SEAWEED, CRABS, LOBSTERS AND OTHER THINGS YOU COLLECT FROM THE SEA?

In terms of the number of kilograms caught per fishing or collecting trip, the largest recorded catches were of deepwater fishes (mostly snappers) that yielded an average of 86 kg of fishes per fishing trip. The next highest value was about 37 kg / trip for pelagic fishes (Figure 29). These data should be interpreted with caution, as very few people have access to facilities for weighing their catches. Only those people selling their catches to buyers have reliable access to scales, so the weight estimates for other species are likely to be underestimates. This might be especially true for sea cucumbers that would not have been weighed until they had been dried.

In terms of the numbers of animals caught or collected, values varied between 6 and 16, individuals per fishing trip. This amount per trip appears to correspond with the numbers of fish being sold at individual tables in the Kavieng Main Market.

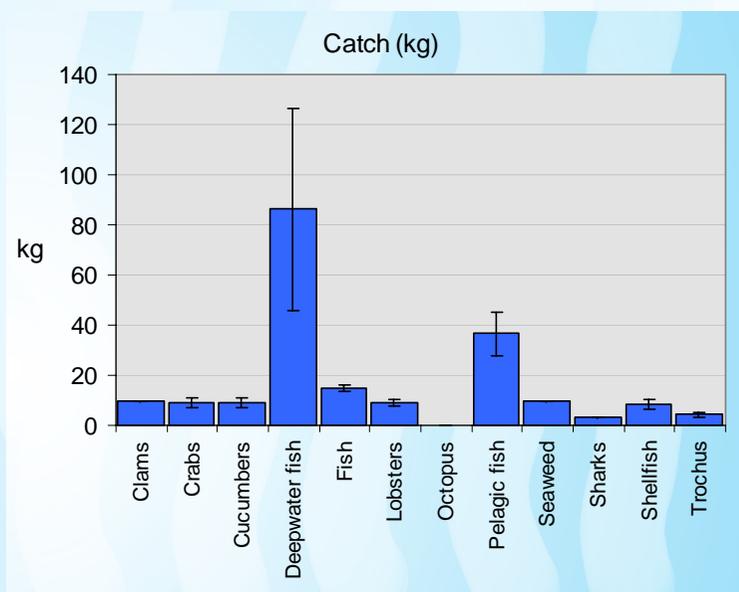
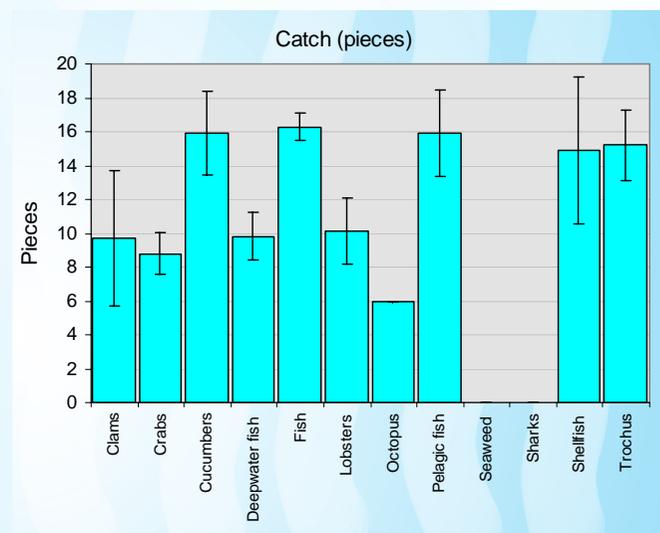


Figure 29: Catches per fishing / collecting trip in (a) kilograms or (b) numbers of animals. Data are means +/-SE. The two data sets are complementary with some responses provided as kg (n=412) and some as number of pieces (n=522). The weights are mostly wet, though for sea cucumbers are likely to be dry weights.

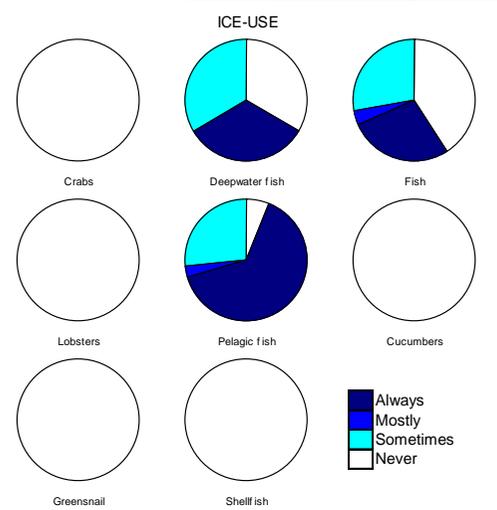


HH-Q29 USE OF ICE

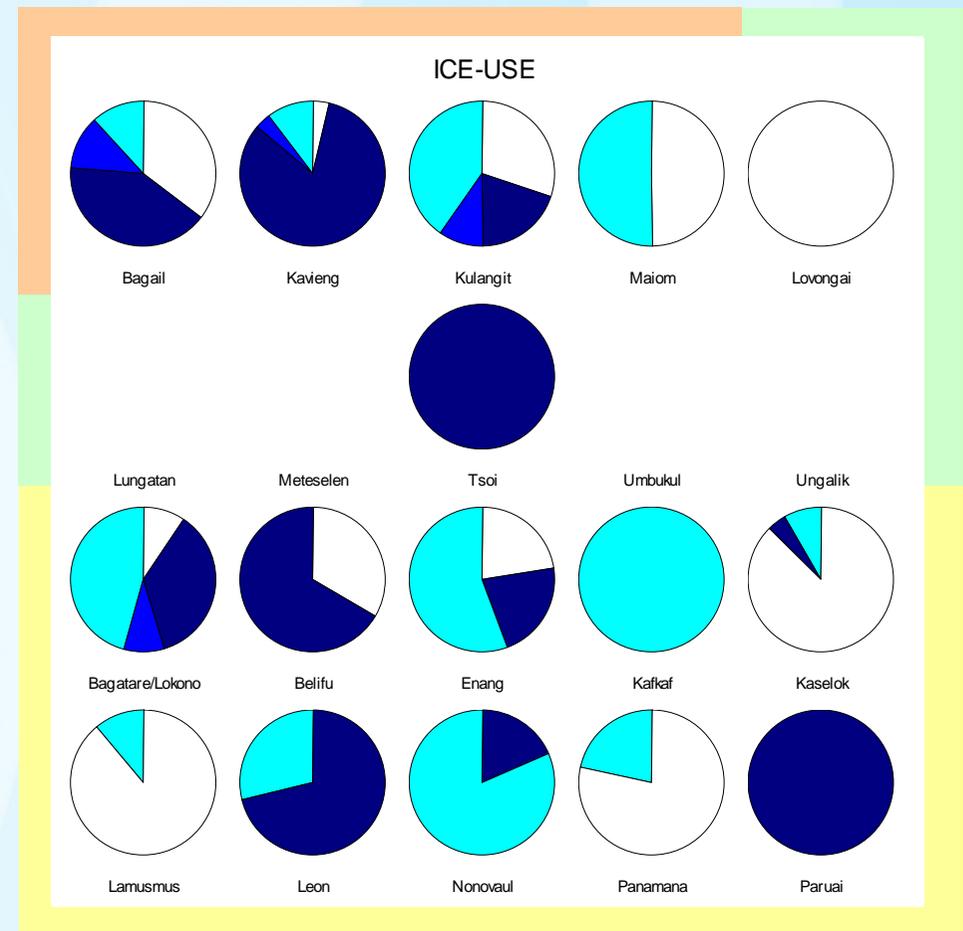
IS THE CATCH CHILLED ON ICE? WHICH ONES? HOW MUCH OF THE TIME?

Overall, 34% of people reported that they used ice “all the time” when they went fishing, and 37% said that they never used ice. 3% said that they used ice most of the time, while 25% said they used it sometimes. Some of this range of ice use can be related to the species / groups being targeted. Ice was most commonly used for pelagic fishing (Figure 30). About 1/3 of deepwater fishers used ice on every trip, 1/3 sometimes and 1/3 never. Ice was not used for crabs and lobsters and shellfish (sold live), greensnail (sold for their shells, with the meat eaten at home) nor for sea cucumbers (that were later boiled and smoked or dried).

Reported use of ice also varied significantly by Ward (with no real patterns relating to LLG). People in Tsoi and Paruai used ice all of the time, but note the total number of responses was 2 and 1 respectively, so the results are unlikely to reflect real usage. The greatest users of ice were those in Bagail and Kavieng, while those in Lovongai did not use ice. The use of ice was sporadic over the remaining Wards and the number of responses to this question was generally low (where n was between 2-24 per Ward).



◀ Figure 30: Use of ice in fishing and collecting, by species or group (n=153 responses).



▲ Figure 31: Use of ice in fishing by LLG and Ward (n=153).

Kavieng
Lovongai
Tikana

HH-Q30 COSTS OF FISHING

WHAT IS THE ESTIMATED COST PER FISHING TRIP OF FUEL, BAIT, ICE, FISHING GEAR, CREW, FOOD, ETC?

The average cost of a fishing trip across the survey was 30 Kina and ranged between 0 and 915 Kina. The highest costs of fishing trips were recorded in Bagatare / Lokono, Kavieng, Bagail and Tsoi, and the lowest costs in Belifu (only a few toea, with n=30). Most Wards in Tikana had low costs of fishing (except Bagatare / Lokono noted above), and Lovongai and Meteselen had the cheapest costs in Lovongai LLG (Figure 32).

When the costs of fishing were broken down, the most expensive items across the survey were fuel and gear (total of 68% of costs), with 10% of costs attributed to food. Ice accounted for 7% of fishing costs and crew only 5% (Figure 33). Costs in the “other” category were generally not identified.

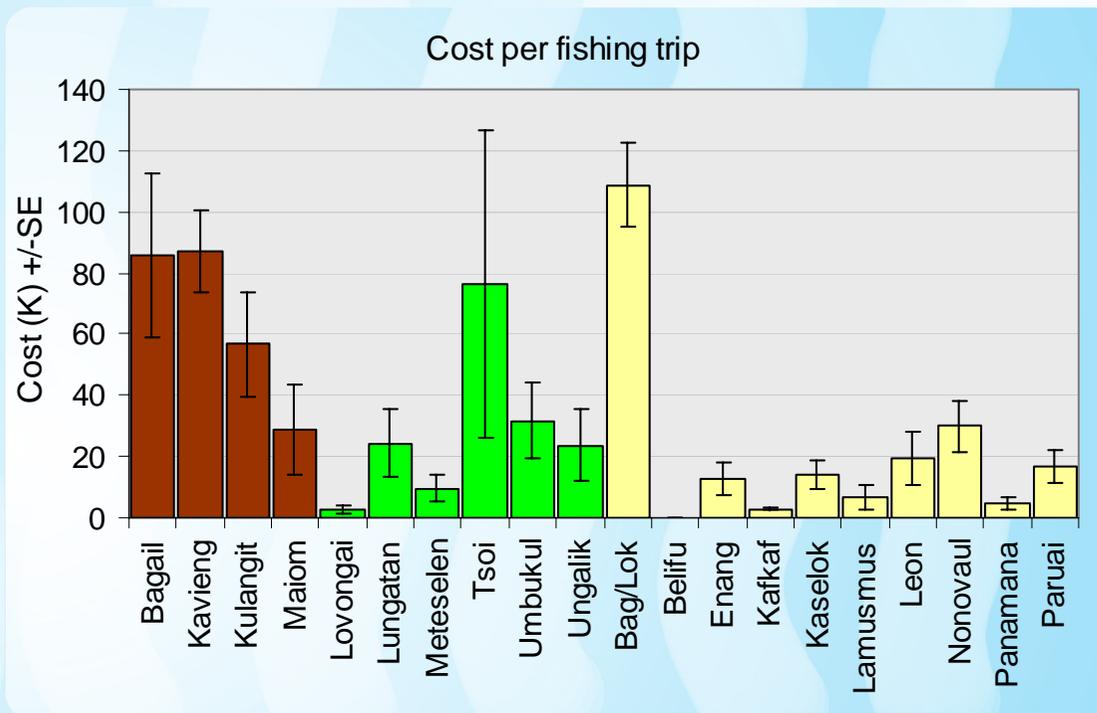
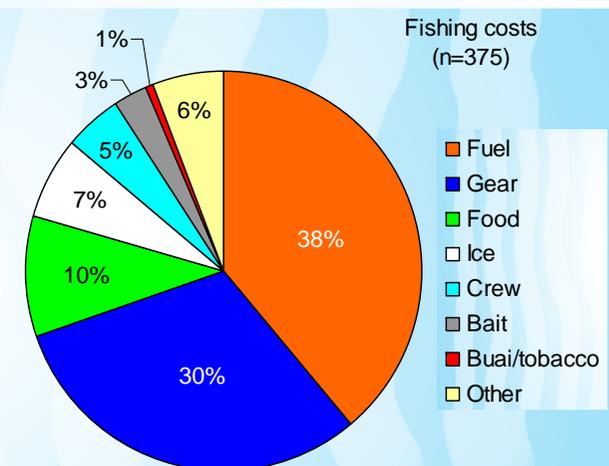


Figure 32: Cost per fishing trip by LLG and Ward (n=375). Values are mean costs (Kina) +/-SE. ! Kavieng LLG ! Lovongai LLG ! Tikana LLG.

Figure 33: Breakdown of costs of fishing trips for all LLGs and Wards (n=375).



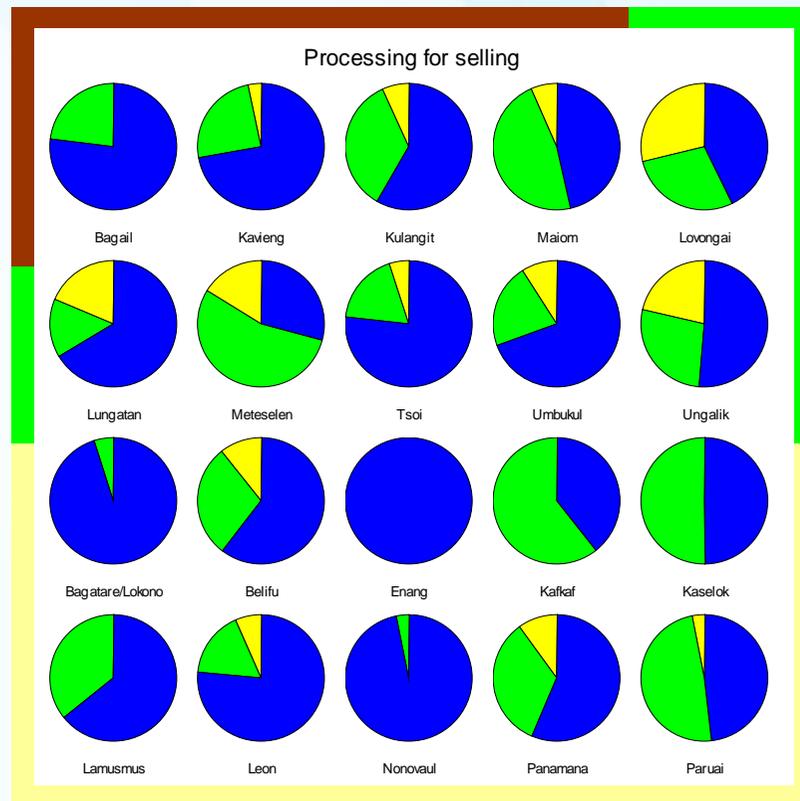
HH-Q31 SEAFOOD PROCESSING

DO YOU PROCESS YOUR CATCH FOR SALE? HOW? WHICH SEAFOODS? WHY?

62% of people in the survey said that they processed their catches in some way before selling them. 7% did not process their catches and the remaining people said they did not sell their catches, though they did sometimes process for their own use (e.g. cleaning or smoking) (Table 12). Processing of the catch before sale was common in all Wards, but those with the largest number of people not processing their catch were Lovongai, Lungatan, Meteselen and Ungalik (Figure 34).

The types of processing of the catch depended on the organism caught or collected (Figure 35). Fish were generally gutted, and most gilled before being chilled and sold fresh, or smoked. There were some notable examples of gilling not being undertaken because people said that some consumers preferred the taste of fish with their gills intact. Generally, fish were not scaled for sale – this was a task generally reserved for the consumer.

The most common reason given for processing seafoods was to preserve them and prevent spoilage (66% of people, Table 13). Other common reasons given were to increase appeal for sale, to clear away any dirt or “rubbish”, and to ensure the food was safe (from bacterial contamination). Only 2.5% of people said that they processed in order to increase the price of their catch.



▲ Figure 34: Breakdown of proportion of people processing their catch before selling by LLG and Ward. NA means that the catch was not sold, so any processing was irrelevant to this question (n=573 households).

Seafood	Gutted	Gilled	Scaled	Cleaned	Finned	Shelled	Tied claws	Filleted	Skewered	Kept live	Wrapped	Packed	Boiled	Smoked	Fried	Mumu	Salted	Dried	Chilled / Ice	Frozen	
Clams																					
Crabs																					
Cucumbers																					
Fish																					
Lobsters																					
Shark																					
Shells																					
Trochus																					

▲ Figure 35: Catch processing for sale for major groups of organisms caught or collected (n=381 instances of seafoods processed over 331 households).



Reason	%	Frequency
Preservation	65.7	337
Appeal for sale	10.7	55
Quality control	6.6	34
Clean / remove rubbish	6.0	31
Hygeine / safety	3.9	20
Increase price	2.5	13
Good taste	1.9	10
No smell	0.8	4
Customer demand	0.8	4
Buyer requirements	0.4	2
Easier to eat	0.2	1
Easier to cook	0.2	1
Fisheries regulations	0.2	1
Total	100	513

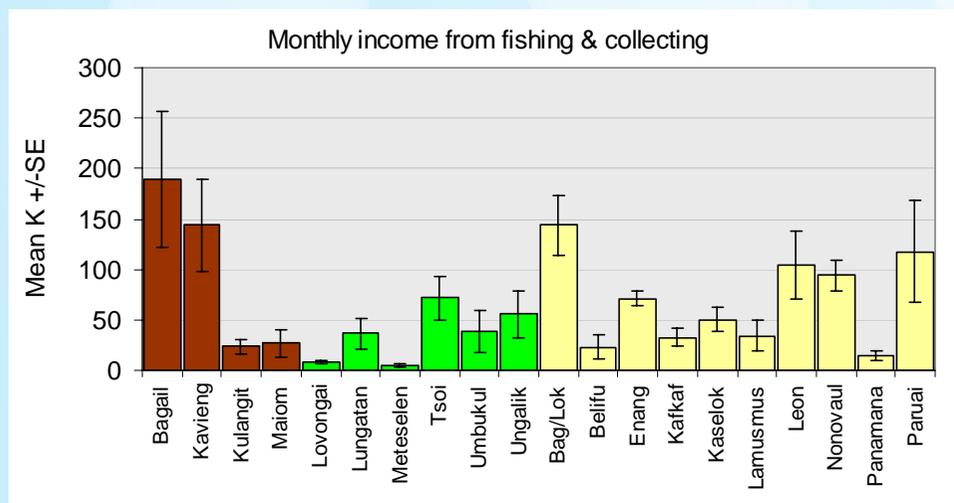
▲ Table 12: Catch processing by response and household (n=624 responses over 573 households). Note: There are more responses than households because people reported more than one type of processing per household to cover different species of seafoods.

HH-Q32 INCOME FROM FISHING

WHAT IS THE ESTIMATED AVERAGE INCOME PER FISHING TRIP? HOW MANY PEOPLE SHARE THIS INCOME INSIDE AND OUTSIDE THE HOUSEHOLD?

The overall average monthly income into each household from fishing across all LLGs and Wards is around K 66, and ranged between 0 and K 1,005 per month. The best household incomes derived from fishing and collecting were found in Bagail, Kavieng and Bagatare / Lokono Wards where average fishing / collecting incomes were between K143-189 / month (Figure 36). Lovongai, Meteselen, Belifu and Panamana Wards all had very low monthly household incomes from fishing, averaging between K 8-23 / month. This income is on average shared with 1.6 (+/- 14 SD) people outside of the household.

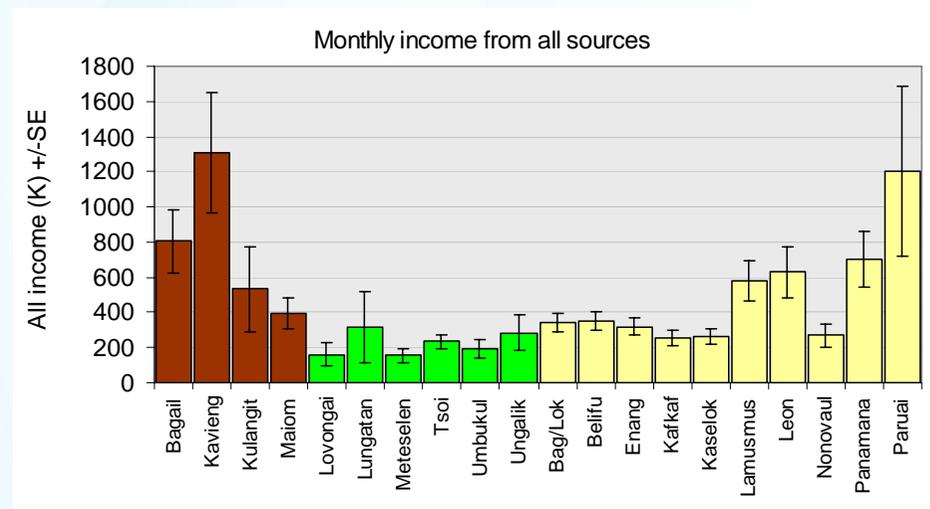
▼ Figure 36: Monthly income derived from fishing and collecting per household per month in each LLG and Ward (n=434). Values are mean monthly income (Kina) +/-SE. ! Kavieng LLG ! Lovongai LLG ! Tikana LLG.



HH-Q33 INCOME FROM ALL SOURCES

WHAT IS THE ESTIMATED TOTAL MONTHLY INCOME FROM ALL SOURCES TO THIS HOUSEHOLD?

The average monthly income to households from all sources across the survey was K 485 (+/-939 SD). Household incomes were highest in Kavieng and Paruai Wards, where they were over K1200 / month. The lowest household incomes were recorded in Lovongai LLG, and 6 of the Wards in Tikana, ranging between K 154 and 348 per month.



▲ Figure 37: Monthly income to households from all sources by LLG and Ward (n=493). Values are means +/-SE. ! Kavieng LLG ! Lovongai LLG ! Tikana LLG.

HH-Q34 LOANS

DO YOU OR ANYONE IN THIS HOUSEHOLD HAVE ANY LOANS (INCLUDE BANK OR WANTOK)? HOW MUCH? WHERE ARE LOANS FROM? WHAT ARE THEY USED FOR?

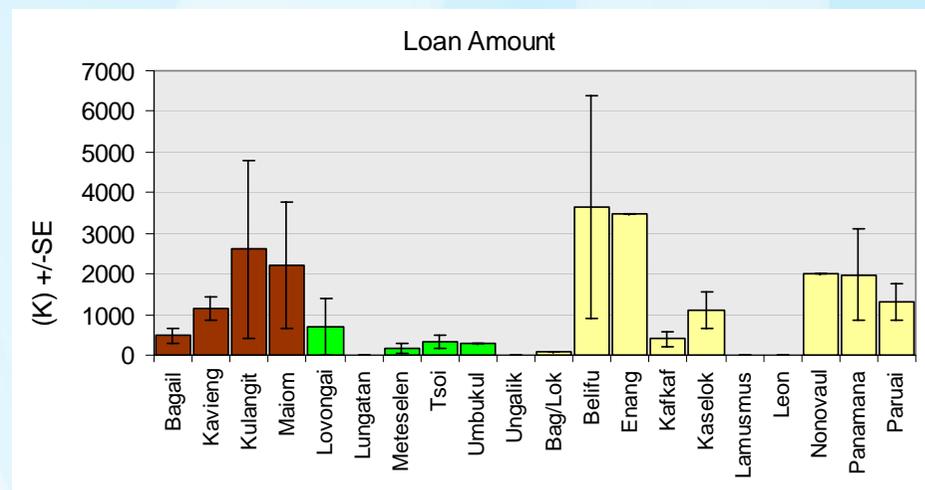
A total of K 97,485 is currently reported on loan to households surveyed during this study. The total number of loans reported was 74, which was spread over 66 households. 55% of all loans reported were from *New Ireland Savings & Loans* or wantoks (Table 14). Most of the remaining loans were from friends, employers or microfinance schemes.

The average loan amount owed by households (excluding households without any reported loans) was K 1,477 across the entire survey with large variations among households (see large error bars in Figure 38), Wards and LLGs. The wards with the highest average household loans (K 1,325 - 3,650) were Belifu, Enang, Kulangit, Maiom, Nonovaul, Panamana and Paruai. People in Lovongai LLG generally had small loans of up to K 700.

People reported taking out loans for a range of reasons including for household use, to pay school fees and to start up businesses (Table 15). The largest loan recorded was K 20,000, used to purchase a boat and engine.

Loan source	Loans	%
New Ireland Savings & Loans	23	31
Wantoks	11	15
Bank	7	9
Friends	6	8
Employer	6	8
Teachers Savings & Loan Society	6	8
Kwila Insurance Corp.	3	4
Oil Palm Companies	3	4
Finance Corporation	2	3
Womens Credit Scheme	2	3
Building Board	1	1
Bisi Trade Store	1	1
Cocoa Savings	1	1
Public Officers Superannuation Fund Housing Scheme	1	1
PNG Teachers Association WF	1	1
Total	74	100

◀ Table 14: Loans held by households in all Wards and LLGs (n=74 loans across 66 households).



▲ Figure 38: Breakdown of average size of loans in households by Ward and LLG (n=74 loans over 66 households). Data are averages +/-SE only for houses with loans.

Uses	Frequency	%
Household use	21	27
School fees	18	23
Any use	7	9
House	6	8
Retailing	4	5
Car	3	4
Oil palm seedlings / work	3	4
Funeral	2	3
Boat / engine	2	3
Agricultural tools	2	3
Start Cocoa fermentry	2	3
Customary	1	1
Install power	1	1
Court case	1	1
Copra buyer	1	1
Copra dryer	1	1
Sewing	1	1
Mower	1	1
Timber	1	1
Contracting	1	1
Total	79	100

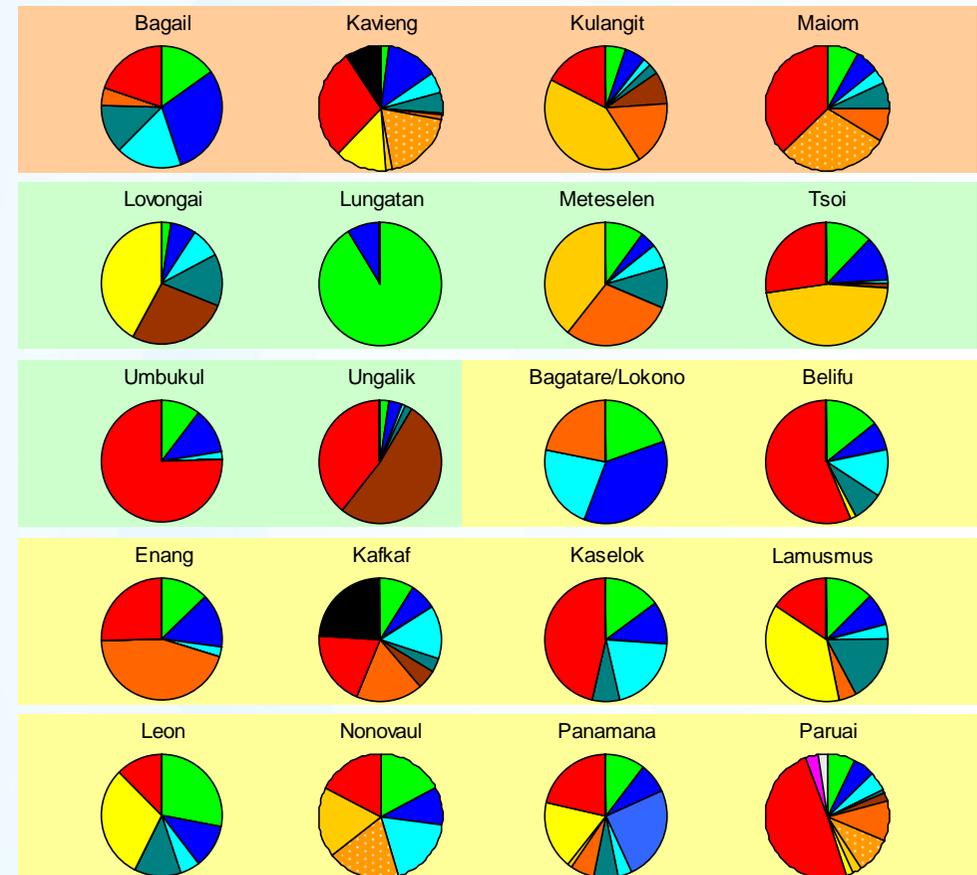
▶ Table 15: Uses for loans across all wards and LLGs (n=79 uses over 774 loans).

HH-Q35 CONTRIBUTIONS FROM DIFFERENT SOURCES OF INCOME

HOW MUCH INCOME COMES EACH MONTH FROM EACH OF THE ACTIVITIES CARRIED OUT BY ALL MEMBERS OF THE HOUSEHOLD?

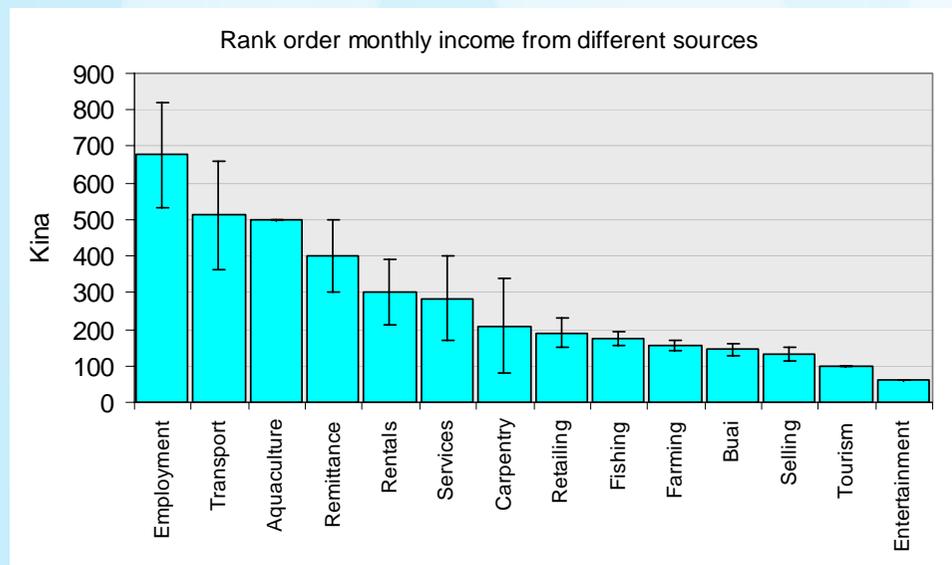
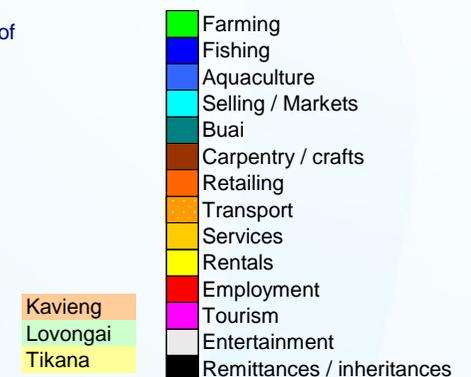
In this question, the average monthly household income from all sources aggregated across the entire survey was 517 Kina, slightly more than indicated in Q33 above. Households derive their income from a wide range of sources which we categorised into 14 broad types (Figure 39). In terms of contribution to the monthly income to households, employment and providing transport services (PMVs, boats, maintenance) are on average the largest cash contributors to the household within the project area. The contributions from farming, fishing and buai selling tended to contribute about 1/4 of the income that employment could.

The types on income activities in households varied among Wards, but there were no identifiable patterns related to LLG (Figure 40). Kavieng, Kulangit, Maiom, Kafkaf, Panamana and Paruai Wards were the most diversified in terms of types of activities used to generate income. In contrast, people in Lungatan Ward derive their income entirely from farming (91%) and fishing.



▲ Figure 40: Relative contributions of all sources of income to households by LLG and Ward (n=1289).

◀ Figure 39: Sources of income in rank order of average Kina contributions to total household income across the survey (n=1289).



HH-Q36 COSTS OF LIVING

HOW MUCH MONEY DO YOU ESTIMATE IS SPENT ON THE FOLLOWING ITEMS PER MONTH? PLEASE ADD OTHER ITEMS NOT LISTED HERE. FOOD, MEDICAL, OTHER HOUSEHOLD ITEMS, BUAI, CLOTHING AND SHOES, ALCOHOL, SCHOOL FEES, CHURCH, SCHOOL SUPPLIES, WANTOKS, FUEL FOR CARS, FUEL FOR FISHING, FUEL FOR OTHER BOAT TRANSPORT, PUBLIC TRANSPORT.

The average monthly cost of running a household in the survey area was K 572 (+/- 1006 SD), approximately K 55 more than our highest estimate of average monthly income. The highest costs tend to be in Kavieng LLG, mostly driven by values given by people in Kavieng and Maiom Wards (Figure 41). The lowest costs of living were consistently recorded in Lovongai LLG.

The largest average expense in households across the survey area was for fuel (Figure 42) which accounted for almost a quarter of outgoings and cost the household about K 258/month. The cost associated with chewing buai (Betelnut) was the second largest expense at K 204/month or 18% of the household outgoings. Purchased food cost households an average of K 189/month (17%) and alcohol K 112/month, or about 10% of the monthly household costs. Medical expenses were the smallest among those reported, accounting for only 1% of household costs and costing only K 13/month.

Costs of fuel were highest in Meteselen, Belifu, Enang and Leon Wards, and were not reported in Ungalik (Figure 42). The greatest proportion of expenses for Buai were incurred in Kulangit, Maiom, Tsoi, Kaselok Wards, and alcohol in Bagail, Lungatan, Ungalik, Bagatare / Lokono, Panamana and Paruai Wards. These data are only proportions of outgoings spent on each item. At least part of the apparent difference in expenditure seen among Wards are likely to be

attributable to the absolute amount of money available for spending or actually spent (see also Figure 41). Further analysis of these data would be needed to clarify this question.

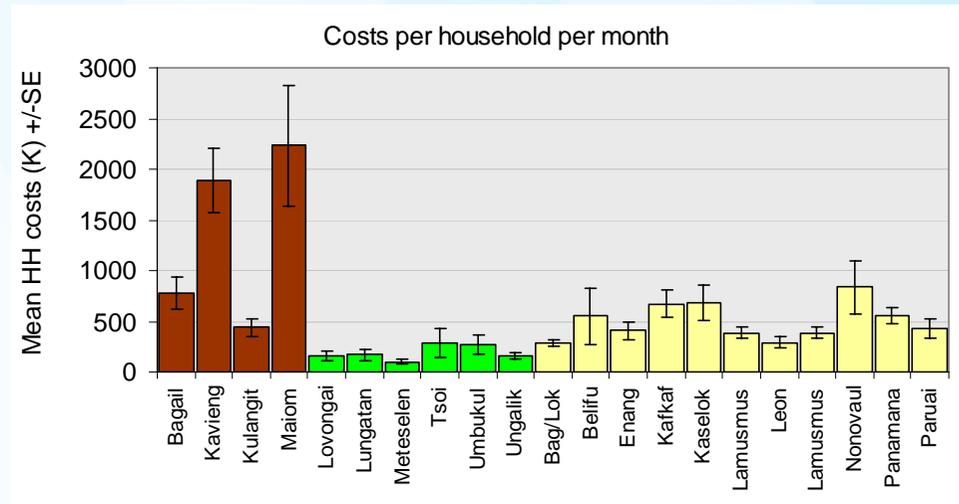


Figure 41: Average aggregated costs per household per month across all LLGs and Wards (n=494). ! Kavieng LLG ! Lovongai LLG ! Tikana LLG.

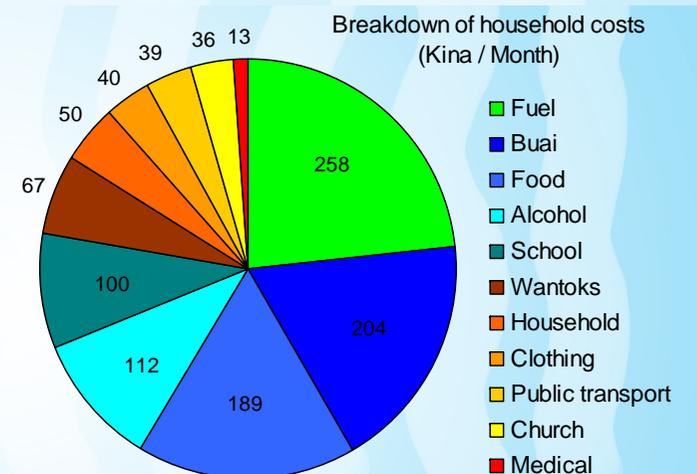
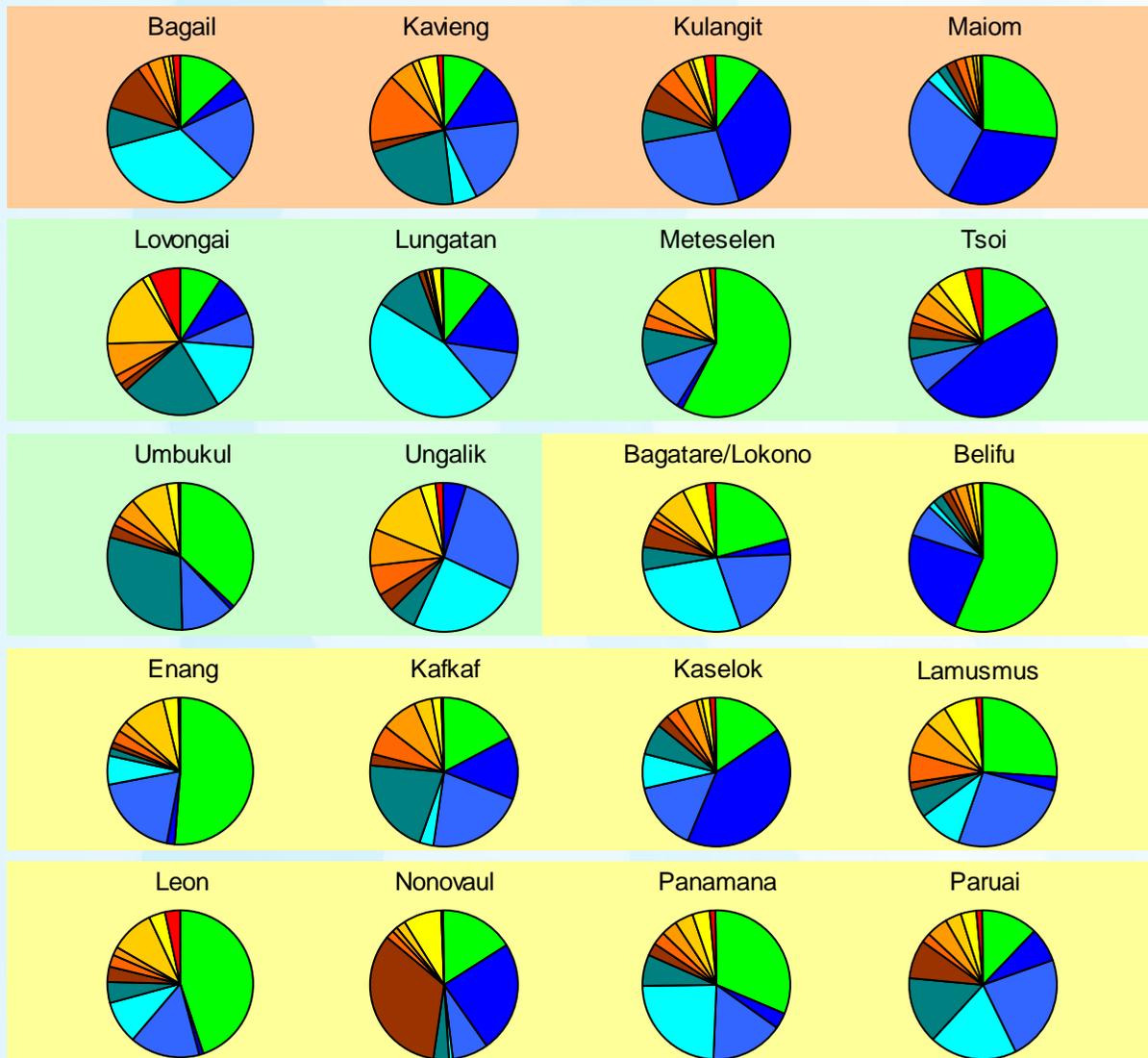
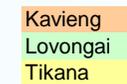


Figure 42 (a): Breakdown of monthly household costs over all LLGs and Wards (n=494).



◀ Figure 42 (b): Breakdown of monthly household costs by LLG and Ward (n=494).



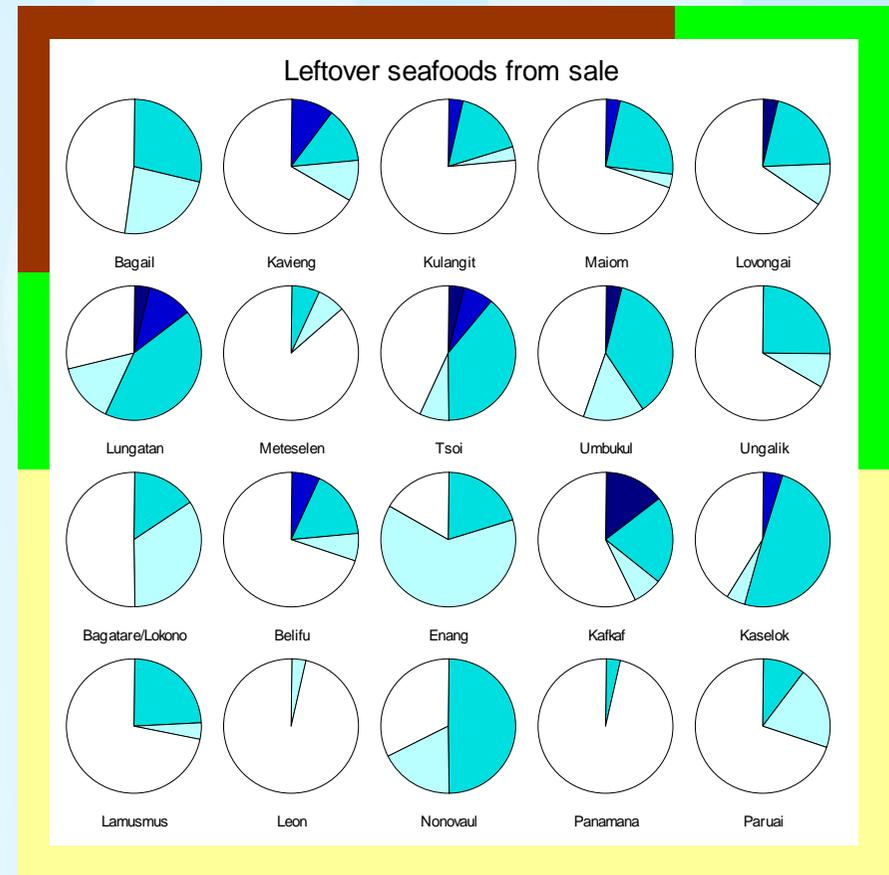
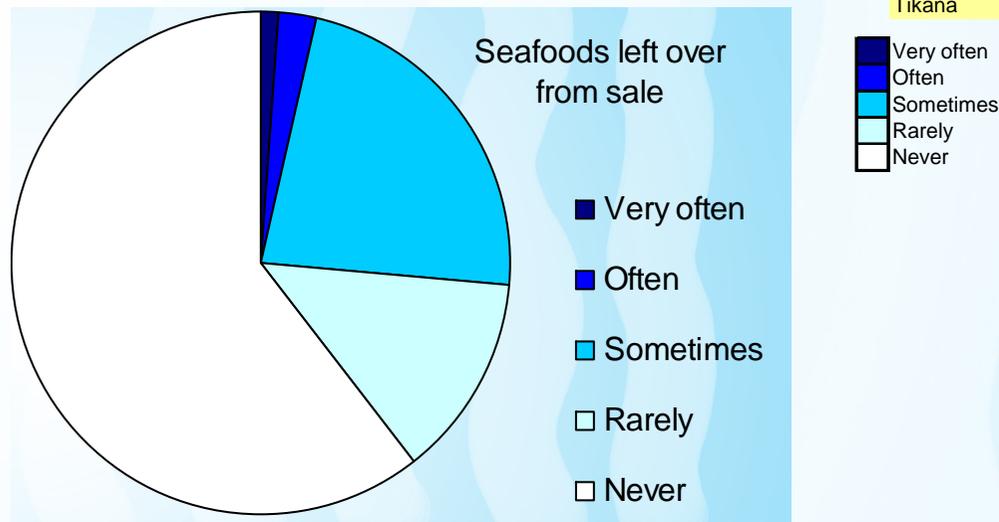
HH-Q39 DISPOSAL OF SEAFOODS NOT SOLD

DO YOU EVER HAVE FISH LEFT OVER THAT YOU CANNOT SELL? VERY OFTEN / OFTEN / SOMETIMES / RARELY / NEVER. WHAT DO YOU DO WITH THEM?

Few seafoods are generally left over after an attempt to sell them. 61% of people said that they never had seafoods left over after attempting to sell them, with a further 13% saying that it was rare for them to have any left over. The locations with the most difficulty in selling fish were Lungatan, Tsoi, Kaselok and Nonovaul (Figure 43). The Ward with the most complete seafood sales was Panamana.

Seafoods that were offered for sale but not sold were mostly disposed of by eating them in the household, or by giving them to Wantoks and friends (a total of 84%) (Table 16). Around 5% were re-offered for sale at a later time, usually after smoking.

►► Figure 43: Seafoods left over from sale (a) across the survey and (b) by LLG and Ward (n=532).



► Table 16: Fate in rank order of seafoods left over from selling (n=288).

Uses of leftover seafoods	%	Frequency
Eaten in household	62	179
Wantoks	14	40
Friends	8	23
Sell later	5	14
Smoke/preserve	5	14
Barter	3	9
Don't know	3	8
Freeze	0.3	1
Total	100	288

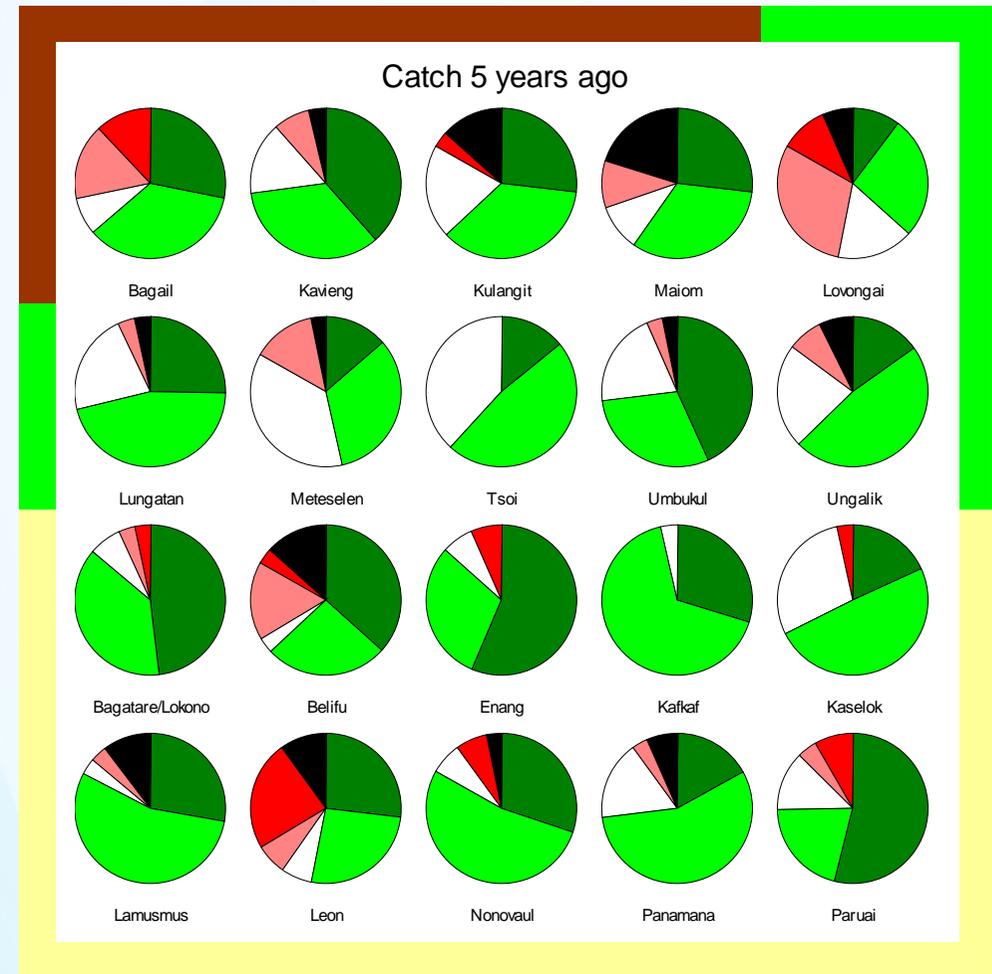
HH-Q40-Q42 PAST, PRESENT AND FUTURE CATCHES

Q40 HOW WOULD YOU DESCRIBE THE CATCHES OF ANY MARINE RESOURCES MADE BY MEMBERS OF THIS HOUSEHOLD OVER THE PAST YEAR? VERY BAD / BAD / OK / GOOD / VERY GOOD. EXPLAIN. **Q41** HOW WOULD YOU DESCRIBE THE CATCHES 5 YEARS AGO? EXPLAIN. **Q42** WHAT DO YOU THINK CATCHES WILL BE LIKE 5 YEARS FROM NOW? EXPLAIN.

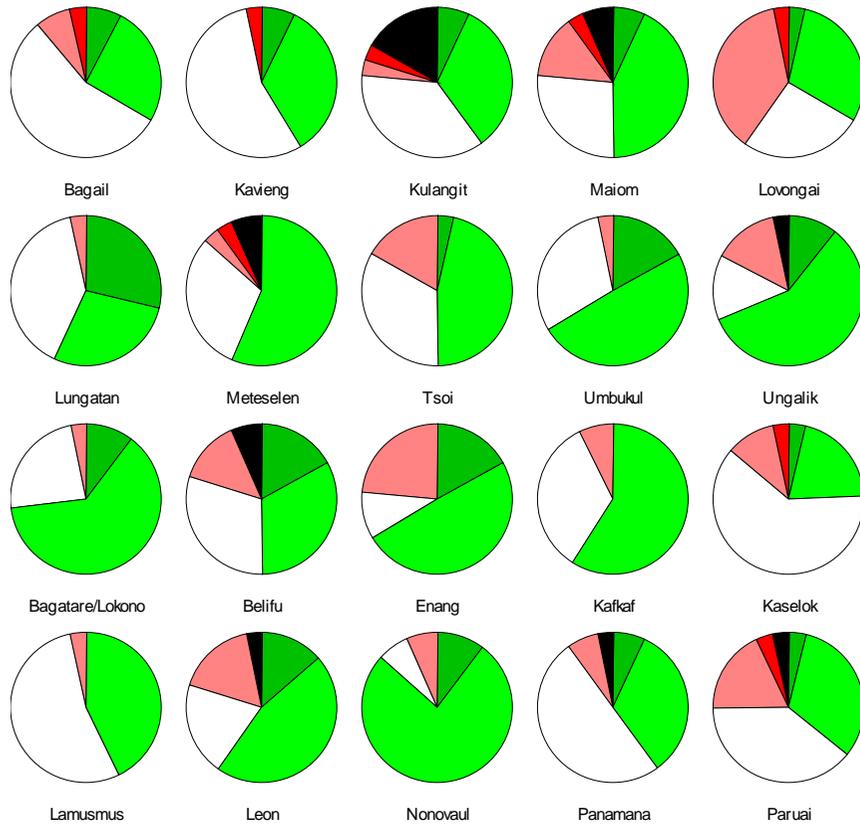
People’s perceptions of how good fishing was in the past, what it is like now and what it will be like in the future shows a strong belief that things are getting worse (notice a shift from green towards red where intuitive colour coding of responses has been used with green = things are good and red = things are bad Figure 44). This pattern was generally consistent throughout the survey area, with more people tending to think that fishing would be worse as time goes on. Superimposed on this pattern was the opinion of up to a quarter of the people interviewed thinking that catches / collecting in the future would greatly improve on their present levels. That is, there tended to be much more polarisation in opinions for the future than in the past or present.

People gave a wide range of reasons for why they thought things would either decline or improve (Table 17). The most common reasons given for an expected future decline in catches were overfishing and the participation of too many fishers, the use of derris root in fishing and human population growth (totalling 58% of responses). For people that things would improve in the future, many of the reasons given were actually conditions that might not eventuate such as proper management (37%), improved control over reefs or resources (9%) and lower pressure on resources (2%). Some people interpreted this question in such a way that they provided mechanisms for improving catches by increasing effort, including having new gear or fishing techniques (12%), being able to travel further to fish (1%) and reduced cost of fuel (1%). Some people said that fishing would be good in the future because it has been in the past (11%), fishes will reproduce (2%) and because they believed that the number of fishes and reefs is increasing (1%).

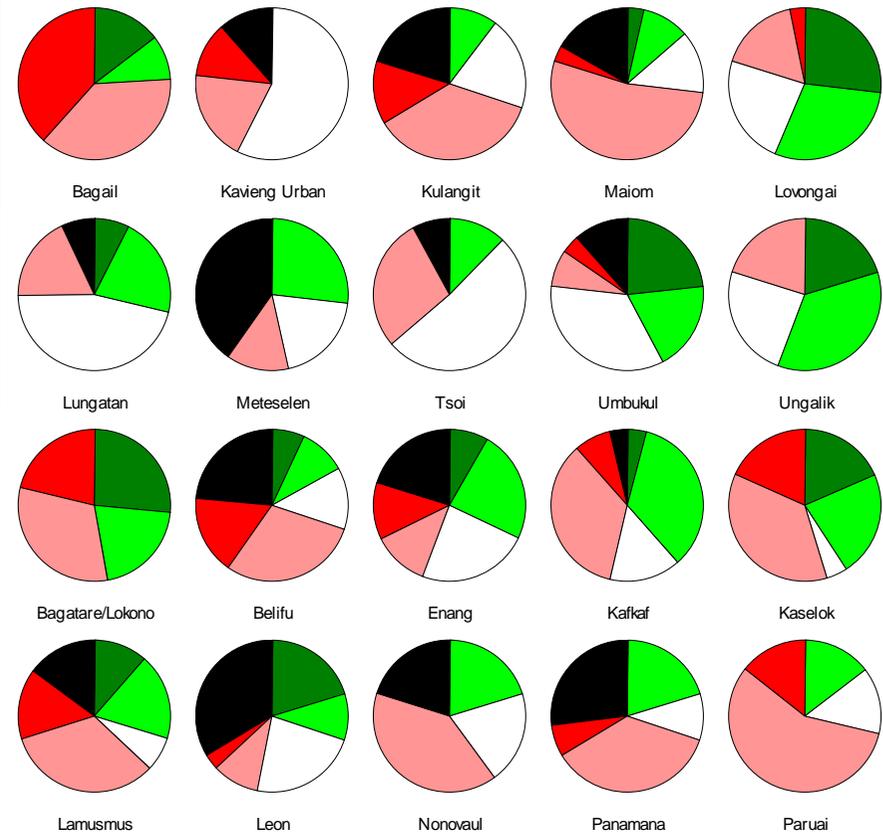
▼► Figure 44: Perceived fishing / collecting conditions past, present and future by LLG and Ward. Data are proportions of people who believed catches were Very bad, Bad, OK, Good, Very good, who were not sure. ! Kavieng LLG ! Lovongai LLG ! Tikana LLG.



Catch last year



Catch in 5 years



▼ Table 17: Reasons given for why catches of seafoods would (a) decline or (b) improve in the future (n=678 reasons given). Note at the bottom of column (b) are additional categories of people who said they did not know why they thought things would decline or improve, and who said that God was responsible for the outcome in either direction.

Reasons for decline	%	Frequency	Reasons for improvement	%	Frequency
Overfishing / Too many fishers	22	80	Resources are managed	37	63
Derris use	21	77	New gear / techniques / cooperation / experience	12	20
Population growth	15	53	Has been good so far / fish always there	11	18
Lack of awareness	4	15	Control over reefs / resources	9	16
Destructive fishing	4	14	Assistance from Fisheries	4	6
Its bad now, will be bad in future	4	14	Community Based management (CBM)	4	6
Lack of Management / control	4	13	Law in place and enforced	3	5
Habitat damage / dying	3	12	Care of environment	2	4
Pollution	2	9	Conservation is occurring	2	3
Netting	2	8	Fishes will reproduce	2	3
Changes in climate / tides	2	8	Pressure on resources is low	2	3
Outsider fishing	2	6	If aware of proper fishing techniques / seasons	2	3
Rules not followed	2	6	Demand will be high	1	2
Fish move away	2	6	Will be able to go greater distance fishing	1	2
Pressure for money	1	5	Commercial fishing will increase catch	1	2
Easier methods become available for catches	1	4	Pressure reduced on fish when cucumbers used	1	1
People don't care about environment / resources	1	4	Belief / tradition (ways to improve fishing)	1	1
Dynamite used	1	2	No markets to drive overfishing	1	1
Night fishing / diving	1	3	Number fish / reefs are increasing	1	1
Fish become wise to gear and avoid it	1	3	People abide by rules	1	1
Enforcement lacking	1	3	People only take what they need	1	1
People ignore bans	1	2	People only use fishing lines	1	1
Not fully committed to fishing	1	2	Reduced costs (fuel)	1	1
Fishing will have to be further away	1	2	Reefs recover	1	1
Things are changing	1	4	Resources rested	1	1
Declines in food chain	1	2	People stay in their tenured area	1	1
Weather	1	2	Traditional singing to bring fish	1	1
Transport drives need to fish	0.3	1	Use sustainable methods	1	1
Cost of store protein too high	0.3	1	Total	100	169
Commercial fishing	0.3	1			
High consumption fish	0.3	1			
Undersized being caught	0.3	1	God is in charge		3
Total	100	364	Don't know why resources would decline or improve		142

HH-Q43 FACTORS AFFECTING CATCHES

WHAT DO YOU THINK CAN AFFECT THE NUMBERS OF FISHES, CUCUMBERS, SHELLS, CLAMS, SEAWEED, CRABS, LOBSTERS AND CORALS IN THE SEA? RANK THE THREATS TO FISHERIES IN ORDER OF IMPORTANCE.

The factors thought by people to affect the abundance of sea foods in their areas fell into three broad categories: broad drivers that affect how and how much people fish, specific fishing / collecting practices or activities, and environmental conditions. Of these, the factors considered of most importance in the survey area were those concerning specific fishing / collecting activities (Table 18). The use of derris root and dynamite in fishing were considered the most important determinants of the numbers of sea foods that would be available for capture, with overfishing and the use of fishing nets much less important. The most important environmental factors identified were pollution and coral / reef damage. Underlying drivers were generally not seen as very important to the numbers of seafoods occurring in the survey area.

Factors affecting fishing and collecting	Weighted score
Activities	3699
Derris use	1876
Dynamite use	1049
Overfishing / collecting	186
Netting (especially small size)	156
Night fishing	115
Undersize collecting	86
Collecting / overharvesting sea cucumbers	86
Spearfishing (including chases fish away)	42
Destroying shelter	21
Destructive fishing (generalised)	19
Women breaking corals	17
Customary fish chasing	9
Diving	7
Cyanide use	7
Harvesting females of organisms	6
Antimalaria chemicals in nets used to kill fish	5
SCUBA for cucumbers	4
Disturbance of fish breeding	3
Deep acces to cucumbers through use of lead	2
Fish traps	2
Trolling	1

◀▶ Table 18: Factors thought to affect the numbers of seafoods (n=558 responses). Values are weighted scores for each factor identified, calculated by summing the ranked scores using values of Rank 1 (most important)=4; Rank 2=3, Rank 3=2 and Rank4=1.

Factors affecting fishing and collecting	Weighted score
Don't know	4
Drivers	116
Human population	32
Attitudes towards marine environment	22
No / poor management	10
Outsiders	10
Commercial fishing	9
Aquaculture	8
Too many fishers	7
Increasing cost of living / income pressure	6
Tambu not used	5
Foreign fishing	4
Violations of traditional rules	3

Environment	576
Pollution	239
Coral / reef damage	140
Climate / tides change	60
Oil palm plantations	23
Coral bleaching	14
Crown of thorns starfish	13
Damage to food web	10
Strong sunlight (usually with low tides)	10
Logging	10
Mining	9
Seaweed growth	8
Wave damage	8
Loss of seagrass	8
Weather	5
Ship oil leaks	5
Petroleum	4
Urchins	3
Moorings	3
Mangrove damage	2
Turtles / dugongs destroying seaweed	1
Environmental change	1
Total of weighted values	8786
Total number of reasons given	1428

HH-Q45 SOLVING PROBLEMS WITH FISHING

ARE THERE ANY PROBLEMS WITH FISHING / COLLECTING (FISHES, CUCUMBERS, SHELLS, CLAMS, SEAWEED, CRABS, LOBSTERS, CORALS ANY OTHERS) AROUND THIS VILLAGE? WHAT PROBLEMS? IF THERE ARE ANY PROBLEMS WITH FISHING, WHAT DO YOU THINK SHOULD BE DONE TO IMPROVE THINGS? WHAT SHOULD BE DONE? WHO SHOULD DO IT?

Most people interviewed thought that there were problems with fishing / collecting in their areas (Table 19). In suggesting solutions to fishing problems, people identified that education, awareness and discussions would be needed (Table 20) in addition to a range of actions that could be taken (Table 21).

The most important information-related solutions for fisheries problems were a general increase in awareness, technical advice and education. Specifically, people wanted information on how to exploit resources sustainably (Table 20), as well as

Problems with fishing?	%	Frequency
Yes	61	351
No	20	114
Don't know	19	106
Total	100	571

◀ Table 19: Opinions on whether there are any problems with fishing / collecting in respondent's areas (n=571).

general information on environment, conservation and on the resources themselves. Discussions with leaders and traditional owners were also identified as necessary.

Actions to be taken for solving fisheries problems fell into 5 broad categories: (i) control over areas or resources, (ii) management; (iii) environment / fishing practices, (iv) expansion of fishing and (v) other (Table 21). We have separated control from management for this discussion. Here we take control measures as those focusing more on who gets the resources, while management focuses more on ensuring the resources, although they can operate together. Some people suggested that their problems with fishing could be addressed by expanding effort. Options suggested included moving to new locations or stocks, and obtaining new boats and fishing gear.

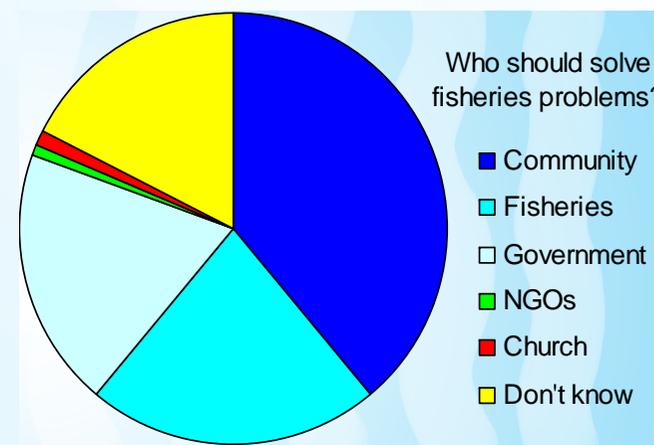
Overall, many people (40%) thought that fisheries problems should be addressed by the community, sometimes alone, but often in conjunction with Fisheries

(Figure 45). Opinions of who should be involved varied from Ward to Ward, but community approaches were considered important in all. Interestingly, only in Kavieng and Kaselok did people think that NGOs should have a role. The generalised response that "Government" should do it was common to all Wards, but this response rarely identified the departments or people who should be involved, nor the role they should take.

▶ Table 20: Awareness and discussions needed for addressing fisheries problems.

Awareness / discussion needed	%	Frequency
Awareness / advice / education	53	83
How to exploit sustainably	15	24
Community discussions	9	15
Consult with leaders	5	8
Management	4	7
Conservation	3	5
Looking after environment	2	3
Environment	2	3
Resources	2	3
Effects on environment	1	2
Importance / potential of resources	1	2
Discussions with traditional owners	1	1
Bad fishing practices	1	1
Considering the future	1	1
Total	100	158

▶ Figure 45: Proportion of people with different ideas on who should solve fisheries-related problems (a) overall and (b) by Ward and LLG (n=608 responses).

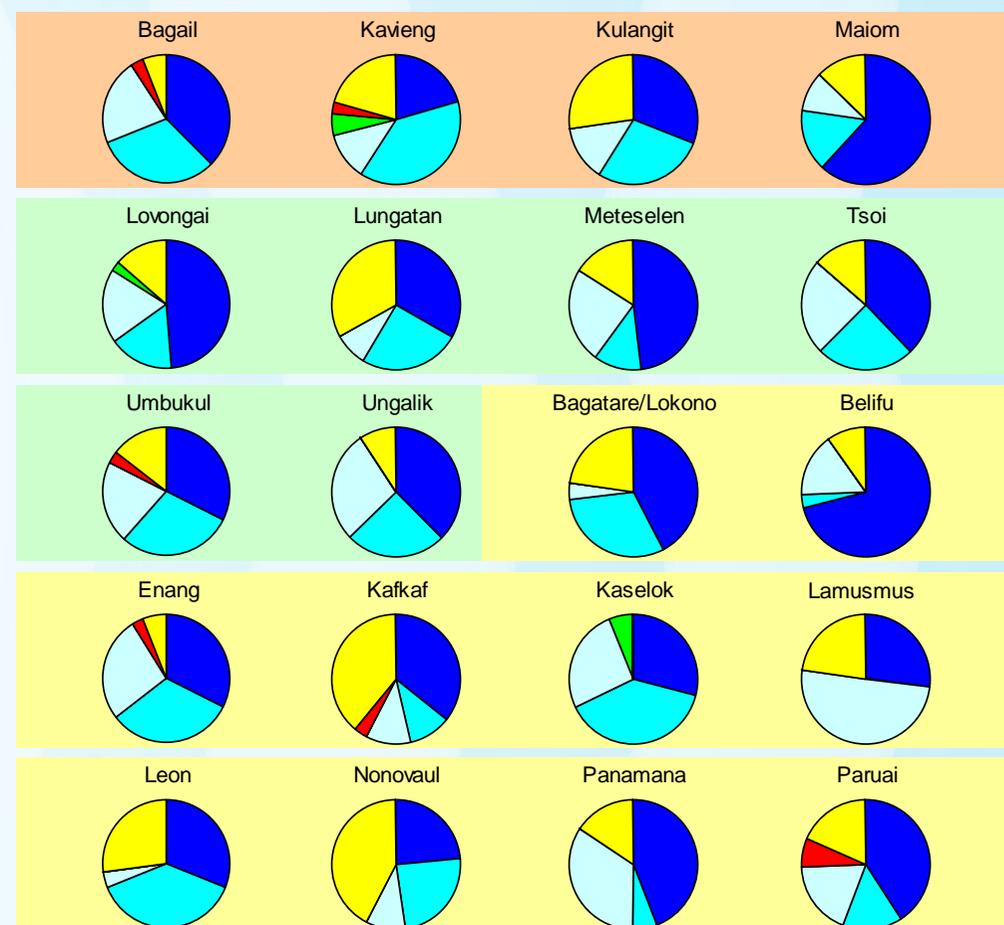
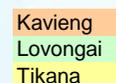
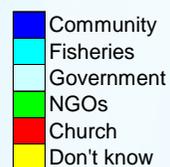


Measures for addressing problems	Frequency
Control	
Closures / time restrictions	46
Control of areas / resources	33
Outsiders (stop)	10
Management	
Rules / Laws / Regulations	20
Traditional tambus	14
Enforce rules	13
Management	9
Enforce fisheries regulations	9
Community-based management (CBM)	6
Community rules	6
Report infringements	5
Fines / punishment	5
Tenure	4
Court / village court	3
Traditional management	2
Village - Fisheries MOU	5
Revive traditional methods	2
Customary charge for violations	1
Resolve in meetings with village elders	1
Environment & fishing practices	
Derris ban	61
Restrict / ban destructive fishing	13
Conservation	11
Undersize bans	8
Restrict nights & diving	8
Dynamite ban	6
Net ban / restrictions	4
Spear ban	3
Habitat damage ban	3
Ban on catching females / eggs	3
Ban on catching rare species	2
Everyone use handline / spear	2
Minimise fishing	2
Anchor damage	1
Restrict at spawning sites	1
Stop harvesting turtles / eggs	1

◀▶ Table 21: Proposed actions for addressing fisheries problems (n=341 responses).

Exansion	
Change fishing locations	3
Go to deepwater fishing	3
New boats / canoes	2
Give out gear	1
Other	
Stop fishing	6
Respect marine environment	1
Don't give fish to another to sell	1
Other options to fishing	1
Total	341

▶ Figure 45 (continued): Proportion of people with different ideas on who should solve fisheries-related problems (a) overall and (b) by Ward and LLG (n=608 responses).



HH-Q46 ROLE IN ADDRESSING PROBLEMS WITH FISHING

WHAT ROLE CAN YOU AND MEMBERS OF YOUR HOUSEHOLD PLAY TO ADDRESS ANY FISHING PROBLEMS?

Most people thought that they did have a role to play in addressing their problems with fisheries, with 7% believing they had no role to play, and a small number saying either it was not their responsibility, they were not interested, or that others should do it for them (Table 22). A few people (1%) said that they had no role because they either had no power to affect others, or in one case, because they were not an expert. 27% of people did not know whether they had a role.

People who believe they and their household members had a role in addressing fisheries problems gave answers in 5 general categories of how they could contribute: (i) unspecified help (ii) general approaches (iii) roles that were in association with others (iv) general actions to take and (v) action or advice on a range specific fisheries controls.

In 19 households, people suggested they could help with dealing with fisheries problems, but did not specify the form that should take (Table 23). General approaches to dealing with problems included becoming involved in discussions, encouraging people to behave more responsibly in fishing / collecting and advising people to avoid bad fishing practices. Improving or helping to improve awareness was raised in 48 households, and 38 people suggested that their role was to “look after” resources and/or the environment. Many people saw their role as one that would be in conjunction with either the family / clan (32 households) or the community at large (39 households), with some saying they needed to work with both. The second most frequently-cited single action was for people to just stop using derris root, and to encourage others to do the same.

▼ Table 22: Role of household members in addressing fisheries problems (n=594 responses over 588 households).

Is there a role?	%	Frequency
There is a role	64	379
Don't know	27	160
No role	7	43
No power / not expert	1	6
Not my problem	1	4
Not interested	0.2	1
Leaders should do it	0.2	1
Total	100	594

In association with:	
Community	39
Family / Clan	32
Actions that could / should be taken	
Assist enforcement	14
Report offenders	9
Control areas from outsiders	7
Let Fisheries to deal with it	7
Assist with monitoring	5
Assist Community Leaders	4
Assist with Community Laws / CBM	4
Set up tambus	4
Send people Summons / to Court	2
Support Fisheries	1
Let NGOs do it	1
Use customary ways	1
Talk to Ward Member	1
Chase away outsiders	1
Increase awareness of tambus	1

What is your role?	Frequency
Unspecified help	19
General approaches	
Discuss / complain / encourage / advise	69
Improve awareness	48
Look after resources / environment	38
Abide by rules / laws	19
Think of the future	11
Control catches / don't overfish	11
Cooperate with leaders / community	8
Brainstorming solutions	5
Look for alternative protein	2
Talk to offenders	2
Be a role model in the community	2
Pray to God	1
Have a fair say in decisions	1
Obtain help from outside	1

◀▲▼ Table 23: Grouped types of actions in ranked order that household members could take to assist with dealing with fisheries problems (n=470 responses over 303 households).

Take action and/or advise others:	
Not to use Derris root	52
Stop destructive fishing	16
Not damage habitats	6
Rest fishing grounds	5
Release undersized seafoods	4
Stop polluting	3
Not to use Dynamite	2
Restrict use of Nets	2
Not collect Cucumbers at night	2
Not to use Spearguns	2
Not harvest turtles	1
To use handlines (safe method)	1
Not to break reef for worms as bait	1
Change fishing locations	1

HH-Q47 CHANGES IN THE ENVIRONMENT

HAVE YOU NOTICED ANY CHANGES IN THE MARINE ENVIRONMENT AROUND YOUR VILLAGE IN THE LAST 5 YEARS? WHAT CHANGES? RANK THEIR IMPORTANCE. HOW GREAT IS THE CHANGE? HAVE THESE CONDITIONS IMPROVED OR DECLINED?

95% of households said that they had observed environmental changes in their area over the past 5 years, with only 3% reporting that they had seen no changes (Table 24). Changes observed included (i) those that related to the condition of fished or collected species and (ii) general environmental changes.

The most frequently reported changes in seafoods were a decline in abundance (9% of households) and the “extinction” of species from some areas. All of the seafood related changes were considered relatively important by most people who reported them. The main environmental changes reported were damaged or dying reefs, erosion, the growing of reefs in new places (particularly where they obstructed passages) and changes in tides and/or currents.

► Table 24: Summary of responses on environmental changes seen by respondents in their areas (n=586 responses over 511 households answering this question. 347 households gave information on importance. Data are number and % of responses reporting a change (some households reported more than 1) and a measure of perceived importance as an average value calculated for each response based on whether the change was “Not very big”=1; “Some”=5; and “Very big”=10.

Any environmental changes?	Responses		Importance (1-10)
	#	%	
Yes	555	95	
Can't see any	19	3	
Not sure	10	2	
Changes are natural	2	0.3	
Seafoods related			
Decline in or inconsistent catch	56	10	7
Species disappeared from some areas	19	3	8
Species moved to deeper areas	8	1	6
Stocks have increased	5	1	7
Individuals are small	1	0.2	10
Changes seen			
Reef damage / dying	137	23	7
Erosion	83	14	8
Coral reefs are growing	73	12	7
Changes in tides & currents	65	11	7
Seagrass damage / dying	45	8	7
Lagoons / reefs / river mouths shallowing	31	5	7
Coral bleaching	19	3	7
Seagrass growing	15	3	8
Accretion of beaches / land	12	2	8
Pollution	11	2	7
Seaweeds growing	10	2	7
Sea-level rise	9	2	7
Corals have grown to block passages	8	1	10
Mangroves damaged	8	1	8
Sand / other build-up on reefs	7	1	5
Climate / Water temperature change	7	1	6
Water turbidity (reduced clarity)	6	1	5
Change in normal fish seasons	6	1	7
Reef damage (from waves)	6	1	5
Seaweeds declining	5	1	5
Shipwrecks	4	1	8
Loss of trees (especially on shoreline)	4	1	5
Breeding places damaged	3	1	8
Waves overtop on to land	2	0	10
Urchins increasing	2	0	8
Mangroves growing / spreading	2	0	3
Overpopulation of starfish	1	0	1
Reefs changing colour	1	0	10
large waves	1	0	10
Logs washing onto beach	1	0	5
Groundwater has become bitter	1	0	10
Fish moving away	1	0	10
Crown-of-thorns starfish	1	0	5
Rough weather	1	0	10
Sea-level fall	1	0	5

HH-Q48 REEF TENURE

DO PEOPLE IN THIS VILLAGE HAVE TENURE OVER THE REEF AREAS? WHAT KIND OF CONTROL? IF SO, WHO OWNS THE REEF, COMMUNITY, CLANS, INDIVIDUALS, OTHER?

Most people (57%) said that they did not have or did not participate in any control over reefs in the area in which they lived, while 36% said that they were part of some kind of marine tenure system (Table 25). In a few cases (3%) people reported that they had some form of tenure in the past, but that it either was no longer effective, or that the area had been taken over by a company, or others.

Of those that said they did have some form of control over reefs (n=211), some people (9) said they actually had none, and others (5) that they had very little control over the reefs or resources. Only 3 people interviewed thought that their control was good. Tenure areas were often marked by stones or sticks and enforced through customary practices (including the giving of pigs and shell money). In one area, control of reefs was implemented through the legend of a large snake (Masalai) of which fishermen were afraid.

The types of controls placed in tenured areas included bans on certain fishing methods (e.g. use of derris root), exclusion of outsiders, temporary closures (e.g. for stocks to recover or for a funeral), to control or gain benefits from aspects of tourism (diving), or to control breeding areas.

Do you have tenure?	%	Frequency
No	57	335
Yes	36	211
Don't know	5	31
In the past	3	18
level of control		
No control	4	9
Little control	2	5
Good control	1	3
How implemented?		
Marked by stones / sticks	11	24
Customary	7	15
Masalai (big snake)	1	3
General understanding	2	4
Permission needed to fish	1	2
Watch the area	1	2
Chase off outsiders	1	2
Verbal announcement	0.5	1
Village court for offenders	0.5	1
Type of control		
Tambu (unspecified)	15	31
Control certain fishing methods	12	25
Tambu for outsiders	9	18
Tambu at certain times	5	10
Control diving	3	6
Control breeding area	2	5
Control certain resources	2	4
When stocks are low	0.5	1
Control the harvest of certain sizes	0.5	1
Conservation area	0.5	1
Control pollution	0.5	1
What areas?		
Reefs	32	68
Fringing reefs	3	7
Front of the village	3	6
Who has tenure?		
Clan	31	65
Community	28	60
Individual	13	27
Family	12	26
Landowners	1	3
Leaders	1	3
Company	1	3
Controlled by Ailan Awareness	0.5	1
Another community	0.5	1

Control of reefs was most usually by clans (31%) or communities (28%), though individuals and families were also important resource owners. In one case, the person interviewed said that the reef is owned by the community, but that it was now controlled by Ailan Awareness (an NGO) and “big men of the community” to control ways of fishing and harvesting of sea cucumbers and lalai (*Trochus*).

◀ Table 25: Summary of presence, types, implementation and who has tenure over reef areas (n=585 responses).

HH-Q49 ACCESS TO RESOURCES

HAS OWNERSHIP ACCESS CHANGED OVER THE YEARS?

74% of people said that their ownership and access to resources has not changed over the past years, with 6% not being sure and only 1 person indicating any kind of dispute (Table 26).

20% of people thought that things had changed significantly, and 65 of them offered a range of changes they had observed, and in a few cases, the driving forces behind them (increasing population and lack of respect of traditional ways). The most important changes reported were a lack of access now where in the past people had access, people not obeying the rules, and a transfer of ownership.

▼ Table 26: Summary of opinions on changes in ownership and access to resources (n=454).

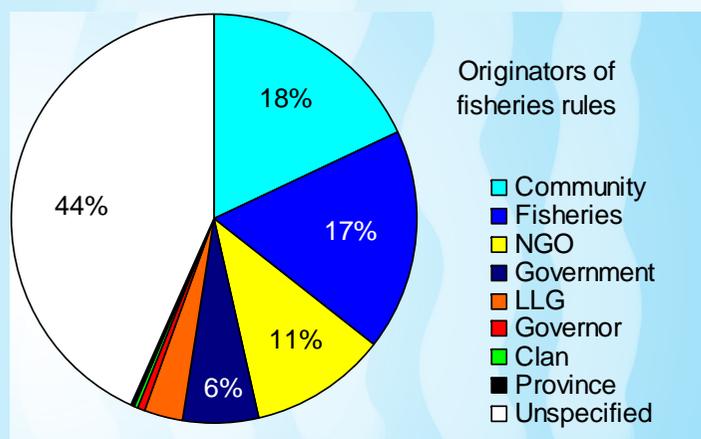
Changes in ownership of marine resources?	%	Frequency
Yes	20	91
No	74	336
Don't know	6	26
Disputed	0.2	1
Types of changes		
We have no access now	22	14
People are not obeying / respecting customary laws	15	10
Ownership has transferred	14	9
Areas are now open access	9	6
It is not clear who owns the reasources now	6	4
Tambu has changed	5	3
Ownership is gradually dying out	3	2
There is no more Tambu	3	2
Customary Law is there but not active	3	2
People don't mind - jobs are now available	2	1
People are starting to see a need to improve tenure	2	1
The human population has increased (pressure)	2	1
The Chief (Maimai) died	2	1
Leadership is gone so there is less control	2	1
The Community now looks after the area	2	1
Fisheries / Government now owns it	2	1
The Community no longer watches over the reef	2	1
Ownership has moved from individual to community	2	1
Ownership has moved from clan to community	2	1
Ownership was by the clan	2	1
There are new laws now	2	1
Ownership is now by an individual	2	1
Total	100	65

HH-Q50 FISHING RULES

ARE YOU AWARE OF ANY GOVERNMENT (NATIONAL, PROVINCIAL AND LLG), NGO OR COMMUNITY RULES ON FISHING IN THIS VILLAGE OR THE SURROUNDING AREA? WHAT ARE THESE?

56% of the people interviewed said that they were aware of certain rules or laws governing fishing in their area. 22% said they were not aware of any restrictions on fishing and collecting and the environment on which resources depend, while a further 22% of people reported that they were not sure (whether they *knew* of any rules). Most of the rules reported were community rules (18%) closely followed in number by Fisheries rules (attributed to NFA, Provincial Fisheries, and even Fisheries Officers) (Figure 46).

11% of the rules reported were attributed as those 'imposed' by NGOs (usually Ailan Awareness or TNC). In one example the person interviewed said that Ailan Awareness now looks after our marine resources. In another, an unspecified NGO imposes restrictions on fishing at a spawning site at Mait Island. There appeared



to be some confusion on who "owned" the rules. Many of the rules attributed to NGOs appear to be only awareness campaigns promoting good practices, but not necessarily adopted as community rules.

The rules reported included reference to general laws and restrictions over certain areas or fishing methods, as well as specific rules governing when, where or how particular resources could be fished or collected (Table 27). In a few cases, people volunteered the reasons they believed were behind some of the rules. One of the most interesting was a restriction on harvesting sea cucumbers because they give birth to or attract fish (2 people).

◀ Figure 46: Overall breakdown of the authorities responsible for fishing rules in the survey area as indicated by the people interviewed (n=341 responses).

▶ Table 27: Fisheries rules known and reported by those interviewed during the Household Survey. Percentages relate to the total number of people responding to this question (n=578). Blue shading indicates the authority / enactor for each rule, as indicated by the person interviewed.

	%	Frequency	Clan	Community	Fisheries	Government	Governor	LLG	NGO	Province	Unspecified
Laws and rules											
General											
Fisheries Act	0.2	1									
Environment Law	0.2	1									
Resource Management Laws	0.2	1									
Enactment of Tambu	0.2	1									
Specific											
Restrict / exclude Outsiders	3	19									
Restricted reef / Tambu	3	15									
Fish only in own area, not others' areas	2	12									
Community Fishing Zones	1	8									
Spawning areas	1	7									
Look after environment / resources	1	7									
Research area	0.3	2									
Overfishing	0.2	1									
Harvest only for consumption	0.2	1									
Limit of 30 fish / trip	0.2	1									
Methods and actions											
Derris ban	30	176									
Dynamite ban	15	89									
Destructive fishing	6	35									
Reef damage	3	18									
Undersized individuals	2	14									
Pollution prevention	2	12									
Fishing / collecting Night	1	6									
Net mesh size limits	1	4									
Use of nets	1	3									
Harvesting of females	0.3	2									
Sea Cucumbers											
Cucumbers (Collection at Night)	6	35									
Cucumbers (Size)	5	30									
Cucumbers (Harvest)	1	6									
Cucumber season	1	3									
Cucumber TAC	0.2	1									
Trochus											
Trochus (Size)	1	8									
Trochus (Night)	1	4									
Crabs											
Crabs (Size)	1	5									
Crabs (Females)	0.2	1									
Crabs (Destroying shelter)	0.2	1									
Lobsters											
Lobsters (in Berry)	1	6									
Lobsters (Females)	1	3									
Lobsters (Size)	0.2	1									
Lobsters (Night)	0.2	1									
Others											
Giant Clams (Harvest)	0.2	1									
Prawn females (Spawning)	0.2	1									
Mammals (Harvest)	1	3									
Turtles (Harvest)	1	3									
Mangroves (Damage)	0.2	1									

HH-Q51 EFFECTIVENESS OF RULES

DO YOU THINK THESE RULES ARE EFFECTIVE? WHY / WHY NOT?

Most people (60%) said that fisheries rules were ineffective in their area, with only 20% saying that they were observed and effective, and some saying that it was conditional for different rules or resources. For example, in some places, the rules against dynamite were being observed, while those for the use of derris were not. The places in which more people thought that the rules were being followed were Lovongai, Belifu, Enang, Panamana and Paruai Wards (Figure 47). No one in Nonovaul reported that the rules were being followed.

In cases where people thought that the rules were effective, the main reasons given included: involvement by the whole community, a general tendency for people to respect and abide by the rules, and good attitudes towards community cooperation and the use of resources (Table 28). In two cases, people said that rules were being followed because people believed that they worked to ensure the condition of resources, in one case with someone noting that the fish were bigger and more abundant in tambu areas than outside.

Where the rules were generally not being followed, the reasons given were wide-ranging, including 30 different types of reasons. 31% of people said that in their area people ignored or did not respect the laws, had a bad attitude or were careless. 22% said that a lack of enforcement was

the reason. Some of the remaining reasons were related to outsiders coming in and breaking rules, a high pressure on resources or need for income, because banned (destructive) fishing methods were easier to use or because people did not know how to use other methods, that there was a lack of leadership and/or the leaders and Fisheries were not doing their duty, or because resources were declining so it was difficult for people to meet their needs. One person interviewed said that because sea cucumber resources were low, it was necessary for fishers to collect undersized animals to accumulate more weight for sale (this contradicts with another person who said that people do not break the rules on sea cucumber sizes because it would be a waste of their time as buyers would not take them). At least 4 people said that some people in the community had allowed outsiders to come in and fish, sometimes using destructive methods.

▼ Figure 47: Effectiveness of fishing / collecting rules by LLG and Ward (n=466).

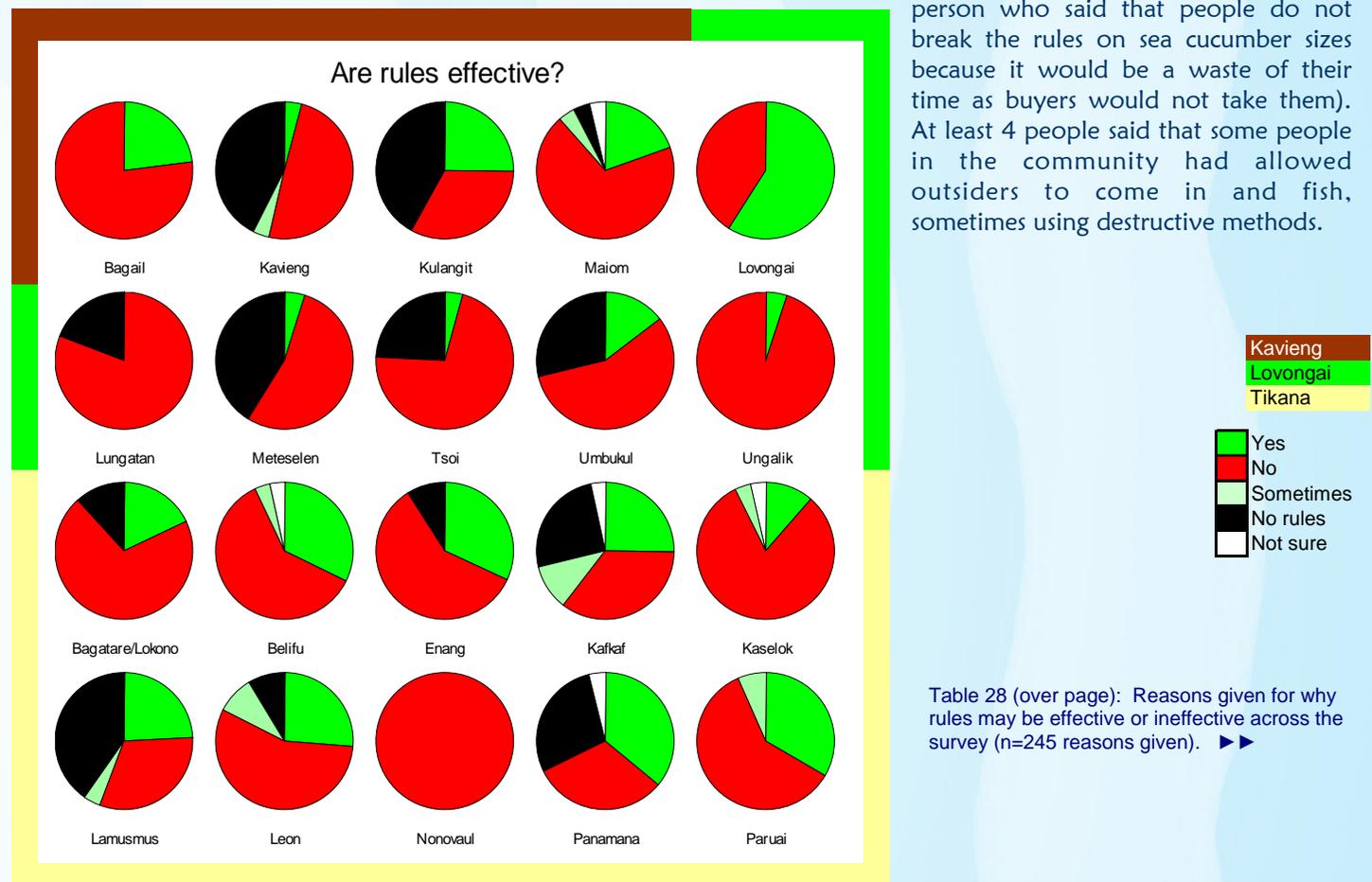


Table 28 (over page): Reasons given for why rules may be effective or ineffective across the survey (n=245 reasons given). ►►

Rules are EFFECTIVE because:	%	Frequency
Whole community is involved	16	7
People respect / follow rules	16	7
People have good attitudes	12	5
Understand the reasons for the rules	9	4
Community is afraid of police / fisheries	7	3
They are restricted by buyers	7	3
NGO presence	7	3
Good awareness has been done	5	2
Because catches are OK	5	2
The community cares about its resources	5	2
People believe the rules are effective	5	2
People were hurt by explosives in the past	2	1
Leaders keep watch for violators	2	1
Fines are used	2	1
Total	100	43
Rules are INEFFECTIVE because:		
People ignore / no respect / bad attitude / careless	31	62
Rules are not enforced	22	45
Outsiders break the rules	8	16
Banned methods are easier	5	10
Income pressure	5	10
No cooperation in the community	4	9
People are selfish	4	8
There is no proper awareness of rules or reasons	3	7
No wise leaders / leaders not doing duty	3	6
Because people in other places still do it	2	4
Demand high for resources / increasing	2	4
Youth ignore laws	1	2
Enforcers break the rules themselves	1	2
Because Government has not made it law	0.5	1
Fisheries are not doing their duty	0.5	1
People don't have access to plans or policies	0.5	1
The minority makes the rules	0.5	1
The rules need reinforcing	0.5	1
Still selling undersized seafoods to exporters	0.5	1
Stocksize is too low	0.5	1
There is not enough of correct sizes available to catch	0.5	1
People's own place has no resources left	0.5	1
Human population is too high	0.5	1
People need to meet their basic needs	0.5	1
Resources have a high value	0.5	1
People want fish quickly, don't take the time to do it right	0.5	1
People break rules if they can't be seen (e.g. night)	0.5	1
Plantation people don't cooperate with rest of the community	0.5	1
Don't know about or how to use other methods	0.5	1
Fishing is not important to the community	0.5	1
Total	100	202

HH-Q52 COMMUNITY FISHING RULES AND ENFORCEMENT

IF THERE ARE COMMUNITY-LEVEL FISHING RULES, HOW ARE THEY ENFORCED IN THIS VILLAGE?

48% of people responding to this question said that there were no community rules in their village to enforce, while 2% said the rules had been made, but that they were not enforced and 13% did not know whether rules were enforced. 208 of the people interviewed (37%) said that there were community rules and an attempt was made to enforce them (Table 29).

Of those people who said that the community fisheries rules were enforced, the most common mechanism was through the village leaders, including the VPC, Maimai (Chief) and sometimes through the Ward Members. Usually these people were connected to making the rules and raising awareness / reminding people to respect them during village meetings. Discussion of the laws during village meetings was reported by 24% of people who said the rules were enforced, and use of the Village Court and traditional penalties (e.g. fines of pigs or shell money) reported by 16% of people. Most of the mechanisms appear to rely on self-discipline based on on-going awareness and reminders from village leaders and a community-wide effort to watch the reefs, report offenders and sometimes chase outsiders away.

Are community rules enforced?	%	Frequency
Not applicable / No rules	48	269
Don't know	13	74
No	2	13
Yes	37	208
Totals	100	564
Rules enforced by:		
Community Leaders	45	93
Awareness / Community meetings	24	49
Village Court / Traditional	16	34
Community cooperation	13	28
Community Police	7	15
Community / Individual self-discipline	6	12
Reef watch (man)	3	6
Tambu markers	3	6
Chasing people away	3	6
Report to Fisheries	2	4
Church Leaders	1	2
Public notices	1	2
Government authorities	1	2
Physical force	0.5	1

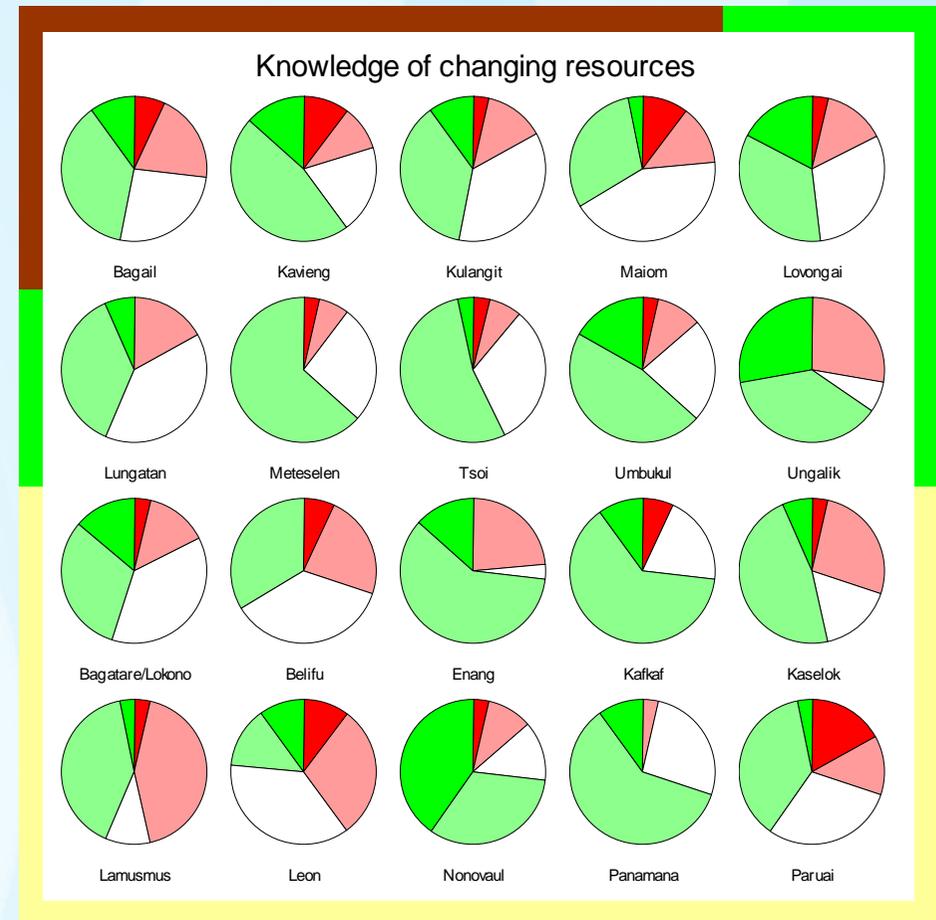
► Table 29: Mechanisms for the enforcement of community rules (n=564).

HH-Q53 KNOWLEDGE OF CHANGES IN RESOURCES

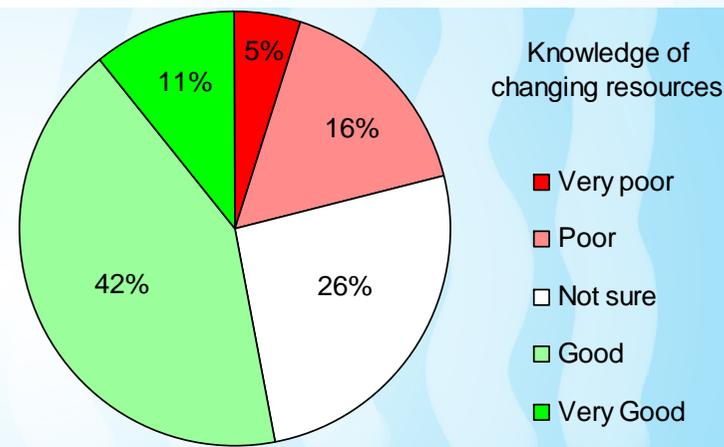
DO YOU THINK YOU HAVE A GOOD IDEA OF THE CONDITION OF THE MARINE RESOURCES IN THIS AREA? HOW WOULD YOU RANK YOUR KNOWLEDGE OF WHETHER RESOURCES ARE INCREASING, DECREASING OR STAYING THE SAME? VERY POOR / POOR / NOT SURE / GOOD / VERY GOOD.

Most people felt that they had a good idea of how and by how much resources might be changing over time. 42% of people interviewed thought that they had a good knowledge of the state of their resources, while 11% rated themselves as very good. About 1/5 of those interviewed said that they had poor (16%) or very poor (5%) knowledge of the state of their resources.

Self-rating of this issue did not vary much among LLGs, and only slightly among Wards. People in Nonovaul, Kafkaf, Enang and Umbukul felt their knowledge of the state of their resources was good or very good more than in other Wards (Figure 48). The Wards in which people tended to say they had the least knowledge about the state of their resources were Paruai, Leon and Maiom.



◀ ▲ Figure 48: Knowledge of whether resources are changing (a) across the survey and (b) by LLG and Ward (n=595).



HH-Q58 PARTICIPATION IN THE COMMUNITY

HOW WOULD YOU RATE YOUR LEVEL OF PARTICIPATION IN COMMUNITY AND CHURCH ACTIVITIES IN THIS VILLAGE? (DO NOT INCLUDE GOING TO CHURCH, SCHOOL OR EMPLOYMENT). VERY LOW / LOW / AVERAGE / HIGH / VERY HIGH. HOW MANY HOURS PER MONTH WOULD YOU AND MEMBERS OF THE HOUSEHOLD SPEND ON COMMUNITY ACTIVITIES?

As might be expected, the most common rating for level of community participation across the survey was "Average" reported by 43% of those interviewed. More people considered that they contributed to community activities at above average levels than below them (Figure 49). The relative

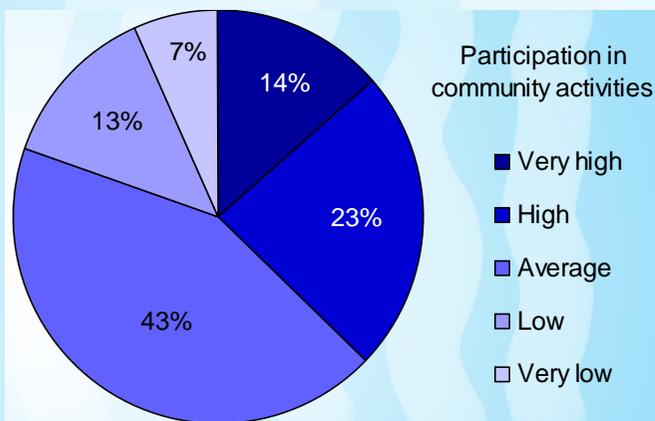


Figure 49: level of participation in community activities (a) across the survey and (b) by LLG and Ward (n=579).

Figure 49: level of participation in community activities (a) across the survey and (b) by LLG and Ward (n=579).

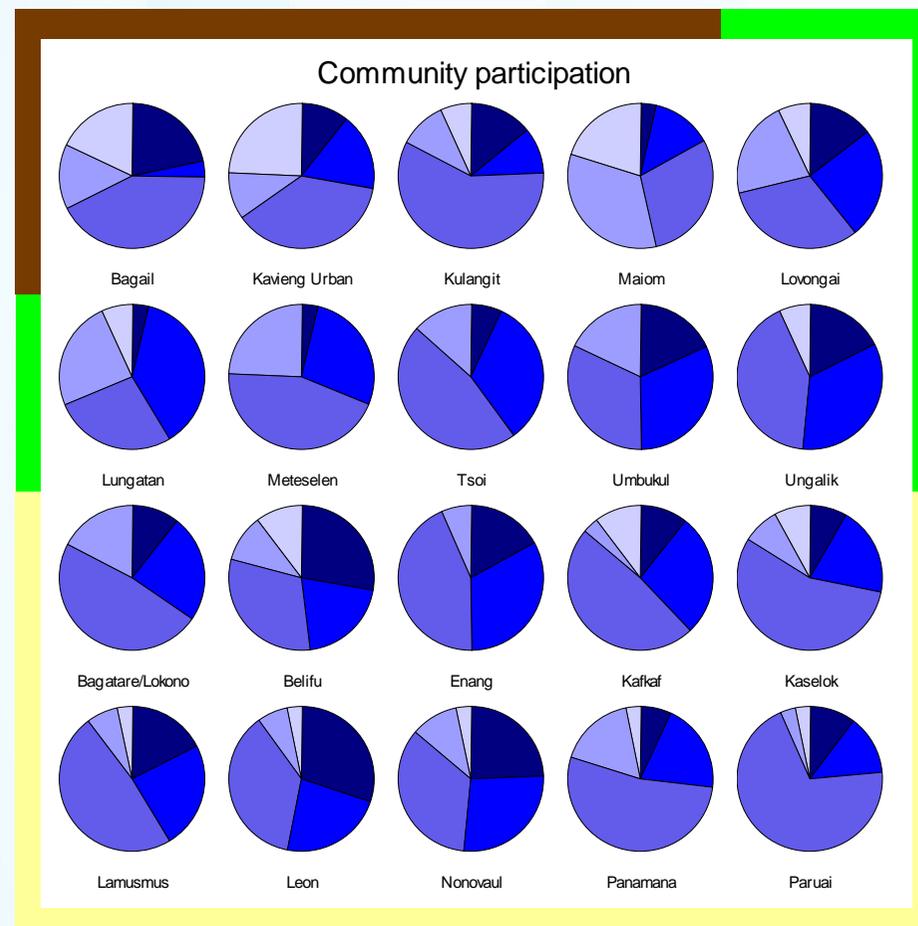
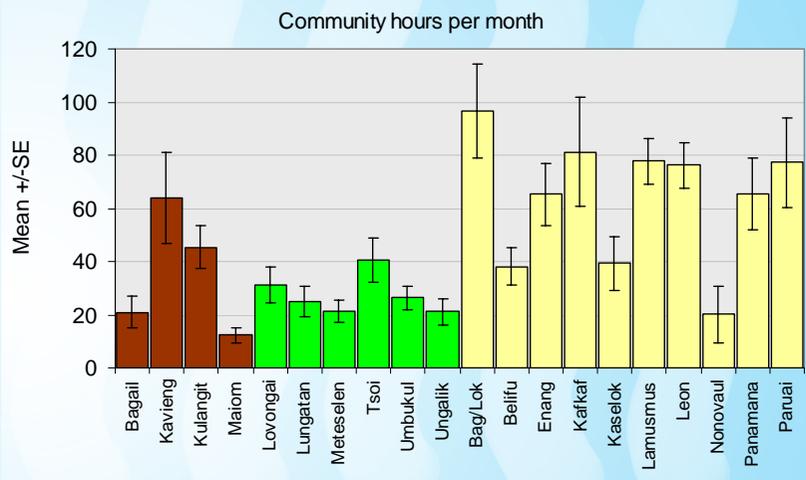


Figure 50: Average (+/-SE) hours per month spent in community activities by all members of households (n=505).

proportions of each rating within the community showed no pattern in relation to LLG, but there were some differences by Ward. People felt they contributed to community activities more than average most often in Bagail, Belifu, Leon and Nonovaul.

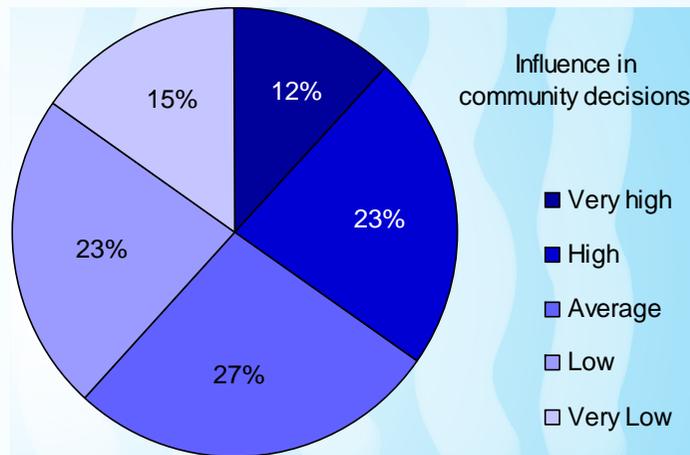
In terms of estimated hours spent on community activities per month, Wards in Tikana LLG were generally higher than either Kavieng or Lovongai LLGs (Figure 50).



HH-Q59 INFLUENCING COMMUNITY DECISIONS

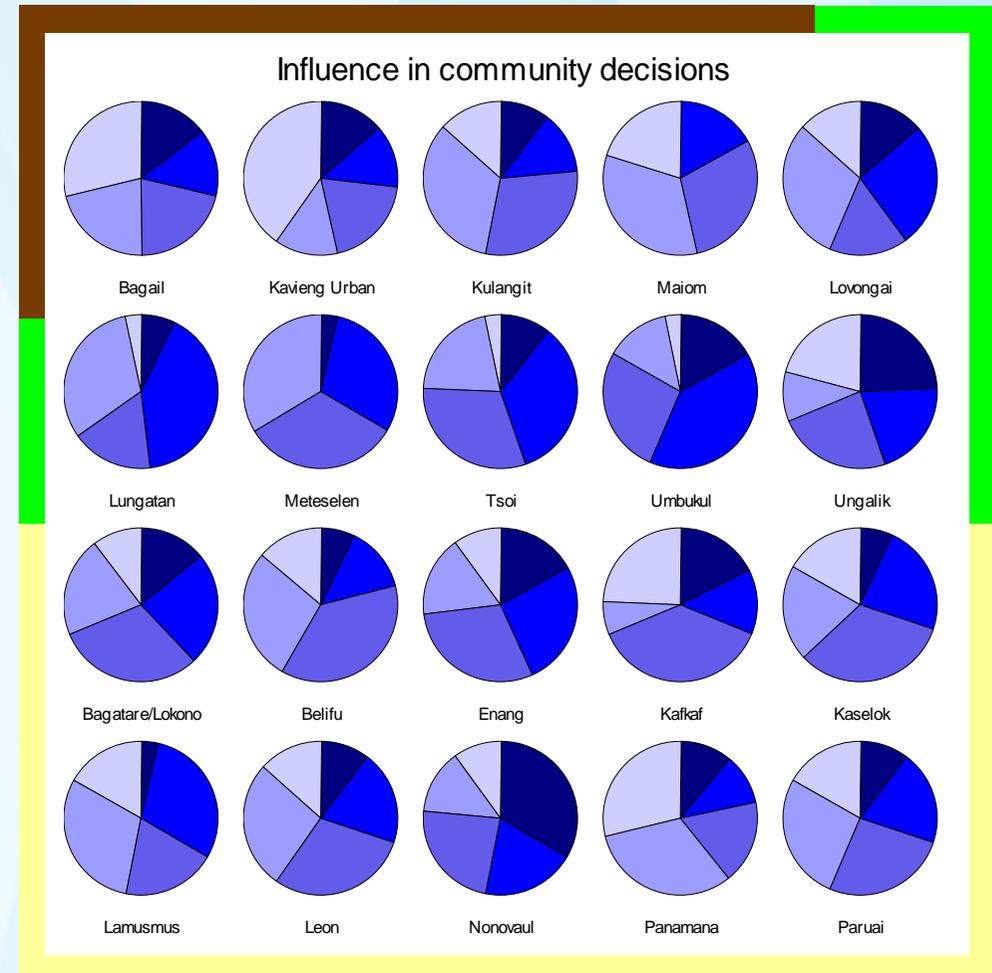
HOW WOULD YOU RATE YOUR ABILITY TO INFLUENCE COMMUNITY DECISION-MAKING IN THIS VILLAGE? VERY LOW / LOW / AVERAGE / HIGH / VERY HIGH. EXPLAIN.

People rated themselves remarkably *normally* (statistically) in terms of their ability to influence decision-making in their communities across the survey. The largest group of people rated themselves with “Average” ability to influence decisions (27%). There were much smaller groups in the *tails* of the distribution, with 12% of people believing they had a lot of influence and 15% believing they had very little (Figure 51).



Although there was no clear pattern relating to ability of influence decisions with LLG, there were some differences among Wards. The Wards in which the most people felt they could influence community decision-making were Nonovaul, Ungalik and Umbukul. No people in Maiom felt they had a “Very high” rating for influencing decision-making.

▲► Figure 51: Results of self-rating on peoples’ ability to influence community decision-making (a) across the survey and (b) by LLG and Ward (n=590).



HH-Q60 DECISION-MAKING

HOW ARE DECISIONS MADE IN THE VILLAGE AND WHO ARE THE MAIN PEOPLE INVOLVED IN THIS PROCESS? DO YOU THINK THAT ALL PEOPLE IN THE COMMUNITY HAVE A “FAIR SAY” IN DECISIONS AFFECTING THE VILLAGE? (WOMEN, YOUTH, OLD PEOPLE, OTHERS?). IF NOT, WHAT GROUPS OF PEOPLE ARE HAVING LESS SAY?

The most important decision-makers common in most communities were the Village Planning Committee (VPC) and Chairman (reported by 49% of interviews) and community leaders reported by 44% of people (including Maimais) (Table 30). The whole community as decision-maker was reported by 27% of people. Most communities simultaneously utilised 2-3 of these categories of decision-makers working together.

51% of those interviewed said that people in their communities all had a fair and equal say in community decision-making (Table 31). Where certain groups of

Decisionmakers	%	Frequency
Village Planning Committee	49	276
Community Leaders	44	248
Community as a whole	27	153
Church Leaders	15	84
LLG / Ward Member	9	52
Magistrate / Village Court	5	29
Ward Development Committee (to endorse)	4	22
Elders	4	21
Group Leaders (e.g. Women, Youth etc)	3	15
Village Police / Law & Order Representatives	2	12
Womens Representatives	1	7
Youth Representatives	1	3
Don't know	5	26
No community meetings	2	11
Total number of responses		566

▲ Table 30: The decision-makers in the community (n=566).

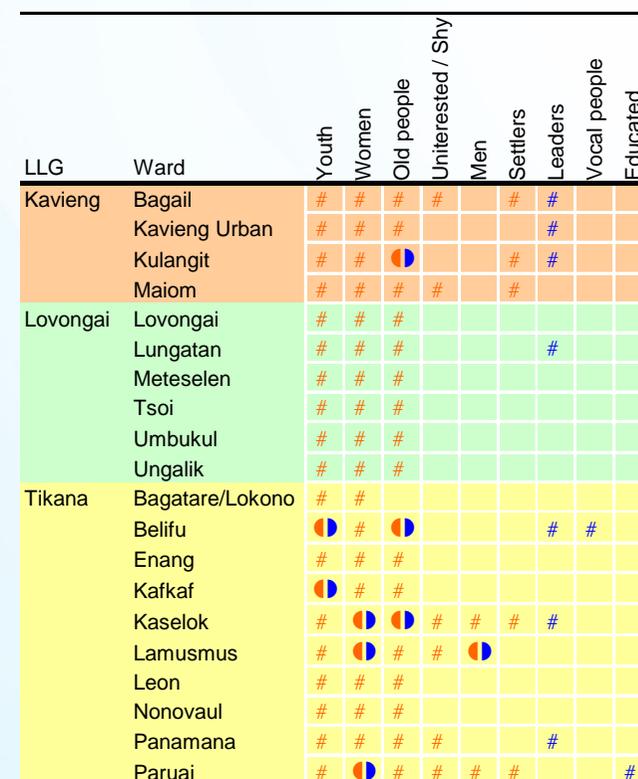
People who have LESS say	%	Frequency
Youth	15	85
Women	14	79
Old people	12	69
Uninterested or shy people	3	14
Men	2	13
Settlers / Outsiders / Married-in	1	8
Politically opposed	1	5
Illiterate / uneducated	1	4
Disabled	1	3
Church Groups	0.4	2
Teachers	0.4	2
Students	0.4	2
Minorities	0.2	1
People who have MORE say		
Leaders	3	14
Youth	1	8
Women	1	4
Old	1	3
Men	0.2	1
Very vocal people	0.2	1
Educated	0.2	1
Everyone same	51	285
Not sure	6	32
No meetings	2	10
Total number of responses		556

▲ Table 31: People who have more and less say in community decision-making (n=556).

▶ Figure 52: People or groups with less influence on decision-making by LLG and Ward.

Less say
More say
● Both opinions given

people were given less of a say, the most usual groups disadvantaged were youth, women and old people. A range of other groups with less of a say in community decision-making included people who were uninterested or shy, men, settlers or those who have married-in to a community and those politically in conflict with the current leaders. Some people expressed uneven influence in decision-making describing themselves as people who tended to have more say than others. Youth, women and old people tended to have less of a say in all LLGs and Wards (Figure 52). Men and/or settlers had less of a say in Bagail, Kulangit, Maiom, Kaselok, Lamusmus and Paruai.



Analysis of Survey Questions



Focus Group Survey

FG-Q1-Q2 GROUP DETAILS

IS THIS A FORMAL / REGISTERED GROUP? YES / NO. IF THE GROUP IS REGISTERED, PLEASE DESCRIBE WHERE AND IF / HOW IT IS OFFICIALLY CLASSIFIED OR RECOGNIZED. IS THIS GROUP AFFILIATED WITH ANY OTHER ORGANISATIONS? WHICH ONE(S)?

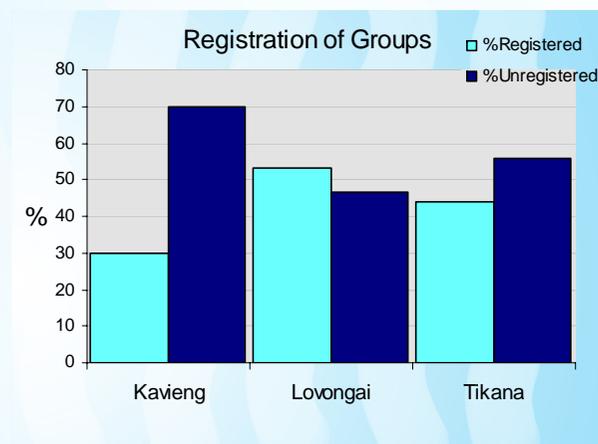
Of the 100 focus groups interviewed across the survey, 4 were fishers, 59 were women's groups and 33 were youth groups (Table 32). A minimum of 2 women's groups was surveyed in each ward, with the maximum in Kafkaf (Tikana LLG). Organised groups of fishers were generally difficult to find to include in the survey and none were interviewed in Lovongai LLG. One of the groups interviewed in Kavieng Urban LLG described itself as both a youth and fishing group, though in the analyses that follow it was classified as a youth group.

44% of all groups interviewed were registered, with 56% being groups formed for their own purposes without formal recognition. A larger percentage of groups were unregistered in Kavieng Urban LLG than in the two more rural LLGs surveyed (Figure 53). The vast majority of the groups, 33%, was affiliated with the church, 9% with Government programmes, including youth, women, commerce and others, and 5% were NGOs. The remaining 53% of groups did not report any affiliations.

LLG	Ward	Fishers	Women	Youth
Kavieng	Bagail		4	1
	Kavieng Urban	1	2	2
	Kulangit		2	2
	Maiom		3	2
Lovongai	Lovongai		2	3
	Lungatan		3	2
	Meteselen		3	2
	Tsoi		3	1
	Umbukul		2	3
	Ungalik		3	2
	Tikana	Bagatare/Lokono		3
	Belifu		3	1
	Enang	1	3	1
	Kafkaf		5	
	Kaselok		5	
	Lamusmus	1	2	2
	Leon	1	2	2
	Nonovaul		2	3
	Panamana		4	1
	Paruai		3	1
Total		4	59	33

◀ Table 32: Distribution of focus groups interviewed during Survey 1. *One of the groups described itself as both a youth and fishing group (n=100).

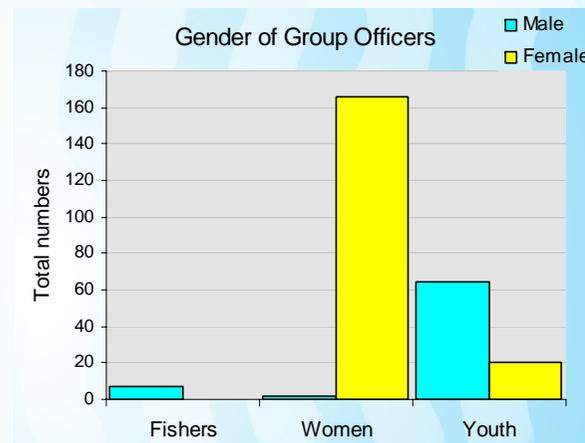
▼ Figure 53: Registration status by LLG for groups contacted during the survey (n=100).



FG-Q3-Q4, Q7 GROUP STRUCTURE AND HISTORY

WHAT OFFICERS DOES THIS GROUP HAVE? HOW ARE POSITIONS SELECTED?
HOW LONG HAS THIS GROUP EXISTED? HOW MANY MEMBERS? MALES /
FEMALES. IS THERE A MEMBERSHIP FEE?

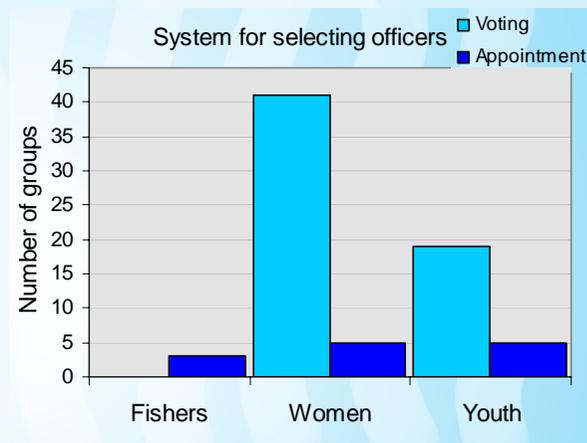
As would be expected given the high representation of women's groups, most of the people that hold some kind of office in the groups contacted were women. Most groups had a hierarchical structure, with a leader (variously



termed the President, Chairman, Leader, Chief or Captain), vice-leader, treasurer and secretary. Some groups also had committees and advisers. The fisher groups contacted had no female officers, and youth groups were dominated by males. Male officers were rare in women's groups, with only 2 males recorded across the study (Figure 54). The most common system for selecting officers in the community groups we surveyed was via vote.

In terms of membership, women's groups were usually the largest (and most variable in size), followed by youth groups and lastly, fishers. The average membership of women's groups across all wards and LLGs was 34, but varied between 0 and 150 (we assume 0 means all in the organisation were officers). For youth groups, the average membership was 28 people and reached a

maximum of 57. Fisher's groups tended to be small, averaging only 12 members (and ranging between 4 and 25) (Figure 55). Membership of the three types of focus groups included in the study tended to be heavily biased towards males for fishers and youth groups, and towards women in women's groups. For youth groups, the relationship between males and females observed among officers is approximately the same in members (Figure 54a and b). For women and fishers, there appears to be a gender bias towards females and males respectively in terms of officers. That is, groups of fishers appear to favour male officers, and groups of women favour female officers compared

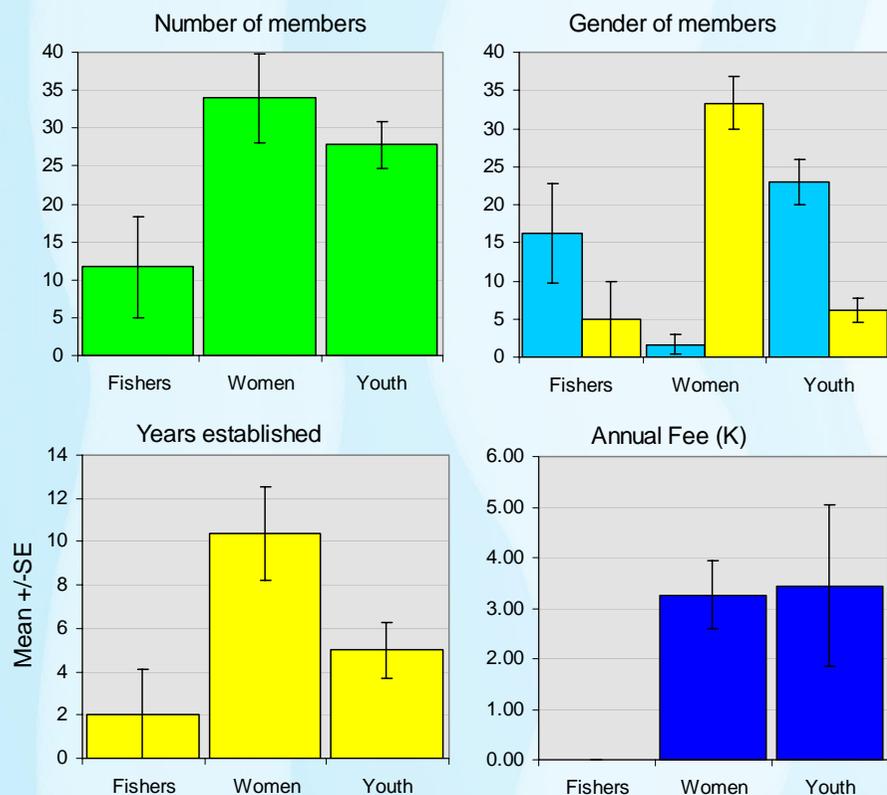


◀ Figure 54: Gender and selection system for groups interviewed during this study. (a) shows the gender distribution among officers (n=84); and (b) the system used for selecting officers (n=76).

with their general membership (already biased in these same directions).

Women's groups are generally the longest established, with an average organisational life of 10 years, which varies between <1 and 44 years. The average life of youth groups interviewed was 5 years (ranging between <1 and 28 years). Fishermen's groups had only been established for an average of 2 years and a maximum of 5 years. They appear to be a relatively new phenomenon, with few groups formed and small membership (Figure 55). The average annual membership fee to women's and youth organisations is 3 Kina, and ranges for youth groups up to 25 Kina. Many organisations charge no fee.

▼ Figure 55: Membership, years of operation and annual fee charged in community groups contacted during the survey (n=49-57).



FG-Q6 OBJECTIVES

WHAT ARE THE GROUP'S MAIN OBJECTIVES? WHY / HOW WAS IT FORMED?

Focus groups in NIP are involved in a range of activities designed to improve the wellbeing of people and the community in general (Table 33). Both women's and youth groups cover a diversity of issues, while fishermen's groups tend to focus only on fishing activities. Women's groups tend to focus on Church and community activities, followed by promoting women's issues, education and sport / recreation. Youth groups tend to focus on community and youth issues, with lesser attention paid to Church and sport / recreation.

▼ Table 33: Ranked activities undertaken by focus groups interviewed in this survey (n=96). Data are total number of times an activity was mentioned across all groups. Although 100 groups were contacted, 179 activities were reported because many groups address more than one issue. Percentages refer to groups of one type engaging in an activity.

Activities	Fishers		Women		Youth		All	
	%	Frequency	%	Frequency	%	Frequency	%	Frequency
Community			49	29	61	20	51	49
Church			59	35	21	7	44	42
Sport / Recreation			24	14	21	7	22	21
Promote women			34	20			21	20
Education			24	14	9	3	18	17
Address youth issues					48	16	17	16
Promote fishing / markets	100	4					4	4
Culture			5	3			3	3
Promote farming			2	1			1	1
Promote handicrafts for sale			3	2			2	2
Environment					6	2	2	2
Promote development					3	1	1	1
Travel					3	1	1	1
Number of activities		4		118		57		179
Number of groups		4		59		33		96

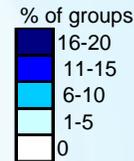
FG-Q8 INCOME OPPORTUNITIES

WHAT ARE THE INCOME OPPORTUNITIES FOR PEOPLE IN THIS VILLAGE? ARE THERE ANY GROUPS OF PEOPLE WHO CANNOT PARTICIPATE OR ARE NOT ALLOWED TO? IF SO, WHY?

The focus groups were asked what the perceived opportunities for income generation were for people in their village / area. In terms of general opportunities, all three groups, fishers, women and youth identified fishing and farming as the most important activities followed by selling in markets (Figure 56). Note that for market selling, people did not distinguish between selling goods derived from other sources and those caught or grown themselves or by others in their family. As a result of this, there is likely to be considerable overlap between fishing / farming and market selling, except where it refers to on-selling of clothes, fuel and other manufactured items. All three groups tended to see crafts and culture, and outside employment as limited in opportunity. Women’s groups further included fund-raising as a form of income, and several; youth groups reported no opportunities at all (these comprise the “Other” category in Figure 56 and Figure 57).

When asked whether there were any disadvantaged groups within the community in terms of opportunities for employment, the focus groups identified 12 different groups of people. The most important of these were the disabled and the aged members of the community (accounting for 32 and 25% of reasons respectively). Other disadvantaged groups mentioned in descending order included: those with religious affiliations (7%), particularly Seventh Day Adventists (SDAs), and in one case Roman

► Figure 56: Perceived income opportunities by focus group type, accumulated into general categories (n=435 responses over 99 groups). Values are percent of each group type reporting an opportunity.



Category	Details	Fishers	Women	Youth	Category	Details	Fishers	Women	Youth	
Market	Food	1	1	1	Fishing	Fishing	16	11	6	
	Baking	1	1	1		Reef collecting	1	1	1	
	Market	1	1	1		Shellfish	1	1	1	
	Buai	1	1	1		Crabs	1	1	1	
	Cigarettes / Tobacco	1	1	1		Lobsters	1	1	1	
	Fuels (Kerosene)	1	1	1		Trochus	1	1	1	
	Sago	1	1	1		Sea Cucumbers	1	1	1	
	Clothes	1	1	1		Crafts	Handicrafts	1	1	1
	Oil	1	1	1			Sewing	1	1	1
				Shows	1		1	1		
Farming / Forestry	Cash Crops	1	1	1	Employment	Kavieng Council	1	1	1	
	Pigs	1	1	1		Private Sector	1	1	1	
	Flowers	1	1	1		Resort	1	1	1	
	Copra	1	1	1		Boat transport	1	1	1	
	Cassava	1	1	1		Roadwork	1	1	1	
	Oil Palm	1	1	1		Self-employment	1	1	1	
	Vanilla	1	1	1		Teachers	1	1	1	
	Cocoa	1	1	1		Red Cross	1	1	1	
	Coffee	1	1	1		Other	Fund-raising	1	1	1
	Timber	1	1	1			None	1	1	1

◀ Figure 57: Details of perceived income opportunities separated by focus group type. Many of the market opportunities probably overlap with others. It was difficult to distinguish the market selling of goods obtained from suppliers from goods grown or caught by the marketers or their families (n=99 groups).

Catholics; children (<12 years old) (4%); widows; sick people; those with alcohol problems; pregnant women; newly-weds; outsiders; and lazy youth. 24 of the groups consulted said that there were no disadvantaged groups, and one that they did not know.

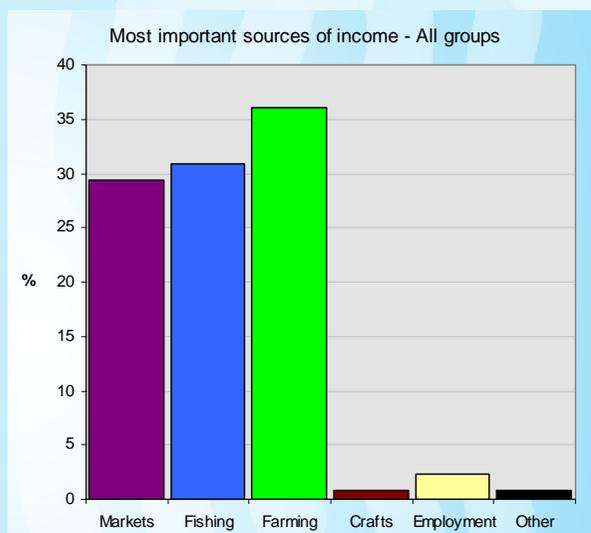
FG-Q9 MOST COMMON SOURCES OF INCOME

WHAT IS THE MOST COMMON SOURCE OF INCOME IN THIS VILLAGE?

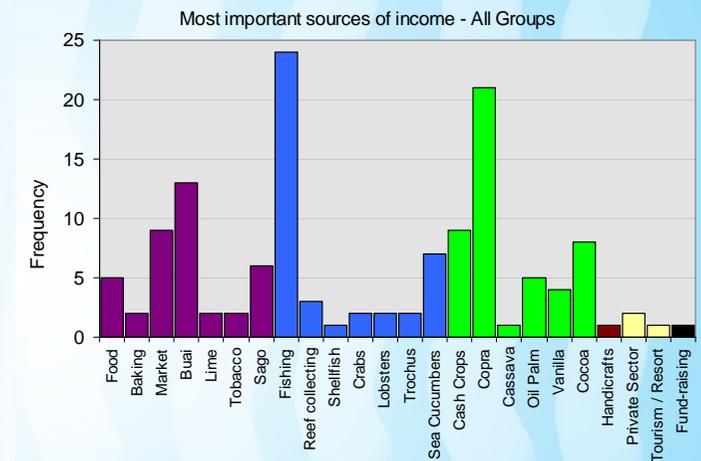
Focus groups reported that the *most important* livelihoods in their villages / areas were focused on farming / forestry, fishing and selling goods in markets. Market selling probably overlaps with farming and fishing to some extent, but is mostly focused on cooked or processed foods (cakes, icecreams, drinks), buai (including lime and mustard), cigarettes and tobacco (tobacco would have been grown) and sago (which would have been collected and processed). Some of the cooked foods for sale might have also included smoked fish (Figure 58). In their opinion, employment only accounts for 2.3% of important forms of income-generation, with crafts and fund-raising reported in 1% of cases each.

The most important forms of farming / forestry were copra (16% of a total of 133 important forms of income-generation across 100 interviews), cash crops (7%), and cocoa (6%) (Figure 59). In terms of fisheries, the most important group is fish (18%) with sea cucumbers following second at 5%. Collecting, shellfish, crabs, lobsters and Trochus although all reported by some groups as important sources of income for their communities were mentioned only 1-2% of the time. The most important form of marketing was for buai (10%), with sago and cooked food reported 5% and 4% of the time. The category “Market” was not clarified by enumerators during the survey and could overlap with any other item.

▼ Figure 58: The most important income categories reported for their area by focus groups.



► Figure 59: The actual sources of income considered by focus groups to be the most important in their area (FGQ9).



▼ Table 34: Summary of the most important sources of income as described by focus groups in each ward and LLG included in the study (n=133 sources reported). Increasing intensity of colour indicates a higher frequency of this activity being identified as one of the most important activities by focus groups in that ward. Coloured bars at the top of the table indicate general categories of income-generating activities that correlate with figures above.

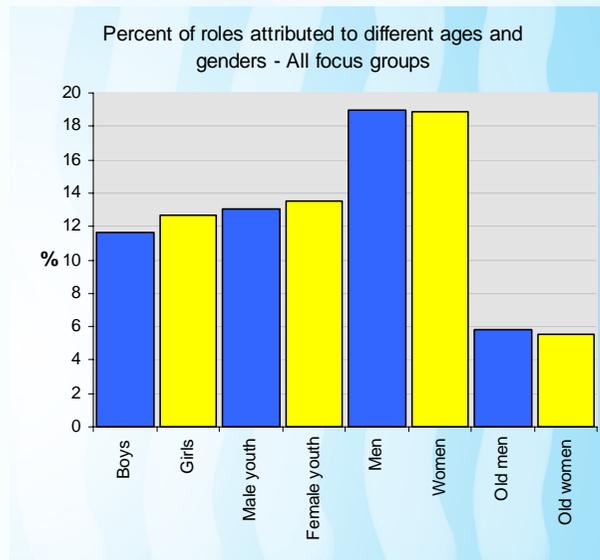
LLG	Ward	Income Source																						
		Food	Baking	Market	Buai	Lime	Sago	Fishing	Reef collecting	Shellfish	Crabs	Lobsters	Trochus	Sea Cucumbers	Cash Crops	Copra	Cassava	Oil Palm	Vanilla	Cocoa	Handicrafts	Private Sector	Tourism / Resort	Fund-raising
Kavieng Urban	Bagail																							
	Kavieng Urban	2																						
	Kulangit	3																						
	Maiom																							
Lovongai	Lovongai																							
	Lungatan																							
	Meteselen																							
	Tsoi																							
	Umbukul																							
	Ungalik																							
Tikana	Bagatare / Lokono																							
	Belifu																							
	Enang																							
	Kafkaf																							
	Kaslak																							
	Lamusmus																							
	Leon																							
	Nonovaul																							
	Panamana																							
	Paruai																							

FG-Q10 ROLES IN FISHING & COLLECTING

WHAT ARE THE ROLES OF MEN, WOMEN, CHILDREN, YOUTH AND OLD PEOPLE IN FISHING AND COLLECTING?

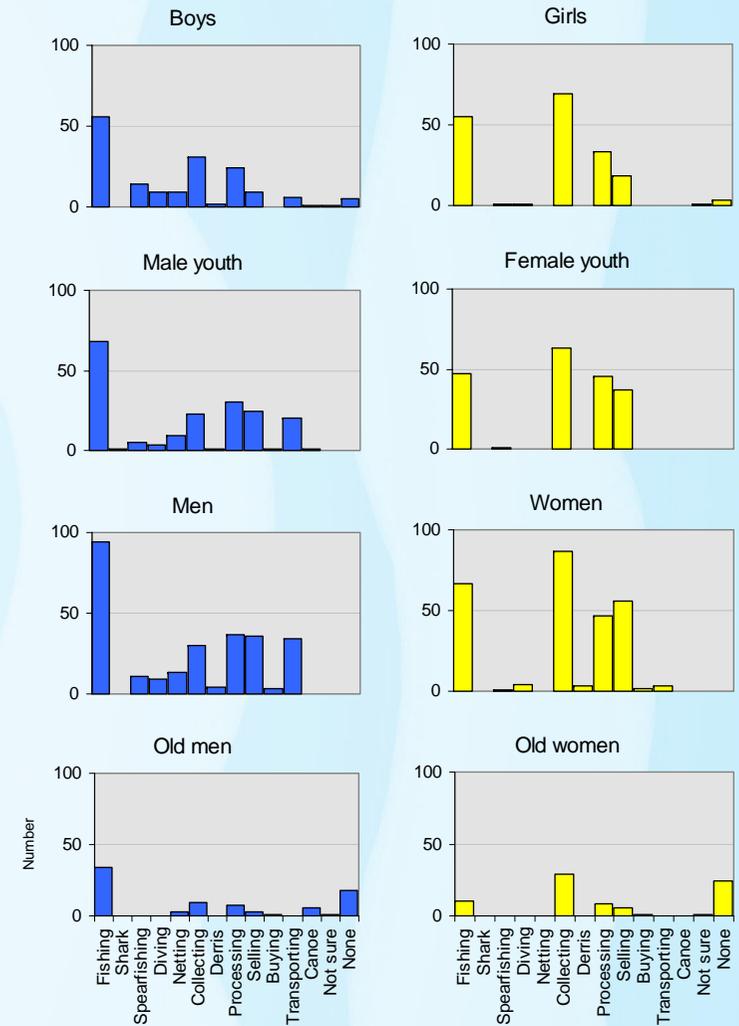
According to the focus groups consulted, males and females, and people of different age groups play different roles in the entire work load associated with procuring, processing and using marine resources. Both genders remain involved throughout their lives. There is a large degree of equality among genders in terms of overall involvement (Figure 60) and large differences among age groups. Men and women appear to have the greatest role in utilising marine resources (19% of tasks attributed to each of them), with old people having a diminishing role. Children and youth contribute significantly, taking 12-13% of tasks in each group.

A breakdown of the tasks (Figure 61) shows that in some communities children and old people have no role in the tasks associated with using marine resources (other than eating them). In most communities, all age groups and both genders are involved in fishing, collecting, processing and selling of marine products. Males of all ages tend to be more involved in spearfishing, diving, transport and canoe-building than females, though the only activity that appears to be exclusively male is netting. Females tend to be more involved in collecting and selling.



▲ Figure 60: The roles of different members of the community in utilising marine resources (n=1430 roles reported). Data are percentages contributed by each to the total effort of utilising resources. These were calculated by totalling frequencies of all roles attributed to each group (see figure below) across the focus group surveys. Percentages are calculated over a total of 1430 times that a role was attributed to any group. Boys & girls <16 years; youth 17-30 years, Men & women 31-60 years; and Old men & women 60+ years of age.

▼ Figure 61: Breakdown by gender and age group of roles of members of the community in utilising marine resources (n=1430 roles). Data are frequencies that particular roles were attributed to males and females and age groups across all LLGs and wards, and as attributed by all focus groups. The frequency with which a role appears for any group of people is taken here as an indicator of importance.



FG-Q12 PEOPLE RESTRICTED IN FISHING / COLLECTING

ARE THERE ANY GROUPS OF PEOPLE RESTRICTED BY ANY CUSTOMARY TAMBUS IN FISHING AND COLLECTING ACTIVITIES?

According to the focus groups surveyed (FGQ12), the majority of communities (55%) do not impose restrictions on the fishing activities of particular members of the community. 7% of communities imposed restrictions in the past, but no longer do so, while in 6% of communities the focus group interviewed did not know whether there were any restrictions. A total of 15 restrictions were reported across the remaining communities. Many of them were targeted directly at women (5%) or because they must not be involved in netting (2%). Women were also restricted from being involved in fishing activities if they were menstruating, pregnant or had new-born babies (total of 10%). Men are also sometimes restricted because their wives were pregnant (2 cases) or because they are forbidden from sex before fishing. There were 2 cases in which children were restricted, but it was not clear why or in what way. A range of other restricted members of the community were reported (only 1-2 cases each), unrelated to age or gender. These were restrictions against dancers during celebrations, the sick and disabled and certain religions* (SDAs), practitioners of black magic, and people who eat pork, which together total to 7% of restrictions (including no restrictions) reported. Gardeners were mentioned in two communities. In one they were restricted from fishing, and in the other were not to collect sea cucumbers before working in the garden. No details on the reasons for these restrictions were collected by enumerators. Interestingly, women's groups tended to report that there were no fishing restrictions against members of the community about twice as often as fishers and youth (adjusted as %).

Restricted people	All groups		Fishers	Women	Youth
	%	Frequency	%	%	%
None	55	54	33	59	31
People restricted in the past	7	7	0	7	3
Don't know	6	6	0	5	3
Children	2	2	0	3	0
Women	5	5	0	5	3
Menstrual women	2	2	0	3	0
Pregnant women	7	7	33	8	2
Women with new-born babies	1	1	0	0	2
Women prohibited from netting	2	2	0	2	0
Men with pregnant wives	2	2	0	2	2
Men who have had sex	1	1	0	0	2
Dancers during celebrations	1	1	0	2	0
Sick people	1	1	0	2	0
Disabled people	1	1	0	0	2
Gardeners	2	2	33	2	0
Black magic practitioners	1	1	0	0	2
Pork eaters	1	1	0	0	2
Religious	2	2	0	0	3
Restrictions reported	100	98	3	59	33
Groups reporting		27	3	12	12

▲ Table 35: Summary of restrictions imposed on groups of people living in the survey area as reported by focus groups (n=27).

* It is not clear whether sick or disabled people are actually restricted, or whether they do not have the capacity or opportunity to fish. Enumerators did not distinguish between these possibilities or provide details. It is likely that Seventh Day Adventists (SDAs) are not restricted by the community from fishing but do not wish to fish for certain target species.

FG-Q13 INCREASING INCOME FROM FISHING

DO YOU THINK THAT INCOME FROM FISHING COULD BE INCREASED IN THIS VILLAGE? IF SO, WHY HAS THIS NOT HAPPENED ALREADY? HOW COULD IT BE INCREASED?

When asked whether they thought that income from fishing activities could be increased in their communities, the large majority of focus groups (89%) replied 'yes'. Only 6% of the groups interviewed thought that income from marine resources could not be increased, and 4% were not sure. One group interviewed was of the opinion that a lack of a place to sell marine products, combined with an overall lack of commitment to fishing (unless people wish to generate cash for a particular purpose) would prevent income from this sector from increasing.

The focus groups that thought that income from marine products could be increased in the future cited a large list of impediments (19) that were preventing them from doing so and 18 actions that they felt could be implemented to help them to improve income from fishing in the community (Table 36). The focus groups felt that the most important impediments to increasing income derived from marine resources were a lack of transport to get their products to markets, a shortage of gear and technology, the lack of a nearby buyer or market for their products and a lack of skills and knowledge. Details of exactly what gear, technology and skills were needed were few, but included: (i) the need for "better gear", (ii) a "lack of gear", (iii) more "know-how on processing and catching", (iv) the need for information

on how income from fishing could be increased and how to manage and develop marine resources, (v) the lack of skills for using other [marine?] products, (vi) the need for new methods of fishing, and (vii) a need for "funding for fishing gear" and boats. 11% of the reasons given that were preventing an increase in income from fishing were focused on attitudes and cultural constraints. Laziness, a lack of commitment to fishing as a livelihood, a subsistence approach to fishing in which fishing is only undertaken

intermittently to meet immediate needs and poor cooperation among fishers were seen as contributing to poor overall performance of the sector. One group raised the presence of resource owners as an impediment. This was not further clarified, but suggests that they felt access to grounds was restricted. Three groups suggested that there were problems with the resource (there are "no fish" and "fishing areas are no good") but did not give further details of what that meant.

Most of the actions proposed by focus groups to address impediments to increasing income from fishing focused on bringing buyer(s) to their area, training, improving gear and technology and improving transportation (Table 36). It is interesting to note that although the lack of transport was raised most often in terms of impediments, the first option solution was not to improve transport to markets, but to bring the markets closer.

IMPEDIMENTS			NEEDED ACTIONS		
	%	Frequency		%	Frequency
Infrastructure					
Transport	16	24	Economical transport	8	10
Storage / facilities (ice, esky)	5	8	Storage	7	9
Fishing gear					
Gear / technology	15	23	Gear / technology	13	16
Boat / motor	5	8	Boats	6	7
Bait	1	1			
Knowledge					
Skills / knowledge	11	16	Training	13	16
Business management	3	4	Business management	2	3
			Processing skills	2	2
Economic					
No Market / Buyers	13	20	Buyer nearby	16	20
Low prices / income	5	8	Increase buyer price	2	3
High costs	2	3	Sell to town	1	1
			Sell to other provinces	1	1
Support					
Mangement	3	4	Mangement	6	7
Government support	2	3	Government support	3	4
Information	1	2	Information	2	3
Funding	1	1	Funding	2	2
Attitudes / cultural					
Laziness / no commitment	6	9	Commitment	4	5
Subsistence approaches	3	4	Cooperatives	2	3
No or poor cooperation	1	2			
Resource owners	1	1			
Resource					
No fish / poor fishing grounds	2	3	Expand to other spp.	2	2
Don't know	3	5	Don't know	8	10
Totals	100	149		100	124

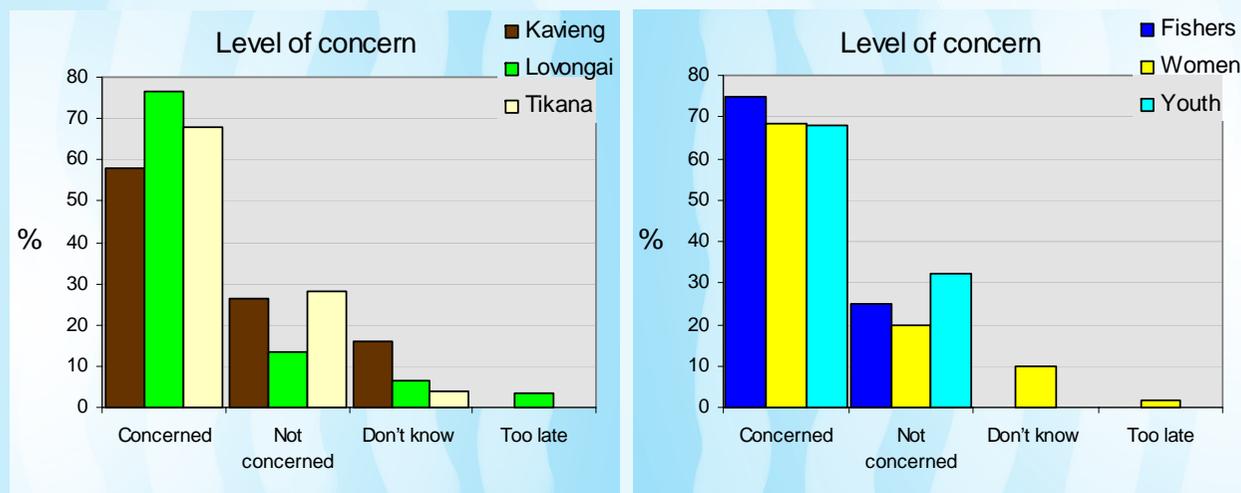
▲ Table 36: Summary of the perceive impediments to increasing income from fishing, and suggested actions to address them given by focus groups (n=91). Values are total number and % of times an issue was raised across all focus groups, wards and LLGs.

FG-Q17 CONCERNS FOR NATURAL RESOURCES

ARE THERE ANY CONCERNS ABOUT NATURAL MARINE RESOURCES IN THIS VILLAGE? DESCRIBE THEM.

Most of the people within the groups interviewed (69%) were concerned about the state of their marine resources, with only 23% not being concerned. The concerns raised fell into 4 broad categories: (i) biophysical, (ii) fishing-related, (iii) effects of outside forces and (iv) management-related (Table 37). The most commonly-raised concern was on the effects of using derris root in fishing (27% of all groups) and overall condition of reefs (15%). A small number of groups said that fisheries restrictions were a concern to them because they impeded fishing.

▼ Figure 62: Level of concern for the state of marine resources expressed by focus groups by (a) LLG and (b) group type (n=99).



Category	%	Frequency
Biophysical		
Pollution marine	6	9
Sedimentation turbidity	1	2
Reef condition	15	22
Mangrove condition	1	2
Fishing related		
Derris	27	38
Dynamite	6	8
Spearfishing	1	1
Netting	1	1
Overharvesting	4	6
Declining stocks	7	10
Fishery destroyed	1	2
Undersized	6	8
Need to travel far to get fish	1	2
Outside forces		
Live reef fish	1	2
Commercial fishing	1	2
Global warming	1	2
Coral bleaching	1	1
Outsiders using	4	6
No share of commercial operations (live reef fish)	1	1
Management related		
No rules	1	2
No authority / control	1	1
Need enforcement / management	8	11
Restrictions impede fishing	2	3
Don't know how to address	1	1
Totals	100	143

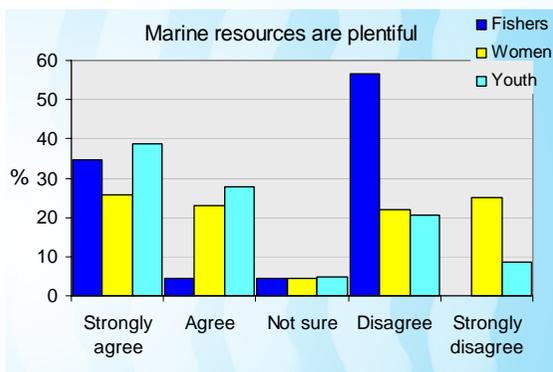
▲ Table 37: Summary of concerns about natural resources raised by focus groups (n=98).

FG-Q18 ABUNDANCE OF SEAFOODS

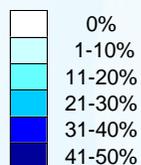
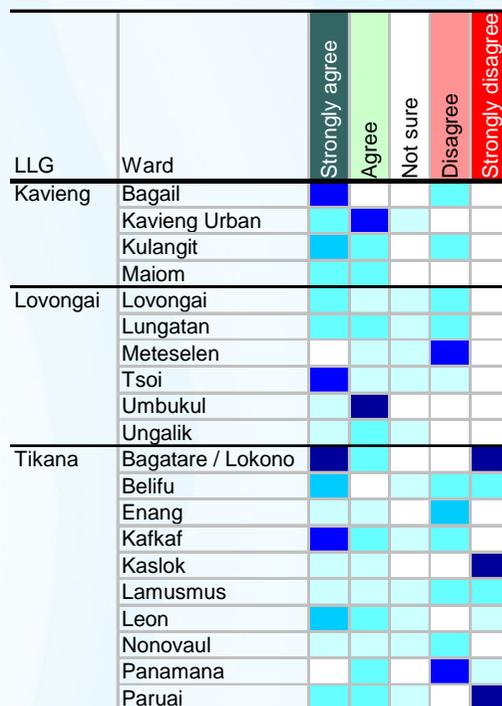
THERE ARE PLENTY OF SEAFOODS TO CATCH IN AND AROUND THIS VILLAGE. (ASK FOR SHOW OF HANDS AND COUNT THE NUMBER OF PEOPLE WITH EACH OPINION). STRONGLY AGREE / AGREE / NOT SURE / DISAGREE / STRONGLY DISAGREE. EXPLAIN.

55% of all voters either strongly agreed or agreed that marine resources were plentiful in their area, while 5% were unsure and 40% believed that the statement was untrue. Although fishers were a small group, there tended to be more of them that thought that resources were not plentiful (Figure 63).

The reasons given for peoples' opinions were argued with the same types of observations on both sides (i.e. easy to find and hard to find were both reported) (Table 38). Some people reported that their opinion was seasonally-specific, hinting that at certain times of the year (their *season*) fishing was better than at other times.



▲► Figure 63: Level of agreement (by vote) with the statement that seafoods are plentiful (a) over the whole survey and (b) by LLG and Ward (n=1058 votes).



▼ Table 38: Summary of reasons given for why people agree or disagree that there are plenty of seafoods to catch (n=82).

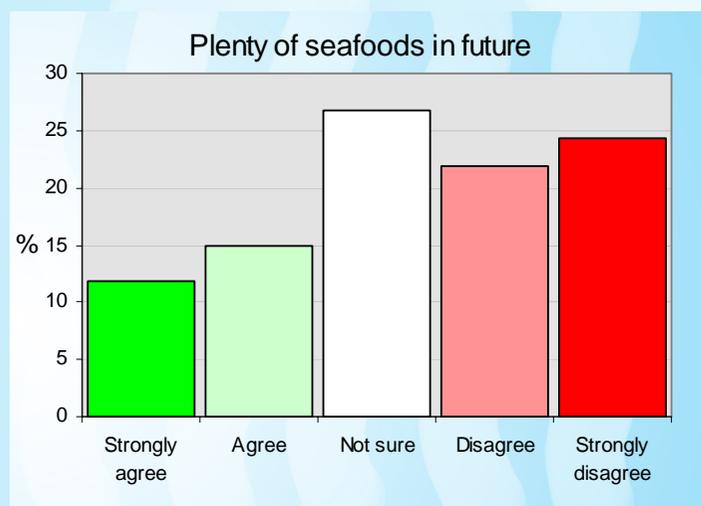
Reasons	Fishers		Women		Youth	
	%	Frequency	%	Frequency	%	Frequency
Agree						
Plentiful / sufficient to needs	33	1	40	19	48	15
Easy to find			10	5	13	4
Easy to catch			15	7	6	2
Underused resource			4	2	6	2
Plenty sold at the market			6	3	3	1
Deepwater areas not tapped	33	1	2	1	3	1
Tuna untapped			2	1		
Lobsters are plentiful			2	1		
There is plenty to eat			2	1		
Being conserved			2	1		
Disagree						
Declining	33	1	21	10	19	6
Hard to find			6	3	6	2
Undersized	33	1	6	3	3	1
Shells declining			8	4		
Reef fish declining			8	4		
Hard to catch (effort)			6	3	3	1
Many users / overfishing			6	3	3	1
Sea cucumbers declining			2	1	10	3
Species are gone			4	2		
Conditional						
Species-specific	33	1	8	4	10	3
Seasonal			8	4	6	2
Number of issues raised	5		82		44	
Number of groups	3		48		31	

FG-Q19 FUTURE ABUNDANCE OF SEAFOODS

THERE WILL BE PLENTY OF SEAFOODS TO CATCH IN AND AROUND THIS VILLAGE IN THE FUTURE. (ASK FOR SHOW OF HANDS AND COUNT THE NUMBER OF PEOPLE WITH EACH OPINION). STRONGLY AGREE / AGREE / NOT SURE / DISAGREE / STRONGLY DISAGREE. EXPLAIN.

More people (46%) disagreed that seafoods would be plentiful in the future than agreed (27%) with the statement (Figure 64), a reversal of the pattern seen in FG-Q18 on present state of resources. People are concerned about the future and do not at present believe that it will be equipped with plentiful resources. People gave a range of reasons for the future expected state of their marine resources, some of them appearing to assume that certain practices would have changed, and others giving the conditions under which things would be good or bad in the future (Table 39). The most common reasons given for expecting resources to decline were human population increases and overfishing. For resources to be in good condition in the future, the most important conditions reported were that they should be well managed and that derris would not be used.

▼ Figure 64: Level of agreement (by vote) with the statement that seafoods will be plentiful in the future (n=1058 votes).



Expect less	Fishers	Women	Youth	All Groups
Human population increasing		15	6	22
Overfishing	2	11	5	18
Derris roots used		5	2	7
Management lacking		5		5
Too many fishers	1	1	1	4
Climate change		2	2	4
Already declining		2	2	4
Pollution damage		2	1	3
Habitat damage	1	1	1	3
Reef changes		1		1
No control of outsiders		2	1	3
Live reef fish trade	1			1
Dynamite used		1		1
Expect more				
God will provide	1	2	1	4
Plenty now / presume same in future		2	1	3
Managed well	1		1	2
Derris stopped		1	1	2
Dynamite stopped		1		1
There are untapped resources		1		1
Small sizes are avoided			1	1
Breeding areas kept intact			1	1
Conditions under which there will be less				
If coral is damaged		1		1
If business increases			1	1
Conditions under which there will be more				
If managed well	1	12	4	19
If derris root is not used		3	5	8
If the environment is in good condition		2		2
If resources can be controlled		1	1	2
If there is training on management			2	2
If awareness increases			1	1
Other				
Don't know		4	2	7
Wouldn't be able to tell		2		2

▲ Table 39: Reasons given for agreeing or disagreeing with the idea that there will be plenty of seafoods to catch in the future (n=136 reasons).

FG-Q20 INCOME OPPORTUNITIES FROM MARINE ENVIRONMENT

APART FROM FISHING & COLLECTING, ARE THERE ANY OTHER ACTIVITIES OR INCOME OPPORTUNITIES OFFERED BY THE MARINE ENVIRONMENT (E.G. DIVING, ECOTOURISM)

Most of the alternative income opportunities from the marine environment reported by Focus Groups centred on various forms of tourism, particularly those that might yield royalties (36% of groups) (Table 40). Apart from various forms of tourism, opportunities in lime making, saltmaking, handicrafts, transport and aquaculture were suggested. In 2 cases, fines for breaching customary laws were reported as a possible source of income – it is not clear whether this would be an unintended but positive side-effect of management, or a focus for income generation.

Income from marine environment	%	Frequency
Diving tourism (royalties)	36	32
Surfing tourism	6	5
Tourism (unspecified)	4	4
Lime making from coral	4	4
Ecotourism	3	3
Fishing fines - customary	3	3
Saltmaking	2	2
Handicrafts	2	2
Ferry	2	2
Fish farming	2	2
Research	1	1
Pearl harvesting	1	1
Pearl farming	1	1
Clam farming	1	1
None	30	27
Don't know	21	19

▲ Table 40: Income opportunities from the marine environment identified by Focus Groups (n=90).

FG-Q21 IS MANAGEMENT NEEDED?

MANAGEMENT OF NATURAL MARINE RESOURCES IS NEEDED. (ASK FOR SHOW OF HANDS AND COUNT THE NUMBER OF PEOPLE WITH EACH OPINION). STRONGLY AGREE / AGREE / NOT SURE / DISAGREE / STRONGLY DISAGREE. HOW SHOULD THEY BE MANAGED?

The majority of people polled during Focus Group meetings said that management of marine resources is needed (89%), with only 7% strongly opposing the idea (Figure 65). The mechanisms suggested for management of marine resources included a range of controls and behaviours, bans or closures on certain methods or areas, controls on certain species and the use of certain preferred kinds of gear (Table 41). Overall, the most important mechanisms proposed included establishing a system of community-based management, improving awareness and education, banning destructive fishing gear, and controlling certain sensitive species (sea cucumbers). Some people suggested that certain types of fishing gear were friendly to the environment and resources and should be adopted as a way of limiting damage. These included the use of handlines and spear guns (though others have said that spear guns are destructive and should not be used).



◀ Figure 65: Level of agreement (by vote) on whether management of marine resources is needed (n=1076).

▼ Table 41: Suggested mechanisms, banned practices and limits for the management of marine resources as suggested by Focus Groups (n=94).

Mechanisms	%	Frequency
Community-based Management	12.1	27
Awareness / education	8.9	20
Fisheries / Government officers	7.6	17
Rules	4.0	9
Tenure	3.6	8
Manage by "us" (unspecified)	3.1	7
Enforce rules	3.1	7
Environment	2.7	6
Rest fishing (allow recovery)	1.8	4
Control areas / resources	1.8	4
Traditional tambus	1.3	3
Surveillance / Monitoring	0.9	2
Catch what you need	0.9	2
Experts needed	0.4	1
Managed by fishermen	0.4	1
Managed by resource owners	0.4	1
Fish sustainably	0.4	1
Reporting violators	0.4	1
Violence penalty	0.4	1
Bans & Limits		
Limit gears	10.7	24
>> Derris ban	9.4	21
>> Dynamite ban	3.6	8
>> Netting	0.9	2
Time / seasonal limits	3.6	8
Outsiders	3.6	8
Pollution	3.1	7
Size limits	2.7	6
Catch limits / Overfishing	1.3	3
Limits on reproductive individuals	0.4	1
Live reef food fish	0.4	1
Limit number of fishermen	0.4	1
Reef closure	0.4	1
Species targeted		
Sea cucumbers	2.2	5
Fish	0.9	2
Crabs	0.4	1
Lobsters	0.4	1
Preferred gear		
Use lines	0.4	1
Use spearguns	0.4	1
Don't know	0.4	1
No, erodes access & control	0.4	1
Total	100	224

FG-Q22 CONTROL OVER MARINE AREAS

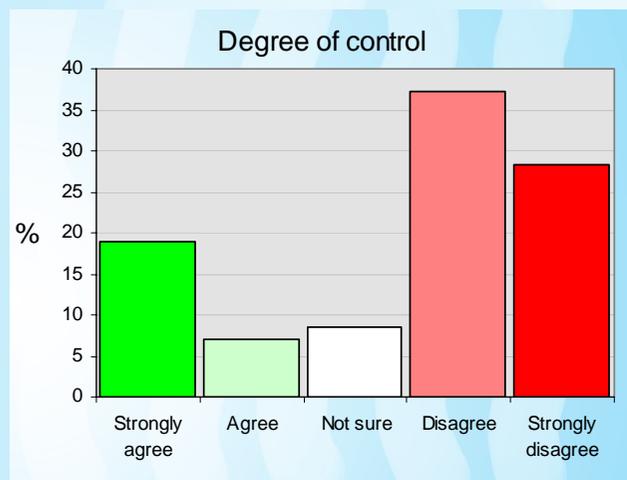
DO PEOPLE IN THIS VILLAGE HAVE ANY CONTROL OVER ANY MARINE AREAS OR SPECIES (TENURE, TAMBUS OR OTHERS)? YES / NO.

The majority of Focus Groups reported that they had little or no control over marine areas (64%) (Table 42). Many reported that the marine areas close to their village were open access or that outsiders came in despite their efforts to exclude or control them. Only 36% of Focus Groups reported that they thought they had relatively good control over their reef areas.

► Table 42: Degree of control over marine areas as reported by Focus Groups (n=87).

	%	Frequency
Yes	36	31
No	64	56
TOTALS	100	87

▼ Figure 66: Results of voting by Focus Groups on the degree of control they have over outsiders using their marine resources (n=1034 votes).



FG-Q23 CONTROL OVER RESOURCES

PEOPLE IN THIS VILLAGE HAVE VERY GOOD CONTROL OVER OUTSIDERS USING THEIR MARINE RESOURCES. (ASK FOR SHOW OF HANDS AND COUNT THE NUMBER OF PEOPLE WITH EACH OPINION). STRONGLY AGREE / AGREE / NOT SURE / DISAGREE / STRONGLY DISAGREE. EXPLAIN.

65% of people in Focus Groups disagreed or strongly disagreed that they had very good control over outsiders using their marine resources (Figure 66), with only 26% of people agreeing. Most people reported that outsiders come and fish / collect on their reefs and that they ignore tambus (even if the people living in the villages observe them). The main underlying reasons for these problems were reported as relating to a basic disrespect of other people's rules and areas, a lack of enforcement, a failure to understand the importance of resources and the environment (presumably in the context of the owners' welfare) and a lack of support from Fisheries (Table 43). In one case, it was noted that it would be difficult to exclude 'outsiders' who were born in an area, but had since moved to another. There was in that case a recognition of birthrights in fishing. In other questions it was made clear that people who marry into or move to new areas as settlers do not ever gain the rights of full members of the community.

► Table 43: Summary of the types and extent of control resource owners have over outsiders and reasons why control may be poor. Data are opinions of Focus Groups.

Good control over outsiders	%	Frequency
Fishers have to ask resource owners	3	3
Outsiders kept away	5	6
Told to not use Derris	1	1
People respect controls	1	1
People see changes	1	1
Tenure works	3	3
Tambus used	2	2
Royalties come	1	1
Little / No control over outsiders	1	1
No one chases outsiders away	1	1
Outsiders come to their reefs / ignore tenure	26	29
Outsiders ignore controls / tambus	8	9
Outsiders ignorant of rules	1	1
Outsiders use Derris	3	3
Outsiders damage reef	2	2
Outsiders come at night or sneak	2	2
Foreigners / commercial destroy reefs	2	2
No control over tourism	3	3
Tourism blocks fishing	1	1
Reasons		
People don't see importance of resources	1	1
People do not respect rules / areas	4	5
VPC does not enforce rules	1	1
No enforcement	1	1
Fisheries is not providing support	1	1
It is the birth of those now living outside to fish there	1	1
Not in town, maybe in villages	1	1
Open acces	25	28
Don't know	2	2
Total	100	113

FG-Q24 MANAGEMENT OF RESOURCES

ARE MARINE RESOURCES MANAGED AROUND THIS VILLAGE NOW? HOW? IS THIS SYSTEM OF MANAGEMENT WORKING? PLEASE DESCRIBE.

76% of Focus Groups reported that marine resources are not currently being managed around their area, while 24% said that they were. The most frequent management measure taken was the banning of derris roots in fishing (Table 44). People also reported the closure of areas using traditional tambus, and refraining of taking reproductive individuals (especially berried lobsters). Few groups commented on the effectiveness of these measures (23). Of these, 13 groups reported that the measures worked, while 3 said that they were partially effective, and 7 groups said they were ineffective.

▼ Table 44: How marine resources are managed as reported by Focus Groups (n=34 responses, with 27 being mechanisms used).

Mechanisms used	%	Frequency
Ban Derris	37	10
Tambu / closures	19	5
Reproductive	11	3
Spawning area	7	2
Sea cucumbers	7	2
Size restrictions	7	2
Bad fishing practices	4	1
Outsiders	4	1
Tenure	4	1
Starting to think about it	3	1
Don't know	18	6

FG-Q25 EXPECTATIONS OF MANAGEMENT

IF MARINE RESOURCES WERE MANAGED (OR MANAGED BETTER), WHAT WOULD YOU EXPECT WOULD HAPPEN TO THE FISHING AND COLLECTING IN THIS VILLAGE?

All of the expected effects of resource management were positive. The most important likely impacts of good resource management were that there would be plenty of resources to harvest (67% of Focus Groups), and the related idea that they would actually increase from current levels (17%). Some people suggested that their income levels would increase, the standard of living would increase, and that there would be more opportunities for income and development in their area (Table 45). Most of the remaining expectations revolved around a reduction in the effort involved (distance to travel decrease and easier to catch) and qualitative improvements in the resources (more variety, increases in sizes).

▼ Table 45: People's expectations of what would happen if resources were managed as reported by Focus Groups (n=92 responses, 119 ideas).

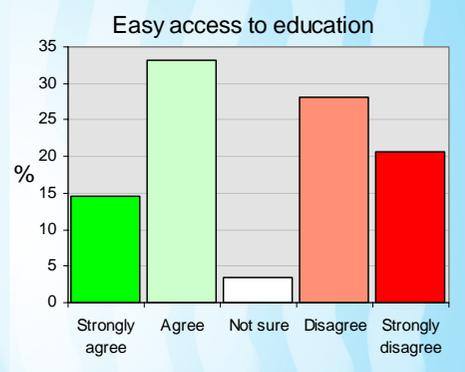
Expectations of management	%	Frequency
Plenty to catch / harvest	67	62
Catch / resource increase	17	16
Income increase	11	10
Distance to travel decrease	10	9
Easy to catch	7	6
Standard of living / Quality of life increases	4	4
Fishing / collecting under control	3	3
Variety of resources available	2	2
More interest in fishing for income	2	2
Return to normal resource conditions	1	1
Preserved for future generations	1	1
Size increase (individuals)	1	1
More opportunities for income	1	1
More development	1	1
Don't know	2	2
Total		119

FG-Q26 EDUCATION

CHILDREN IN THIS VILLAGE CAN EASILY GET AN EDUCATION. STRONGLY AGREE / AGREE / NOT SURE / DISAGREE / STRONGLY DISAGREE. EXPLAIN.

People were strongly polarised when asked whether they thought it was easy to get an education in their village. Approximately half of the people voted that it was easy (strongly agree or agree) (48%), with half disagreeing (49% either disagreed or strongly disagreed) (Figure 67). The main reasons given for poor access to education were high school fees, poor transport and great distances to travel (Table 46). Drugs, poor discipline, a risk of rape and laziness were also cited as reasons for poor access to education.

Half of the groups interviewed said that access to education was easy for unspecified reasons, with a few saying that fees were not a problem to them and others saying that the children could walk to school or were taken there by a resort to which they were connected.



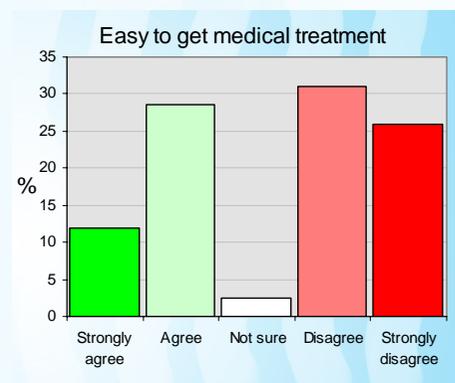
▲ Figure 67: Opinions of people (by vote) in Focus Groups of how easy it is to get an education (n=1100 votes).

Access to education is difficult	Frequency
Fees high	37
Transport poor	13
Distance too great	19
Income insufficient (for fees)	9
Weather	8
Rascals interfere on the way to school	1
Alcohol / drugs are a problem	1
Discipline problem	1
Dormitory provided but raped	1
Children lazy	1
Teachers don't do their work	1
Easy access to education	
Easy access (unspecified)	54
Fees no problem	4
Can walk to school	1
Transport provided by resort	2

◀ Table 46: Reasons given by Focus Groups on why they thought it either easy or difficult to access education in their area (n=92).

FG-Q27 HEALTH

PEOPLE IN THIS VILLAGE CAN EASILY GET MEDICAL TREATMENT. STRONGLY AGREE / AGREE / NOT SURE / DISAGREE / STRONGLY DISAGREE. EXPLAIN.



▲ Figure 68: Opinions of people (by vote) in Focus Groups on the question of the ease of access to medical treatment (n=90).

People were polarised on the question of ease of access to medical services, with 40% agreeing that access to health services was easy and 57% disagreeing (Figure 68). The most frequently given reasons for why access to medical services is difficult include high fees, problems with transport and great distances to the nearest post of clinic (Table 47). Most people who said access was easy did not elaborate on the reasons.

Reasons for difficulties	Frequency
Fees are too high	31
Transport lacking	20
Distance to post / clinic great	18
Supplies are insufficient	17
Staff are absent	6
Poor management of clinic	2
Village "Post" closed	2
Bad weather	2
Wrong medicines given	1
Privacy of women	1
Doctor biased (only serves women)	1
Few clinics	1
Services insufficient	1
Reasons for ease of access	
Easy access (unspecified)	37
Access is through local "Post"	8
Access to facilities is OK	2
Transport OK	2
Staff available	1
Can afford it	1
Can pay later	1
Resort assists	1

▶ Table 47: Reasons given for why people believe that access to medical treatment in their area is easy or not (n=93).

FG-Q30 SOCIAL PROBLEMS

ARE THERE ANY SOCIAL PROBLEMS IN THIS VILLAGE? WHAT ARE THEY? HOW COULD THEY BE ADDRESSED?

86% of Focus Groups said that there were significant social problems in their communities that needed to be addressed, while 2% said that there were some but they were minor, and 12% said there were no social problems in their communities.

The most important problems reported were those associated with alcohol, drugs (marijuana), clan clashes and land disputes (Table 48). People suggested a range of solutions to the local social problems, including (i) Church interventions, (ii) Government actions, (iii) Community actions and (iv) addressing failures that have led to problems (Table 49). The interventions of the police, use of law, and actions by community leaders were the most frequently cited actions that could be taken to address problems.

Problem	%	Frequency
Alcohol	23	60
Drugs	20	53
Clan clashes	10	25
Land disputes	8	22
Violence	7	19
Rascals	7	18
Crime	5	14
Stealing	5	14
Domestic violence	4	10
Fighting	2	5
Buai	1	3
Marital problems	1	3
Adultery	1	3
Prostitution	1	2
Unemployment	0.4	1
Reef tambus (restrictive)	0.4	1
Men controlling money that women raise	0.4	1
Child abuse	0.4	1
Family problems	0.4	1
Swearing	0.4	1
Unmarried pregnancy	0.4	1
Rape	0.4	1
Total	100	259

◀ Table 48: Social problems reported by Focus Groups.

▶ Table 49: Solutions to social problems as suggested by Focus Groups.

Solutions to social problems	%	Frequency
Church		
Church leaders	6	8
Church activities	5	7
Prayer	3	4
Government		
Police / Law	12	16
Ward Member	3	4
Community		
Community Leaders	11	14
Community meeting	7	9
Awareness of impacts	7	9
VPC to address issues	5	7
Advise / counselling youth	5	6
Parents	4	5
Community police	4	5
Village Court / Law & Order	5	6
Youth Groups	3	4
Employment opportunities	3	4
Respect for community	2	2
Self discipline	2	2
Involvement in community activities	2	2
Declare rights of ownership	1	1
Peace talks	1	1
Role models in community	1	1
Provide comfort (to distressed)	1	1
Cooperation among groups	1	1
Female youth join Women's groups	1	1
Community reporting of violations	1	1
Elders advise young	1	1
Failures		
Community Leaders not doing job	3	4
No obedience	2	2
Church leaders not doing job	1	1
Community policing	1	1
Don't know	8	10
Total		130

FG-Q31 CONTROL OF MONEY

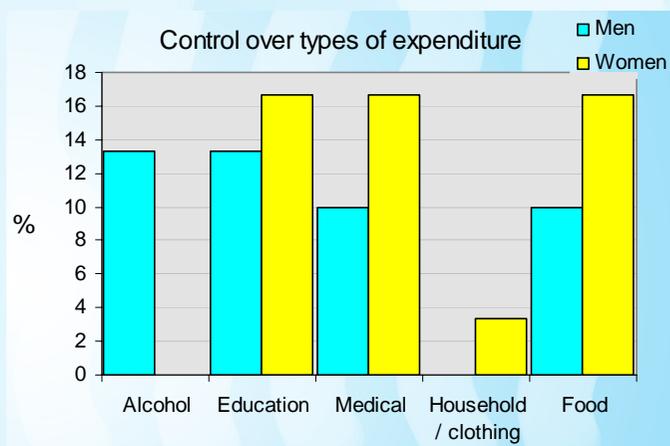
WHO CONTROLS MONEY IN THE HOUSEHOLD? WHO DECIDES HOW MUCH IS SPENT ON FOOD, ALCOHOL, EDUCATION AND MEDICAL?

According to Focus Groups, men and women jointly control the money in the majority of households (55%). In 27% of households, the women or the men control the use of money and the task is not shared. The frequency of women taking on this role occurs equally often as men doing so. 10% of people said that control of the money depended on the family (Table 50). 6 Focus Groups said that control over money depended on the type of expenditure in question. Men tended to exert more control over expenditure on alcohol, and women more control over education, health, household needs and food (Figure 69).

Who controls money?	%	Frequency
Husband & Wife	55	57
Wife	14	15
Husband	13	14
Depends on family	10	10
Depends on type of expenditure	6	6
Depends on who is income-earner	1	1
Each controls what they make	1	1
TOTAL	100	104

▲ Table 50: Responses by Focus Groups on who controls the money in households (n=93).

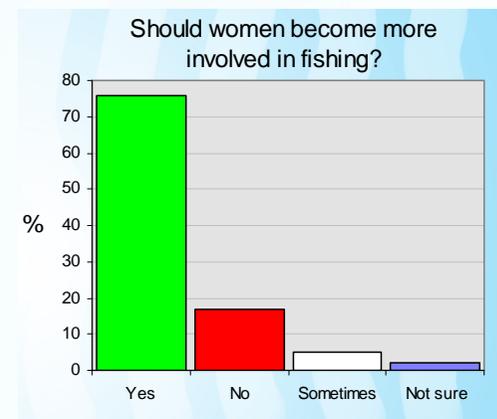
► Figure 69: Breakdown of control of money for different purposes in households (n=6).



FG-Q32 WOMEN IN FISHING / COLLECTING

DO YOU THINK WOMEN SHOULD BECOME MORE INVOLVED IN FISHING AND COLLECTING? WHY OR WHY NOT?

Most people (76%) said that women should become more involved in fishing / collecting, while 17% said that they should not (Figure 70). The main reasons for why women should become more involved included an increase in income and more fish for consumption in the family (Table 51). Reasons why women should not become more involved in fishing were centred around neglect of other duties, that it would violate customs (e.g. concerning menstruation and fishing) and because women may contribute to overfishing or damage the resource.



Reasons for MORE involvement	Frequency
Income increase	32
More for fish for consumption	15
To assist family / household / clan / community	10
To assist men	8
Self-sufficiency / when men cannot fish	5
More "manpower"	4
Women can fish / train like men	4
Catch increase	3
Utilise them in selling	3
Increase standard of living	2
It is their duty / role	2
Population is increasing	1
To let men rest	1
Men & Women should work together to meet needs	1
They have the right	1
To promote equality	1
Women more patient and careful	1
Should be trained in management and lead in that role	1
Reasons for NOT becoming more involved	
They will neglect other duties	9
Against customs	4
Don't know about / are not good at fishing	2
They are destructive	2
Will contribute to overfishing	1
Women will have to fish closer as they have other duties	1

▲► Figure 70: Responses by Focus Groups to the question of whether women should become more involved in fishing and collecting (n=100).

► Table 51: Reasons given for why women should or should not become more involved in fishing and collecting (n=114 responses).

FG-Q36 CHANGES IN THE ENVIRONMENT

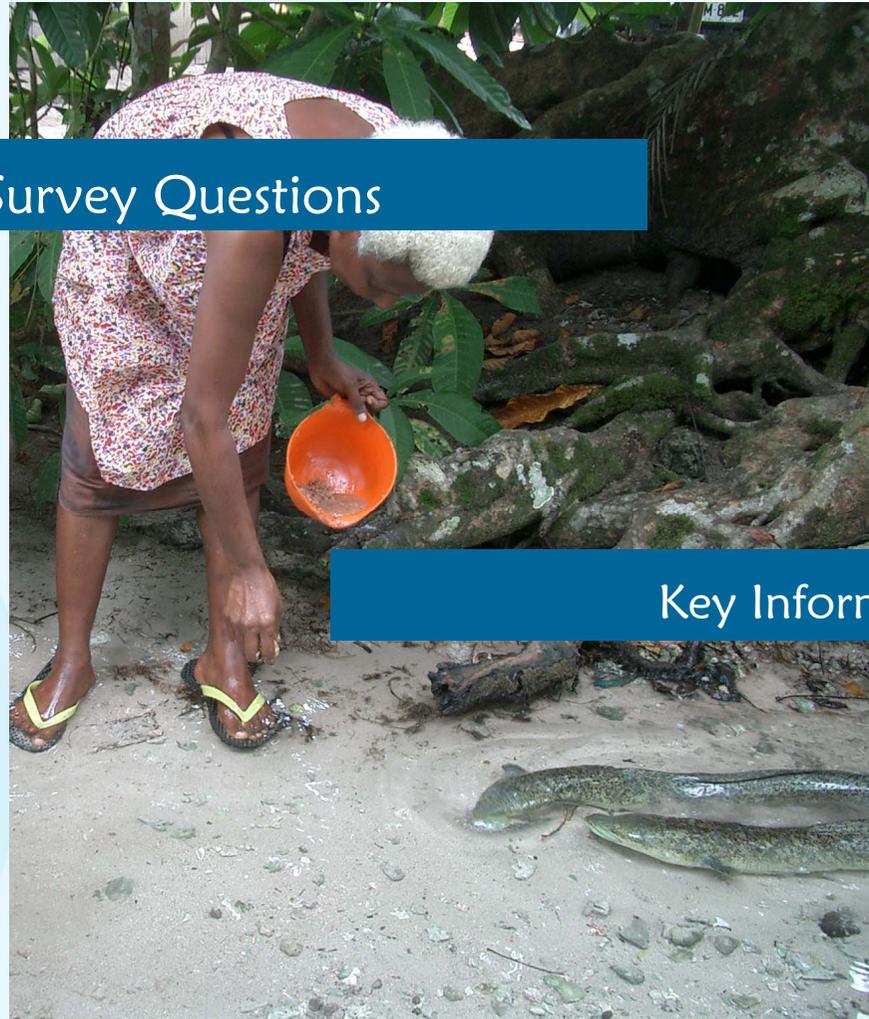
HAVE YOU NOTICED ANY CHANGES IN THE MARINE ENVIRONMENT OVER THE LAST 5-10 YEARS? WHAT CHANGES?

91% of Focus Groups reported that they had noticed changes in the marine environment over the past few years. Changes reported included differences in the physical and biological environment, and changes to marine resources (Table 52). In some cases, observations were contradictory, with some groups reporting reefs growing and others reporting losses of corals or damage to reefs.

► Table 52: Changes in the environment reported by Focus Groups.

Biophysical changes	Frequency
Erosion	43
Tide / sealevel changes	19
Shallowing of marine areas	9
Blocking of passages	5
Reefs exposed more often	4
Stones moved by currents	4
Water current change	3
Sand changed colour (logging, fading)	2
Turbidity	2
Salinisation of drinking water (groundwater)	1
Water colour change	1
Landslide effects	1
Habitat related	
Dead / dying corals	26
Corals / reef growing (shallowing?)	25
Seagrass damaged or dying	10
Coral bleaching	9
Damaged reefs	3
Seaweed growing	3
Seagrass growing	2
Seaweed declining	2
Damaged shelter for resources or juveniles	2
Environment / resources recovering from past damage	2
Mangroves growing	1
Mangroves cut	1
Sand on reefs	1
Pollution (including oil, fuel)	4
Specific signs	
Declines	17
Extinctions / rare	6
Fishing not as good	5
Sizes smaller	5
Trees falling / cut down	2
Greater abundance of reef organisms	2
New spp. Appear	1
Fishes breed further away	1
Lots of jellyfish	1

Analysis of Survey Questions



Key Informant Survey

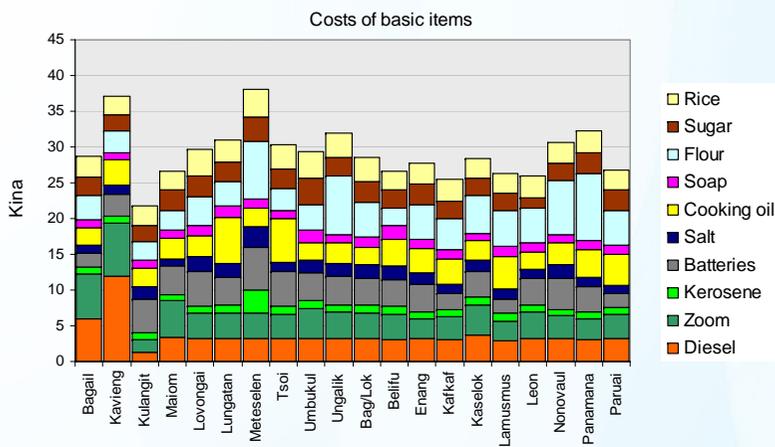
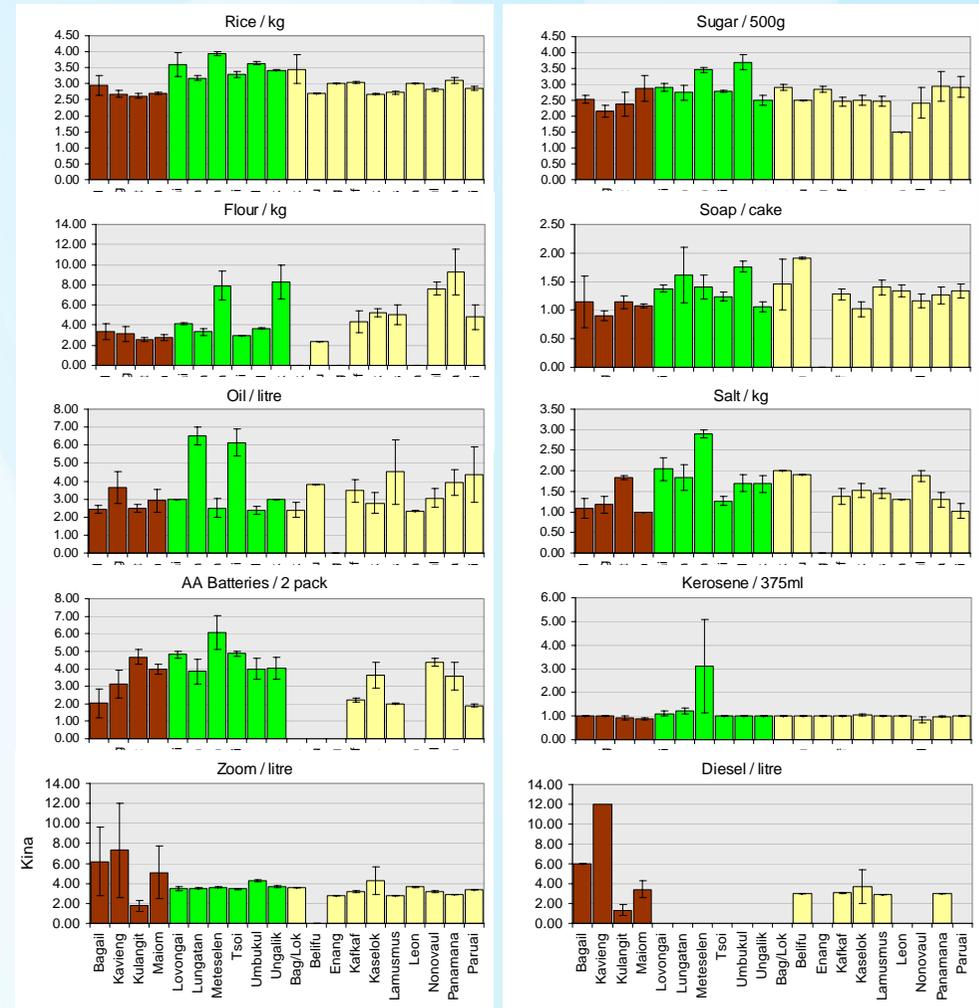
KI-Q1 COST OF ITEMS

HOW MUCH DO THE FOLLOWING ITEMS COST AT ONE SHOP IN THIS VILLAGE: RICE (1 KG); SUGAR (500 G); FLOUR (1 KG); SOAP (CAKE); COOKING OIL (1 LITRE); SALT (500 G); AA BATTERIES (2 PACK); KEROSENE (375 ML); ZOOM (GALLON=5 LITRES); DIESEL (GALLON=5 LITRES).

The cost of common household goods varied significantly in locations across the survey. Of the 10 items we surveyed, flour, cooking oil, batteries and fuels were the most variable in price (Table 53). Overall costs were highest in Kavieng and Meteselen Wards, and lowest in Kulangit (Figure 71). Food items tended to be more expensive and diesel not available in Lovongai LLG (Figure 72).

Goods	Unit	Cost (Kina)	SD	n
Rice	kg	3.05	0.45	95
Sugar	500g	2.67	0.68	93
Flour	kg	4.8	2.87	65
Soap	cake	1.31	0.41	89
Oil	litre	3.47	1.75	74
Salt	kg	1.59	0.57	87
AA Batteries	2 pack	3.76	1.58	72
Kerosene	375ml	1.11	1.07	89
Zoom	litre	3.69	2.06	71
Diesel	litre	3.25	2.17	30

▲ Table 53: Summary of overall average cost (Kina) of common consumer goods across the survey (n=30-95 depending on goods).



◀ Figure 71: Comparison of accumulated cost of items for each Ward. One unit of each has been added in each bar as a proxy indicator of overall costs and how these might vary from place to place (n=95). Note: Values were missing for some items in some wards. These were substituted with the overall mean for that item across the survey (means substitution method) to allow for comparisons among Wards. This was done because omitting missing values would have given an artificially low overall value for costs, but using this method, missing values do not contribute to patterns, but merely hold the place for that item. Results should be interpreted with caution. For missing values see next figure (missing bars).

▲ Figure 72: Cost of common consumer goods in a store selected in each Ward. Kina values are given as means +/- SE of samples taken with each Key Informant Survey (key values are not from the Key Informants themselves).

KI-Q7 POPULATION GROWTH

WHAT IS THE POPULATION GROWTH RATE? % PER YEAR (OR) IS THE NUMBER OF PEOPLE INCREASING / DECREASING / STEADY? WHY?

In the opinion of the key informants, the populations of most of the Wards included in this survey is either increasing or staying steady (Table 54). All wards had at least one key informant say that the population was increasing. Only for Tsoi Ward did one informant say that the population was decreasing.

LLG	Ward	↑	↔	↓	LLG	Ward	↑	↔	↓
Kavieng	Bagail	#	#		Tikana	Bagatare/Lokono	#	#	
	Kavieng	#				Belifu	#	#	
	Kulangit	#	#			Enang	#	#	
	Maiom	#	#			Kafkaf	#		
Lovongai	Lovongai	#			Kaselok	#			
	Lungatan	#	#		Lamusmus	#			
	Meteselen	#			Leon	#			
	Tsoi	#		#	Nonovaul	#	#		
	Umbukul	#	#		Panamana	#	#		
	Ungalik	#			Paruai	#	#		

◀ Table 54: Summary of population trends by LLG and Ward. Information given is the opinion of Key informants only (no data were given). For each Ward ●=population is increasing; ●=population is steady; and ●=population is decreasing (n=92).

Most informants felt that where population was increasing, the most important reasons were that people were marrying earlier, that there are now a lot more unmarried mothers and that there is a general lack of family planning (Table 55). In cases where the informant reported that the population is steady (or declining) the main reasons given were few new couples, few young women or that the population was low – these reasons probably refer to very small villages.

▼ Table 55: Summary of reasons given for reported population trends (n=89).

Reasons why population is increasing	%	Frequency
Early marriages	33	29
Many births	27	24
Unmarried mothers	11	10
Lack of family planning	10	9
Increasing population	6	5
Lots of new marriages	6	5
More marriages	4	4
In migration	3	3
Good health facilities	2	2
Increasing young population	2	2
Not using traditional birth control	1	1
Better education	1	1
Good living standards	1	1
Births>Deaths	1	1
Reasons why population is steady or decreasing		
Births=Deaths	3	3
Few new couples	3	3
In migration=Out migration	2	2
Young don't marry	2	2
Not many young girls	2	2
Population is low	2	2
No immigrants	2	2
Fewer marriages	1	1
Many children lead to economic problems	1	1
Out migration	1	1
Not many married couples	1	1
Traditional ways are strong	1	1
Birth rate is low	1	1
Don't know	2	2

KI-Q9 ILLNESS

WHAT ARE THE MAIN SICKNESSES IN THE VILLAGE?

Malaria was the most often reported and by far the highest ranked in terms of importance of the illnesses reported by key informants. Only 11 diseases were mentioned, and these included minor ailments such as headaches and colds as well as serious diseases (Table 56). It is likely that these reports seriously underestimate the illnesses in the community.

Diseases	%	Importance
Malaria	97	388
Cough / Cold / Flu	5	13
Asthma	4	12
Diarrhoea	3	10
Diabetes	2	6
Skin disease	2	6
Headache	2	6
Upset stomach	2	7
Pneumonia	1	1
Yaws	1	2
Elephantiasis	1	3

▲ Table 56: Illnesses reported by key informants. The value importance was calculated by using the ranked importance supplied by key informants as follows: most important=score 4; intermediate values of 3 or 2 and least important=score 1. ranked scores were then summed across the survey to indicate importance (n=454 responses).

▼ Figure 73: Summary of education accessed from each LLG and Ward (n=422 institutions reported, but many of these would be the same ones reported by different key informants).

▶▼ Figure 74: Transport used by students by LLG and Ward (n=448 responses).

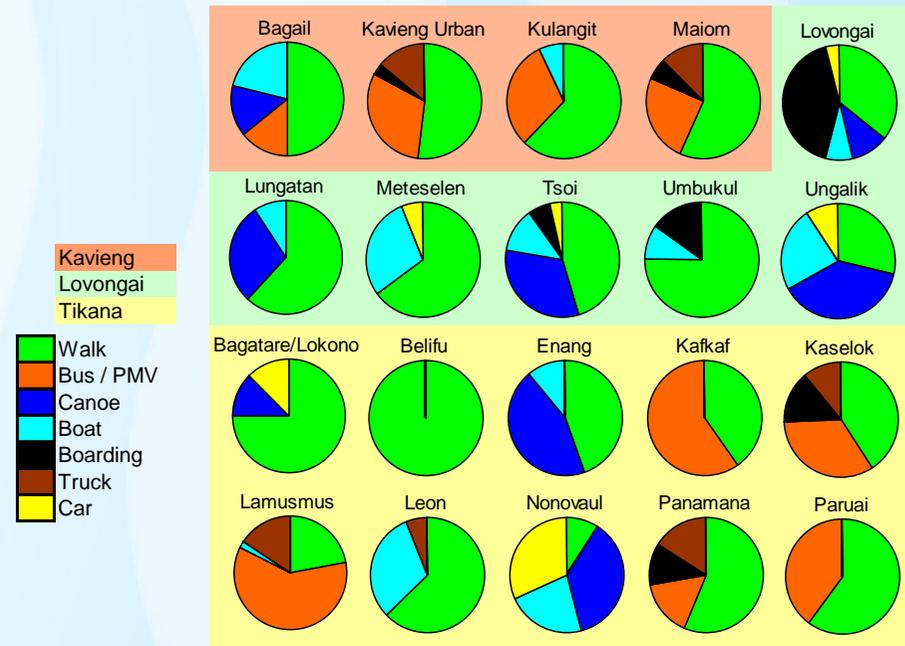
LLG	Ward	Pre-school	Elementary	Primary	Secondary	Secondary	Vocational
Kavieng	Bagail						
	Kavieng						
	Kulangit						
	Maiom						
Lovongai	Lovongai						
	Lungatan						
	Meteselen						
	Tsoi						
	Umbukul						
	Ungalik						
Tikana	Bag/Lok						
	Belifu						
	Enang						
	Kafkaf						
	Kaselok						
	Lamusmus						
	Leon						
	Nonovaul						
Panamana							
Paruai							

KI-Q11 SCHOOLING

WHERE DO CHILDREN IN THE VILLAGE GO TO SCHOOL? HOW DO THEY GET THERE? GIVE NAME(S) OF SCHOOL(S) / LOCATION(S) (VILLAGE) / USUAL TRANSPORT; FOR: PRE-SCHOOL (<5 YRS); ELEMENTARY (5-6 YEARS); PRIMARY (GRADES 1-6); SECONDARY (GRADES 7-10); SECONDARY GRADES 11-12; VOCATIONAL.

According to key informants, students in all Wards were able to access education at elementary, primary and junior secondary levels (usually up to Year 10). Access includes using schools in the area, as well as accessing other schools elsewhere through travelling daily, or boarding. Access to pre-school, higher secondary education (to Year 12) and vocation schooling was more sporadic (Figure 73).

Most students walk to school (Figure 74). Boat or canoe transport is most important in Bagail, Enang and Nonovaul and most of Lovongai LLG. Road transport is most important in Kavieng LLG and parts of Tikana.



KI-Q12 INVOLVEMENT IN FISHING

WHAT IS THE ESTIMATED NUMBER OF HOUSEHOLDS IN THE VILLAGE INVOLVED IN FISHING? IF THERE ARE ANY HOUSEHOLDS THAT DON'T PARTICIPATE, WHY DON'T THEY?

According to key informants, in most cases, all or nearly all of the households in their village are involved in fishing and/or collecting (57%). For the remaining villages where not everyone is involved, the main reasons given were that people did not have sufficient knowledge of how to fish, were not interested in fishing or because they had other interests (e.g. agriculture) or other options (e.g. employment) (Table 57).

▼ Table 57: Reasons given for why some households are not involved in fishing and collecting (n=106 responses).

Reasons for not fishing	%	Frequency
Lack knowledge fishing	11	11
Not interested fishing	9	9
People have other interests / options	7	7
Disabled people	4	4
Lack gear	3	3
Lack boat / canoe	3	3
Lack finance	2	2
Old people	2	2
Laziness	2	2
Lack transport	1	1
Employed	1	1
Everyone fishes	57	55
Don't know	6	6

KI-Q18 GENERAL COMMUNITY CONCERNS

WHAT ARE SOME OF THE GENERAL CONCERNS IN THE COMMUNITY? (WHAT SUBJECTS OF IMPORTANCE COME UP IN COMMUNITY MEETINGS?)

A range of concerns was reported by key informants as cropping up regularly in community meetings and discussions (Table 58). The most commonly cited of these were law and order issues, education, health, water supply, community development and income opportunities. Agriculture and fishing were important in 13% and 11% of cases, respectively. Many of the less frequently-mentioned issues in Table 58 are related to the main ones mentioned, but were more specific, giving a better insight into the actual issues being raised.

Concerns	%	Frequency
Law & Order	38	35
Education	20	19
Health	18	17
Water supply	17	16
Community Development / Planning	17	16
Opportunities / Levels of income	14	13
Agriculture	13	12
Fishing / Management / Laws	11	10
Church	11	10
Obedience / Respect of leaders / Parents	9	8
Land disputes	8	7
Housing	8	7
Transport	8	7
Technical / Government support	6	6
Drugs & alcohol	5	5
Government services	5	5
Infrastructure (unspecified)	5	5
Roads	5	5
Cooperation / community work	4	4
Costs of living / increasing prices goods	4	4
Markets for saleable goods	3	3

▲► Table 58: General concerns of communities in rank order across the survey area as indicated by key informants (n=93).

Concerns	%	Frequency
Derris root	3	3
AIDS	2	2
Electricity	2	2
Environment	2	2
Adultery	1	1
Celebrations / Funerals	1	1
Communication with Ward Member	1	1
Culture	1	1
Funding for developments	1	1
Land shortage	1	1
Money shortage	1	1
Community meetings not being held	1	1
Politics	1	1
Population increase	1	1
Reef boundaries	1	1
Reef royalties	1	1
School fees	1	1
Sex abuse	1	1
Unemployment	1	1
None	5	5

KI-Q19 FISHERIES ISSUES

WHAT ARE THE MAJOR ISSUES CONCERNING FISHERIES IN THIS VILLAGE? WHAT NEEDS TO BE DONE TO ADDRESS THEM? WHAT HAS THE COMMUNITY TRIED TO DO TO ADDRESS THE ISSUES? WHAT WAS THE RESULT?

Through the key informants, a range of fisheries issues being raised in villages was identified (Table 59). The issues of most concern to communities were the use of bad fishing practices (reported by 41 key informants), the need for management of resources, disputes over reef areas, particularly with outsiders coming in to fish, a lack of gear, technology and/or ice for improving catches and a lack of fishing skills. Some communities raised the need for boats to access fishing grounds, and many in this question and others are concerned with buyers being available to the community so they can sell their fish (a problem for many outside of Kavieng LLG). In terms of particular groups of organisms, sea cucumbers were mentioned the most as declining or being fished inappropriately (e.g. at night).

According to the Key Informants, the most important actions and interventions needed to address the fisheries issues raised in communities are assistance from NFA and/or the Government (which part of the Government is not mentioned), increased awareness and training, the establishment and enforcement of fishing rules and management (Table 60). The need for financial assistance for gear, a buying

Issues	Frequency
Bad fishing (e.g. Derris)	41
Management	25
Reef disputes / Outsiders	14
Gear / technology / ice	11
Fishing skills	10
Boats	9
Market needed / Buyer in community	7
Commercial fishing	7
Awareness / Training	7
Transport	6
Environment / Conservation	6
Catch declining / unstable	5
Sea cucumbers	5
Fishing expansion / training	4
Seasonal patterns / aggregations	3
Price of fuel	2
Share of benefits from commercial fishing	1
Logging damage	1
Reasons for low catches	1
Sea safety	1
Crab farming	1
Fish	1
Not sure	1
None	9

▲ Table 59: Fisheries issues raised in villages over the survey area as reported by Key Informants (n=178 responses).

► Table 60: Solutions to fisheries problems proposed by key informants (n=145 responses).

depot in the village and mechanisms for decreasing costs (cheaper fuel, better transport systems and roads) are more specific recommendations.

Most key informants reported that communities had not yet taken any actions, or had no idea of what steps to take to address their problems with fisheries (Table 61). A few communities had begun doing something about their fisheries problems, but most actions taken to date were to talk with the community, or various government officials. In a few cases, requests for funding were made, including in one case application for an EU Project boat (unsuccessful). Overall most attempts made within communities to solve their fisheries problems were unsuccessful or resulted in no response from people consulted in Government (Table 62). In a few cases, some or most of the community complied with local restrictions imposed (e.g. stopping the use of derris root in fishing), while in one case, the action worked in the community but was undermined by outsiders continuing to come in and violate the rules. There were 3 reports that catches had improved as a result of the actions taken.

Solutions	Frequency
Help from NFA / Government	34
Awareness / Training / Talk	33
Rules / Enforcement	12
Management	11
Funds to purchase gear	6
Stop Derris use	5
Establish buying points in villages	5
Make Fishing courses available	4
Community Leaders	3
LLG / Member	3
Resolve disputes / establish areas legally	3
Exclude outsiders	2
Declare tambus	2
Establish transport routes	2
Awareness in schools	1
Build roads	1
Civilian Patrol - monitoring	1
Discount fuel	1
Expand fishing capacity	1
Obtain good advice from experts	1
Acknowledge the limited fishing grounds	1
Obtain materials for a crab farm	1
Mediation for disputes between commercial & landowners	1
Obtain help from NICFA	1
Provide other opportunities / livelihoods	1
Purchase boats	1
Resource owners to make laws	1
Obtain support / advice / ideas	1
Don't know	6

Actions tried by communities	Frequency
Community Day Address	17
Talked to NFA / Provincial Fisheries	8
Imposed tambus	5
Proposals for funding	3
Talked to LLG / Ward Member	3
Stopped use derris / dynamite	2
Consulted politicians	2
Trying to set up local buyer	1
Asked for a boat	1
Talked to Government	1
NFA conducted awareness	1
Letters sent to outsiders to stop them violating	1
Magistrate conducted awareness / threatened action	1
Applied for Government funding	1
Applied for EU Boat	1
Customary Ceremony	1
Sued in Village Court	1
Waiting for handout from EU Project	1
Cooperated with NGO	1
Raised issues with NGO	1
Self-restrictions (e.g not littering)	1
Nothing	20
No ideas	4
Just talk	2

▲ Table 61: Actions tried by communities to solve their fisheries problems (n=80 responses).

▼ Table 62: Outcomes of community attempts to solve their fisheries problems (n=74 responses).

Results	Frequency
Some of community complied	6
Community in agreement / compliance	5
Catches improved	3
Community stopped / outsiders continue	1
Law not recognised by NFA	1
Good income / respect / cooperation	1
NFA restricted trap method	1
Failed	44
No response from those consulted	10
Not sure	2

KI-Q20 IMPROVING FISHING

HOW MUCH OF A PRIORITY IS IT TO IMPROVE FISHING CONCERNS IN THIS VILLAGE? HOW OFTEN DOES THE COMMUNITY TALK ABOUT FISHING ISSUES IN MEETINGS?

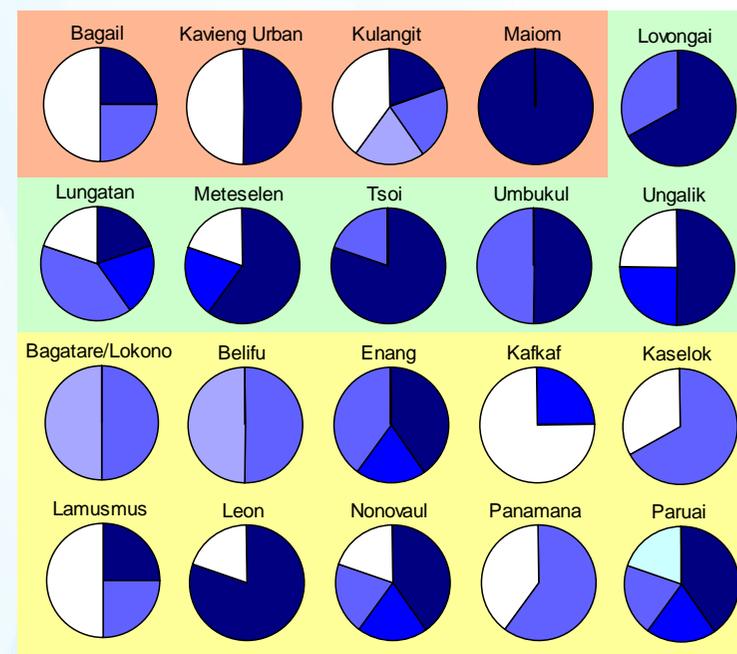
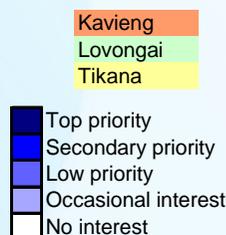
Based on the opinions of key informants, communities appeared to fall into 3 groups in terms of the importance of fisheries concerns at community meetings. For some communities, fisheries concerns were top priority, with issues being raised and discussed at every community meeting (Table 63). For another group of key informants, some communities consider fisheries concerns only of low priority, while in a third grouping fisheries concerns are of no interest in community gatherings. Unfortunately, key informants had very different opinions on the importance of fisheries in communities by Ward, with a wide spread of responses recorded for each LLG and Ward in the survey.

Importance of fisheries at Community Meetings	Frequency
Top priority (every meeting)	32
Secondary priority	7
Low priority	22
Occasional interest	6
No interest	18
No meetings	1
Don't know	3

The Wards with the most interest in fisheries issues and discussion were Maiom, Tsoi, Lovongai, Umbukul and Enang (Figure 75). Kafkaf, Kaselok and Panamana probably have the least interest in fisheries in community discussions.

►▲ Table 63: Importance of fisheries concerns at community meetings as indicated by key informants (n=89).

► Figure 75: Breakdown of interest in fisheries issues during community meetings as reported by key informants (n=89). Increasing amount and darkness of blue indicates greater interest and participation in fisheries discussions.

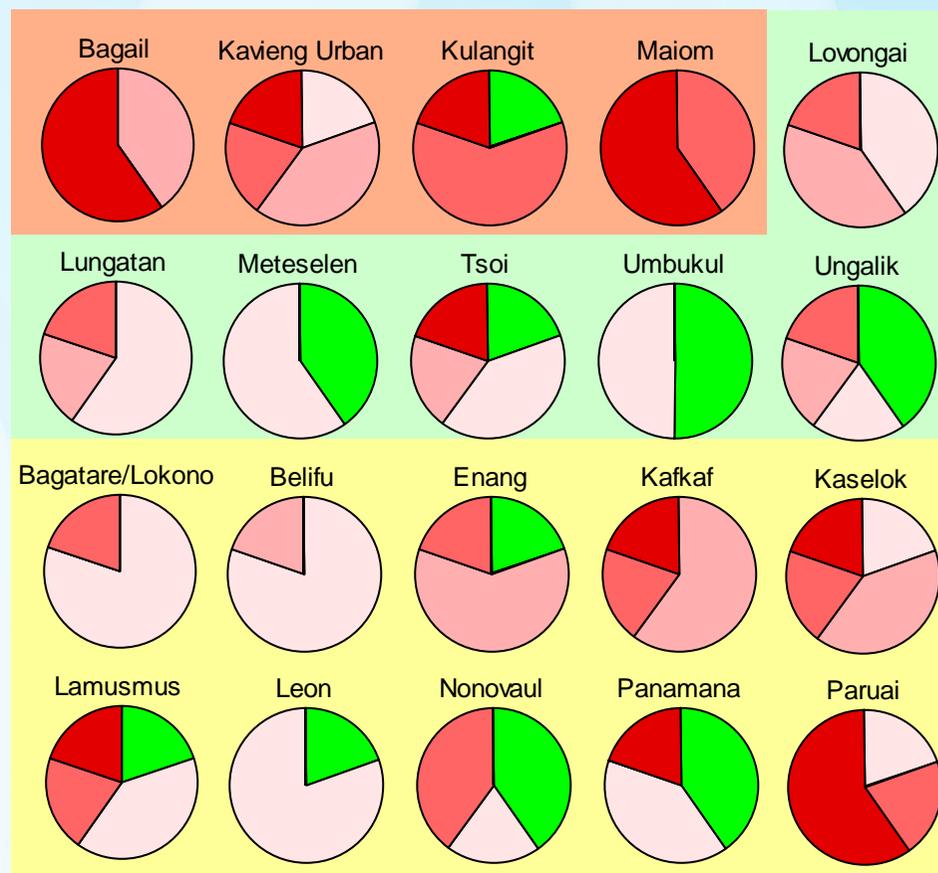


KI-Q37 ALCOHOL AND DRUGS

HOW COMMON ARE PROBLEMS WITH ALCOHOL OR DRUGS IN THE VILLAGE (DRUNKEN PEOPLE DISTURBING OTHERS, VIOLENCE). NO PROBLEM / HAPPENS RARELY / HAPPENS OCCASIONALLY / PROBLEMS ARE COMMON / PROBLEMS ARISE WEEKLY AND CAUSE CONCERN. DESCRIBE THE TYPES OF PROBLEMS.

Overall, 15% of Key Informants reported that their communities had no problems with alcohol or drugs, and a further 34% reported rare problems. The remaining Key Informants were equally divided across the occasional (18%), common (17%) and weekly causing concern (16%) categories. In terms of Wards and LLGs, the most problems were reported in Kavieng LLG, and Paruai and Kafkaf Wards (Figure 76). Alcohol and drug problems were rarely reported for Umbukul, Meteselen and Leon.

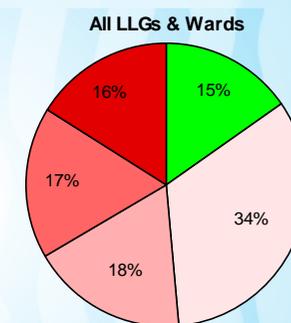
The most important reported effects of alcohol and drugs in the community in terms of frequency were disturbing the peace, fighting and violence and theft (Figure 76).



Problems	%	Frequency
Alcohol	68	57
Drugs	52	44
Disturbing the community	35	29
Fighting / violence	25	21
Theft	13	11
Bad language	7	6
Noise	6	5
Non cooperation / disrespect community	5	4
Domestic violence	4	3
Marriage problems	2	2
Land disputes	2	2
Rape	2	2
Child abuse	1	1
Single mothers	1	1
Mental changes caused by Marijuana	1	1
Smoking	1	1
Threatening behaviour	1	1
Gambling	1	1
Law & Order problems (unspecified)	1	1
Arson to destroy gardens over land dispute	1	1
Murder	1	1
Financial problems	1	1

◀ Table 64: Problems arising in relation to alcohol and drugs in the community as reported by Key Informants (n=84). Note: the problems identified here do not all appear to relate to alcohol or drugs, but seem to be a more general list of behavioural problems arising in communities, related to substance abuse or not. They have been included here as reported.

▶▶ Figure 76: Assessment by Key Informants on alcohol and/or drug problems in villages (n=99). Green colouring indicates an opinion of no problem, while increasing amount and intensity of red indicates an increasing perception of problems.



KI-Q38 CLAN CONFLICTS

ARE THERE ANY CONFLICTS BETWEEN CLANS? WHAT ARE THE MAIN ISSUES?

70% of all Key Informants interviewed said that clan disputes were an issue in villages (and between them), while 27% said that they were not an issue in their area (Table 65). No informants reported clan disputes as a major issue for the community, though 10 Key Informants did say that they were of minor significance. The most important reasons for disputes were over ownership or the boundaries of land, and to a much lesser extent over sea (reef) areas.

Are there clan disputes?	%
Yes	70
No	27
Don't know	3
Importance / Frequency	
Few / Minor	10
Major	0
Types	
Land disputes	65
Boundaries (land or sea)	6
Reef disputes	5
Royalties	2
Marriage (includes bride price)	3
Ownership of land	1
Social issues (unspecified)	1
Domestic violence	1
Selling land to outsiders	1
Stealing from gardens	1
Cutting down mature cash crops	1
Crops & resources on the land	1
Sago	1
Business (unspecified)	1

▲ Table 65: Presence, importance and types of clan disputes as reported by Key Informants (n=100).

KI-Q39 RESOLVING CLAN CONFLICTS

HOW ARE CLAN CONFLICTS RESOLVED?

The most common way that people in villages resolve clan conflicts, according to Key Informants, is through the Village Court, Magistrate or Village Police (Table 66). An appointed Land Mediator and/or the Land Court is the second most common way of resolving issues (this connects well with land disputes being one of the major issues to be resolved). Customary mechanisms such as feasts and settlements of pigs, food and shell money may be used instead of, or in conjunction with formal methods of conflict resolution. In a small number of cases, Key Informants reported that conflicts may not be resolved and that they become long term grudges within the community.

How clan conflicts are resolved	%	Frequency
Village Court / Magistrate / Police	52	43
Land Mediator / Land Court	19	16
Customary feast / payments / settlements (pigs, food, shell money)	14	12
Meetings / Discussion	13	11
Community Leaders	12	10
Chiefs (Maimais)	8	7
Elders	8	7
Clan Leaders	6	5
Village Planning Committee (VPC) / Chairman	6	5
Clans themselves	4	3
Church Leaders	2	2
District Court	1	1
Customary declarations	1	1
Ward Member	1	1
Using clan Genealogy	1	1
Not resolved - Grudges are long-lasting	7	6
Don't know	1	1

▲ Table 66: Mechanisms used for resolving clan conflicts as reported by Key Informants (n=132 responses).

KI-Q41 INCREASING WOMEN’S INVOLVEMENT IN FISHERIES

WHAT IS THE LIKELY EFFECT OF INCREASING INVOLVEMENT BY WOMEN IN FISHING ACTIVITIES?

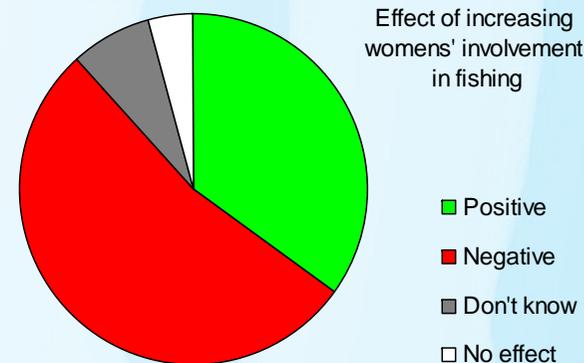
Most Key Informants saw positive or negative effects of increasing the involvement of women in fishing and collecting activities, with very few acknowledging that both could arise simultaneously. A small number said that they thought there would be no effect if the involvement of women was increased (6%). Of those Key informants that suggested positive effects would be seen, the most common impacts cited were an increase in household income, and more protein for consumption (Table 67). Some people saw benefits in terms of non-material gains (such as increased skills and learning in women) or of indirect benefits (increased standard of living or savings).

More Key Informants reported more negative impacts (64) than positive ones (42). The most commonly reported negative impacts were a decline in marine resources (presumably because of the extra fishers in the system), neglected households and children and an increase in domestic conflicts.

Positive effects of women in fishing	%	Frequency
Increase in household income	22	19
More protein is eaten	13	11
Womens' skills increase	5	4
Increase in money in the community & better standard of living	3	3
There will be more money: Women can manage what they earn	2	2
Increase in the fishing industry	1	1
More employment opportunities for women	1	1
Savings	1	1
Negative effects of women in fishing		
Resources decline	17	15
Household neglected	14	12
Domestic conflicts (sometimes violence)	14	12
Marriage problems	6	5
Children neglected	5	4
Risk of harrassment, adultery & rape	3	3
Gardens neglected	3	3
Resources are finished (extinctions)	2	2
Fish will move away (traditional tambus against women)	2	2
More catch, but not useful because no market	2	2
Catches will decline	1	1
Women will become ill after fishing	1	1
Women can't handle bad weather	1	1
Women can't handle sea safety	1	1
Don't know	10	9
No effect	6	5

◀ Table 67: Opinions of Key Informants on the likely impacts of increasing women’s involvement in Fisheries (n=87).

▼ Figure 77: Overall opinions regarding likely effects of increasing women’s involvement in fishing (n=87).



ANNEX 1. TIMETABLE FOR SOCIO-ECONOMIC SURVEY

Week 1	Transport	Mon 16 Aug	Tue 17 Aug	Wed 18 Aug	Thu 19 Aug	Fri 20 Aug	Sat 21 Aug	Sun 22 Aug	Team members		
	Kijang		Kavieng Urban Ward (Kavieng LLG)						Sandra	Elsie	Jenny
Banana boat		Lovongai Ward (Lovongai LLG)						Ashley	Man	Ben	
Hilux		Belifu Ward (Tikana LLG)						Miro	KK	Johnson	
Week 2	Transport	Mon 23 Aug	Tue 24 Aug	Wed 25 Aug	Thu 26 Aug	Fri 27 Aug	Sat 28 Aug	Sun 29 Aug	Team members		
	Kijang		Kulangit Ward (Kavieng LLG)						Emmanuel	Sandra	Jenny
Banana boat		Tsoi Ward (Lovongai LLG)						Ashley	Ben	Man	
Banana boat		Enang Ward (Tikana LLG)						Miro	KK	John	
Week 3	Transport	Mon 30 Aug	Tue 31 Aug	Wed 01 Sep	Thu 02 Sep	Fri 03 Sep	Sat 04 Sep	Sun 05 Sep	Team members		
	Kijang		Bagail Ward (Kavieng LLG)						Jenny	Emmanuel	Rakum
Banana boat		Lungatan Ward (Lovongai LLG)						Ashley	Ben	Manaon	
Hilux		Kafkaf Ward (Tikana LLG)						John	Johnson	Sandra	
Week 4	Transport	Mon 06 Sep	Tue 07 Sep	Wed 08 Sep	Thu 09 Sep	Fri 10 Sep	Sat 11 Sep	Sun 12 Sep	Team members		
	Kijang		Maiom Ward (Kavieng LLG)						Johnson	John	Jenny
Banana boat		Umbukul Ward (Lovongai LLG)						Ashley	Ben	Manaon	
Banana boat/ f		Lokono/ Bagatare Ward (Tikana LLG)						Rakum	Elsie	Sandra	
Week 5	Transport	Mon 13 Sep	Tue 14 Sep	Wed 15 Sep	Thu 16 Sep	Fri 17 Sep	Sat 18 Sep	Sun 19 Sep	Team members		
	Kijang		Kaselok Ward (Tikana LLG)						KK	John	Dan
Banana boat		Meteselen Ward (Lovongai LLG)						Ashley	Ben	Manaon	
Banana boat		Leon Ward (Tikana LLG)						Rakum	Johnson	Miro	
Week 6	Transport	Mon 20 Sep	Tue 21 Sep	Wed 22 Sep	Thu 23 Sep	Fri 24 Sep	Sat 25 Sep	Sun 26 Sep	Team members		
	Kijang		Paruai Ward (Tikana LLG)						Elsie	John	Jenny
Banana boat		Ungalik Ward (Lovongai LLG)						Ashley	Ben	Manaon	
Hilux		Panamana Ward (Tikana LLG)						Sandra	Dan	Rakum	
Week 7	Transport	Mon 27 Sep	Tue 28 Sep	Wed 29 Sep	Thu 30 Sep	Fri 01 Oct	Sat 02 Oct	Sun 03 Oct	Team members		
	Hilux		Lamusmus Ward (Tikana LLG)						John	Dan	Emmanuel
Banana boat		Nonovaul Ward (Tikana LLG)						Sandra	Ben	Johnson	

NATIONAL FISHERIES AUTHORITY



PNG NATIONAL FISHERIES AUTHORITY



COASTAL FISHERIES
Management and Development Project

ASIAN DEVELOPMENT BANK



GPA



Tautai