

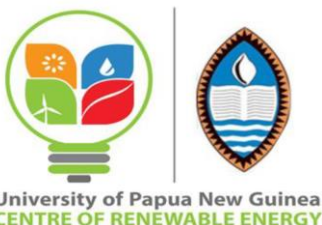


Baseline Survey

For Integrated Water and Sustainable Energy (IWASE)
Project In Selected Communities of Rigo District,
Central Province, Papua New Guinea

John Duguman, Alfred Faiteli, Manu Rawali & Darlen Lohi

A Knowledge Attitude Practice (KAP) Survey



EU-GIZ ACSE
ADAPTING TO CLIMATE CHANGE AND SUSTAINABLE ENERGY



giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Published by

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

EU-GIZ ACSE (Adapting to Climate Change and Sustainable Energy) Programme
FNPF DownTown Blvd, Plaza 1, Level 3
Suva, Fiji
T +679 3305 983
F + 679 3315446
info@acsepacific.org
www.acsepacific.org

Registered offices
Bonn and Eschborn, Germany

March 2018

Design and Layout
John Duguman, Timo Baur, Greenhouse Studio

Front page photo credit: Manu Rawali/UPNG CORE

Text
John Duguman, Alfred Faiteli, Manu Rawali & Darlen Lohi

Disclaimer

This publication has been produced with the assistance of the European Union. The contents of this publication are the sole responsibility of the author(s) and can in no way be taken to reflect the views of the European Union.

**Baseline Survey for Integrated Water and Sustainable Energy (IWASE)
Project in Selected Communities of Rigo District, Central Province,
Papua New Guinea**

KAP Survey Report

Table of Contents

ACRONYMS.....	7
EXECUTIVE SUMMARY	8
BACKGROUND	9
1.1 INTRODUCTION	9
1.2 THE ACSE PROGRAMME	9
1.3 IWASE PROJECT AND OPERATION AREAS	10
1.4 PURPOSE, AND OBJECTIVES OF THE SURVEY	11
1.5 FOCUS AND SCOPE OF SURVEY.....	11
2.0 METHODOLOGY	12
2.1 METHODOLOGY	12
2.2 SAMPLE SIZE AND SAMPLING.....	12
2.3 QUESTIONNAIRE INTERVIEWS	12
2.4 FOCUS GROUP DISCUSSIONS	12
2.5 LIMITATIONS.....	12
2.6 BACKGROUND OF SURVEY AREA	13
2.7 DEMOGRAPHICS.....	15
2.8 HOUSEHOLDS	15
2.9 ECONOMIC ACTIVITY.....	15
2.10 INFRASTRUCTURE	15
2.11 PERSONS WITH DISABILITIES.....	16
3.0 FINDINGS OF SURVEY	16
3.1 CLIMATE CHANGE.....	16
3.1.1 Knowledge.....	16
3.1.2 Attitude and Behaviour	18
3.1.3 Practice.....	19
3.2 WATER SUPPLY.....	20
3.2.1 Knowledge.....	20
3.2.2 Attitude and Behaviour	23
3.2.3 Practice.....	24
3.3 SUSTAINABLE ENERGY	25
3.3.1 Knowledge.....	25
3.3.2 Attitude and Behaviour	25
3.3.3 Practice.....	26
4.0 SUMMARY AND CONCLUSION	28
4.1 CLIMATE CHANGE.....	28
4.1.1 Knowledge.....	28
4.1.2 Attitude and Behaviour	28
4.2 WATER.....	29
4.2.1 Knowledge.....	29
4.2.1 Attitude and Behaviour	31
4.3 SUSTAINABLE ENERGY	31
4.3.1 Knowledge.....	31
4.3.2 Attitude and Behaviour	32
4.3.3 Practice.....	33

5.0 FOCUS GROUP DISCUSSIONS	34
6.0 CONCLUSION.....	39
7.0 RECOMMENDATIONS	40
7.1 CLIMATE CHANGE.....	40
7.2 WATER SUPPLY	40
7.3 SUSTAINABLE ENERGY	40
7.4 PROJECT IMPLEMENTATION.....	41
REFERENCES	42
ANNEXES	43
ANNEX 1: FIGURES FROM THE KAP SURVEY	44
ANNEX 2: SURVEY QUESTIONNAIRE.....	48
ANNEX 3: FOCUS GROUP DISCUSSION	65

List of Figures

Figure 1: Location map of the KAP Survey in Papua New Guinea	13
Figure 2: Location of the KAP Survey Communities	14
Figure 3: Knowledge about Climate Change.....	16
Figure 4: Sources of Climate Change	17
Figure 5: Signs of Climate Change.....	17
Figure 6: Causes of Climate Change.....	18
Figure 7: Informed about Climate Change.....	19
Figure 8: Where to receive information about Climate Change	19
Figure 9: Reasons for not getting Climate Change information	20
Figure 10: Main source of water	21
Figure 11: Main uses of Water.....	21
Figure 12: Transportation of water.....	22
Figure 13: Reasons for clean water	23
Figure 14: Purpose of water project	24
Figure 15: Main use of electricity	26
Figure 16: Reasons for the failure of energy project	27
Figure 17: The source of the spring at Imuagoro	29
Figure 18: Kemp Welch River, Kalo's main source of water	30
Figure 19: Water been ported from the river in Kalo	30
Figure 20: Solar panel on roof to power the TV reception disk in Keapara	32
Figure 21 Solar street light in Imuagoro	33
Figure 22: Solar panel need to be re-orientated to face the north	41
Figure 23: Problems of Climate Change.....	44
Figure 24: Seriousness of Problem	44
Figure 25: Responsible for Climate Change issues	44
Figure 26: Place to receive Climate Change information	45
Figure 27: Measures known and used to combat negative impacts of Climate Change	45
Figure 28: Times water fetched per day	45
Figure 29: Diseases from drinking water	46
Figure 30: Skin diseases from washing	46
Figure 31: Duration of water storage	46
Figure 32: Benefits of electricity to the community	47
Figure 33: Importance of Electricity to Health Centre.....	47
Figure 34: Purpose of Electricity project.....	47

List of Tables

Table 1: Population of Keapara, Imuagoro and Kalo Villages	15
Table 2. Knowledge about Climate Change	16
Table 3. Effects of Climate Change Real	18
Table 4: Main Water Source by Community.....	21

Acronyms

ACSE	Adapting to Climate Change and Sustainable Energy
ADB	Asian Development Bank
CCCPIR	Coping with Climate Change in the Pacific Islands Region
CCDA	Climate Change Development Authority
CPG	Central Provincial Government
EU	European Union
FGD	Focus Group Discussions
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Federal Enterprise for International Cooperation)
IWASE	Integrated Water and Sustainable Energy
KAP	Knowledge Attitude and Practice
LLG	Local Level Government
PACPs	Pacific Asia Caribbean Pacific Countries
PNG	Papua New Guinea
UPNG	University of Papua New Guinea
UPNG CORE	University of Papua New Guinea Centre of Renewable Energy

Executive Summary

A Knowledge, Attitude and Perception (KAP) survey was carried out in Keapara, Imuagoro and Kalo communities in the Rigo District, Central Province, Papua New Guinea from the 14th to 18th August 2017.

The survey provided insight into knowledge, attitudes and practices of the target communities (Kalo, Keapara and Imuagoro) in relation to climate change. The survey findings were also a baseline for the Adapting to Climate Change and Sustainable Energy (ACSE) project implementation plan.

The survey focussed on the communities' understanding of the effects of climate change on households and sustainable development, energy security, and the health and well-being of the communities. Seventy seven (77) household in the communities were surveyed, together with needs of women and children, including people living with disabilities. Both primary data, focus group discussions and secondary sources were used.

More than half (53.2%) of the community knew very little about **Climate Change** and its effects in the community. Information was limited and not readily available as a result of no awareness or education on this. Rising sea level and drought were noted although the community could not link this to climate change. They however agreed that the effects of climate change were real and causing food shortage and land problems.

Over ninety percent (93.5%) of the community used water efficiently with drinking (92.2%), cooking (5.2%) and washing (2.6%). Nearly 70 percent (69.7%) acknowledged water was essential for hygiene and cleanliness as well as improving lifestyle and women's chores such as using wheel barrows for fetching water. Distances to water sources varied in communities.

The communities perceived water borne and skins diseases to be over half (53.2%) and diarrhea ranked higher (82.9%) than other diseases as well as grille (34.1%) dominating the skin diseases.

Within communities, firewood and solar were the major cooking and lighting sources besides generators and electricity would be good for the community. Street lighting would make the communities safer as well as improve living standards. It was also important for electricity to be made available for the health centre and schools with benefits and improve socio economic development tremendously.

Previous water and energy projects were not successful from the communities perceptive and this was attributed to the non-availability of technical persons. Carelessness, theft and vandalism were also reasons for their failure.

A conclusion with recommendations for the KAP survey are in the main report.

Background

1.1 Introduction

Sustainable livelihoods is a high priority for Pacific Island communities and governments alike. They are central to current development policies including resource management and conservation as well as in the emerging policies to meet threats such as climate change.

The European Union (EU) is therefore assisting Pacific ACP countries (PACPs)¹ through a new regional Programme: *Adapting to Climate Change and Sustainable Energy (ACSE)* funded by the 10th European Development Fund (EDF 10). The objectives of the ACSE programme are to enhance sustainable livelihoods in PACPs, to strengthen PACPs capacities to adapt to the adverse effects of climate change and to enhance PACPs energy security at the national, provincial and local/community levels.

The strategic vision will be achieved by supporting the efforts of PACPs governments and empowering communities to increase their self-reliance and their ability to cope with the effects of climate change. Support will be provided for interventions such as implementation of appropriate practices in agriculture and coastal fishery, dissemination of improved plant varieties (e.g. salt-water tolerant), securing of daily water supplies, and improving access to energy, to mention a few examples.

1.2 The ACSE Programme

The ACSE Programme forms part of a broader EU engagement on climate change adaptation, sustainable energy and disaster risk management in the Pacific Island region, which includes the Global Climate Change Alliance (GCCA) programme, the BSRP, and the former B-envelope Disaster Risk Reduction project under EDF 9.

The ACSE programme has three components:

1. the *Energy Catalytic Component* (10 million Euros) which is jointly managed by the EU with the Asian Development Bank (ADB) in selected PACPs;
2. the *Technical and Vocational Education and Training (TVET) Component on sustainable energy issues* (6.1 million Euros) which is jointly managed by the EU with the Secretariat of the Pacific Community (SPC); and
3. the *Adapting to Climate Change and Sustainable Energy Component* (18.64 million Euros) which is administered by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, in close collaboration with the regional SPC-GIZ programme “Coping with Climate Change in the Pacific Island Region” (CCCPIR).

In PNG, the main objective of the ACSE project is to support the socioeconomic development of three rural communities in the Rigo District: Imuagoro, Keapara and Kalo villages (Figure 1) and to reduce their vulnerability against climate change impacts through the provision of

¹Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Republic of Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu

reliable, integrated water and sustainable energy. At the national level, this objective will contribute towards fulfilling PNG's commitment to the Kyoto Protocol.²The project will also promote equitable regional economic growth based on sustainable planning and use of natural resources that will provide high quality of life and long term economic opportunities for its inhabitants. In contributing to this objective, the project is intending to achieve these following outcomes as follows:

1. Water supply systems including, protected water sources, treatment and distribution systems, sustainable energy pumps, reservoirs, rainwater harvesting systems are established and used in the target villages.
2. Stand-alone sustainable energy street lighting systems are established in the target villages.
3. Sustainable energy refrigeration systems are provided to the target villages.
4. Health care centres in the target villages are provided with sustainable energy, medical coolers and water supply, and
5. The capacity and awareness of all stakeholders regarding sustainable energy infrastructure and water supply systems has increased.³

By achieving the proposed outcomes, the project seeks to enhance environmental awareness and participation of communities to be able to address the effects of climate change.

One of the many activities to be implemented in the communities is the Knowledge, Attitude and Practice (KAP) survey. The University of Papua New Guinea (UPNG) through the UPNG CORE is recognized as the potential organization to undertake this activity in the target communities. It has the required expertise to collect, analyses and present results on the KAP of people in relation to climate change and its related issues.

This report presents the outcome of the KAP survey carried out in the three communities to understand the local people's knowledge, attitude and practices at present regarding effects of climate change and how these effects contribute to low socioeconomic development in the communities.

1.3 IWASE Project and Operation Areas

In PNG, the EU –GIZ is working with the Climate Change Development Authority (CCDA) as the implementing Agency in cooperation with key stakeholders (Central Provincial Administration including Rigo District, Rigo Central LLG and Rigo Coast LLG, Water PNG, and UPNG through UPNG CORE will support the implementation of the project activities to achieve the desired outcomes.

²ACSE Project Design Document page 4.

³ ACSE Project Design Document page 4.

1.4 Purpose, and Objectives of the Survey

The purpose of the survey is to provide insight on current knowledge, attitudes and practices of the target communities (Kalo, Keapara and Imuagoro) in relation to climate change. This survey finding will serve as the basis of the current situation in the communities and will inform planning and implementation of other activities in the project life.

The information will serve as the baseline data and this information will be vital after implementation to understand the changes made in these communities as a result of the implementation of ACSE project. The primary intended users of the survey information are: EU-GIZ ACSE Programme, Climate Change Development Authority, the Central Provincial Government, Rigo District Administration, Rigo Central LLG and Rigo Coast LLG. Other possible users of the study are Water PNG and other stakeholders involved in Climate Change Programs.

Overall, the objectives of the ACSE programme are to enhance sustainable livelihoods in PACPs, to strengthen PACPs capacities to adapt to the adverse effects of climate change and to enhance PACPs energy security at the national, provincial and local/community levels.

1.5 Focus and Scope of Survey

The focus of the survey is knowledge, attitudes and practice of the target communities namely; Keapara, Imuagoro and Kalo in relation to climate change. The survey will examine effects of climate change on households and at community at large, especially on how climate change has changed from an environmental issue into one that requires collective expertise in sustainable development, energy security, and the health and well-being of the communities.

In addition, the survey captured information about what people know in terms of increasing temperature, changes in the hydrologic cycle, and sea level rise, climate change is projected to increase the frequency and intensity of heat and other extreme weather events (floods and droughts), change the geographic range and incidence of climate-sensitive vector-, food-, and waterborne diseases, and increase diseases associated with air pollution and aero-allergens.

This survey also provides a pathway to suggest an environmental change associated with anthropogenic greenhouse gases that may lead to respiratory diseases, sunburn, melanoma, and immune-suppression. Health issues such as heat stroke, drowning, gastrointestinal diseases, and disruption of psychosocial development.

Ecologic alterations triggered by climate change can increase rates of malnutrition, allergies and exposure to mycotoxins, vector-borne diseases (malaria, dengue, encephalitides, Lyme disease), and emerging infectious diseases.⁴In this women and children are particularly vulnerable to these health outcomes because of their potentially greater exposures, greater sensitivity to certain risks, and their dependence on others for safety and security.

⁴ ACSE Project Design Document page 8.

2.0 Methodology

2.1 Methodology

The methodology used for the KAP survey involved both primary and secondary data collection. Primary data was collected using the household survey, Focus Group Discussions (FGD)s and informal discussions while secondary data supported the primary data and consisted of existing community structures, schools and health facilities⁵.

Complementary data collection was also collected based on school and health facilities for people living in these village communities and for people living with disabilities.

2.2 Sample Size and Sampling

For a household survey a random sampling is imperative as this will indicate a measure of the homogeneity of the community. From the background information, a total estimate of 770 households were in the three communities. Hence for a ratio of 1:10 sample size needs to be determined following the simple random sampling method. As a result, a total of 77 households were sampled to be interviewed in the KAP household survey. Based on this reasoning, 77 household heads were interviewed in Keapara (13), Imuagoro (12) and Kalo (52).

2.3 Questionnaire Interviews

Interviews were organised by households. For Kalo village, the 52 households came from the four clans (Gamoga, Kinika, Mumuri and Poti) out of more than 400 households. A structured questionnaire was used to interview these household heads (Annex 1).

2.4 Focus Group Discussions

The FGD were done in each village. The discussion was centred on issues relating to climate change, water supply and sustainable energy. The questions in the FGD required more information on certain questions asked in the survey to understand in greater detail the nature of the problem or issue from a community rather than an individual or household perspective.

A community group was selected with representatives from the church, LLG (councillor), schools (teacher), aid posts (community health worker), women's group, children, youth, disabled and the elderly, and they were invited to come for the FGDs. A semi-structure questionnaire was used for these FGDs (Annex 2).

2.5 Limitations

⁵ The secondary data was obtained from the PNG 2011 census data and the provincial and district profiles.

A number of limitations were encountered whilst conducting this survey. These were as follows:

- Many of the ages of the old people who were in the sampled households were estimated as many did not know their dates of birth.
- It was difficult to give a precise amount on the income earned per day/week/fortnight/month from sale of food crops and meat (seafood – fish, crabs, shells) because most of the people interviewed were subsistence farmers and income for them was received on an irregular basis.
- The amount of money earned from selling their produce at the markets differed. For example, people from Keapara sold their produce (mainly fish) at the village, Kwikila or Port Moresby similar to the Imuagoro villagers whereas for the Kalo villagers they sold at their produce at the village, Hula, Kwikila and/or Port Moresby. Variations in the amount earned for local people from these rural villages were caused by a number of different factors.

2.6 Background of Survey Area

The baseline KAP survey was conducted in the rural communities of Keapara, Imuagoro and Kalo in the Rigo District of the Central Province of PNG. These villages are located about 133, 85 and 115 km respectively to the south east of Port Moresby (Figure 1 & 2).



Figure 1: Location map of the KAP Survey in Papua New Guinea

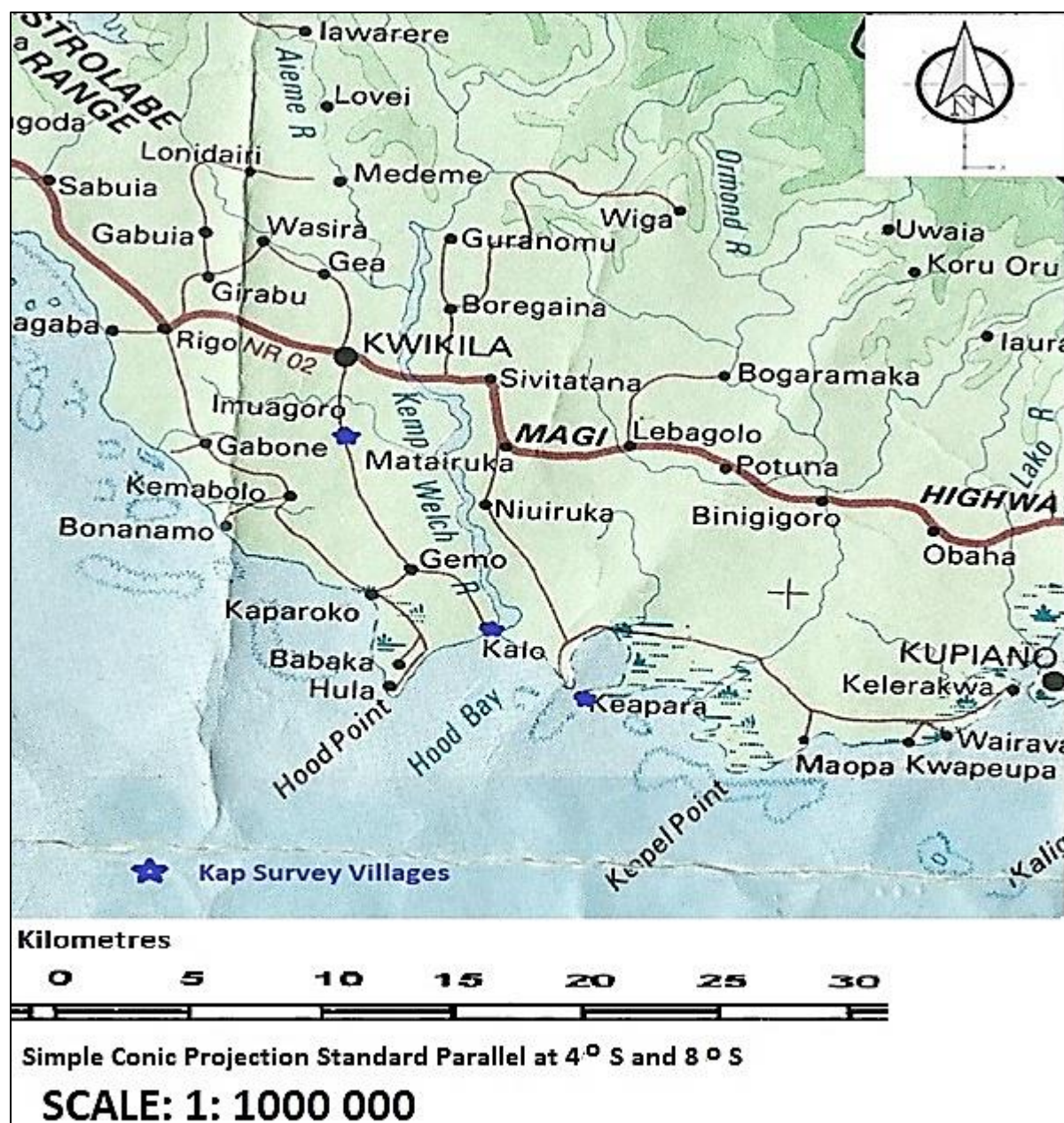


Figure 2: Location of the KAP Survey Communities

This survey was carried out to enhance sustainable livelihoods, to strengthen their capacities to adapt to the adverse effects of climate change and to enhance their energy security at the national, provincial and local/community levels.

This information obtained will provides insights and a general understanding of the current knowledge on climate change (and related issues), and the attitudes and practices of people living in these three rural communities.

There are low income opportunities available from agriculture on the coast as long as the dry season makes the coastal plains unsuitable for intensive agriculture. Many people nowadays commute to Port Moresby to earn an income by selling their agricultural produce (food crops, fish and fresh meat).

2.7 Demographics

A total of 4,047 people lived in the three communities with Kalo having the highest number of people (2,401), Imuagoro with 1,024 and the lowest Keapara with only 653 people⁶. The number of households in the three villages was 91, 113 and 361 respectively (Table 1). The average household sizes for the three villages in 2011 was highest for Kalo (9.4 persons per household), followed by Imuagoro (9.1) and Keapara (7.7).

Table 1: Population of Keapara, Imuagoro and Kalo Villages

Village	LLG	Household Number	No. of Males	No. Of Females	Total Population
Keapara	Rigo Coastal	91	348	305	653
Imuagoro	Rigo Central	113	545	479	1,024
Kalo	Rigo Coastal	361	1,227	1,174	2,401
Total		565	2,120	1,958	4,047

PNG Census Report, NSO: 2011

2.8 Households

For the purposes of this study, only 77 households in total were selected as the sample of this study. This included 13 households in Keapara, 12 in Imuagoro and 52 in Kalo. Only the household heads were interviewed. In addition, some basic socioeconomic information for all others living in the house were also obtained (Table 2). All household heads interviewed in this survey were males, although a few were female.

2.9 Economic Activity

The top agricultural activities in the three communities were food crops, coconut, betel nut (*Areca catechu*), fishing and livestock. In Keapara, fishing was the dominant economic activity. In Kalo gardening as well as fishing was the dominant agricultural activities while for Imuagoro due to its inland location gardening was the dominant form of agricultural activity. Most of the local people in these communities were subsistence farmers but also sold food crops and fish at markets in their communities, Hula, Kwikila and Port Moresby on an irregular basis (NRI, 2010).

2.10 Infrastructure

The Rigo district has 5 health centres, 28 aid posts, 102 elementary schools, 26 community schools, 32 primary schools, 1 provincial high school and 1 technical school. A primary school, an elementary school and an aid post is in all the three communities. However, at the time of the survey, the Kalo aid post was not functioning due to lack of funding, technical and staffing problems.

Literacy rates of this district in 2015 were around 80.4% with males having higher a literacy rate (83.6%) than females (76.9%).

⁶ NSO 2011, National Population and Housing Census, National Statistical Office, Port Moresby.

2.11 Persons with Disabilities

A total of 13 (2.2%) persons were living with disabilities in the three communities. This was from the 583 persons covered in the KAP survey. These included 3 lame persons and 10 with partial disabilities.

3.0 Findings of Survey

The findings of the survey are arranged in the order of the questionnaire and begins with i) Knowledge, Attitude and Behaviour of Climate Change, followed by ii) Water Supply and iii) Sustainable Energy. A few highlighted figures stating the survey findings are noted here with the remainder of the figures in Annex 1.

3.1 Climate Change

3.1.1 Knowledge

i) Knowledge about Climate Change

Of the 77 household heads interviewed, 53.2% of the respondents knew about climate change (Table 2). Of this (36), 58.3% were those from Kalo village, 22.2% in Keapara and 19.4% in Imuagoro. Generally, more people in Imuagoro knew about climate change than in the other two villages (Figure 3). Although many people said they knew about climate change (or said yes to this question). Many did not know in greater detail what climate change is.

Table 2. Knowledge about Climate Change

Response	Count	Percentage (%)
Yes	36	46.8
No	41	53.2
Total	77	100.0

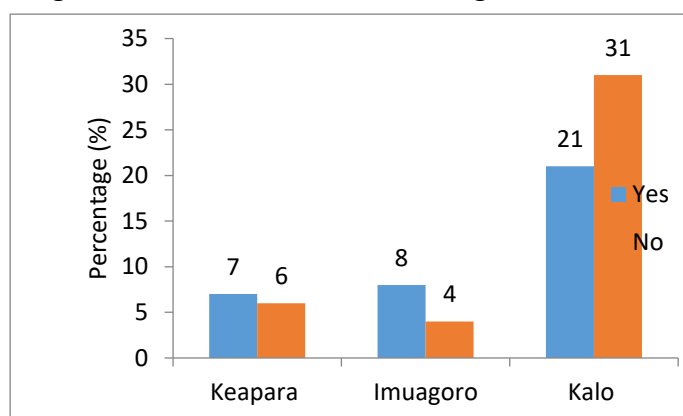


Figure 3: Knowledge about Climate Change

ii) Source of learning about Climate Change

Climate change was learnt by villagers from various mediums. Over forty percent (41.7%) learnt from 'other' ways. This could mean from communicating with others or just by thinking about this issue. Social media (27.8%) was the second highest and the least of these ways was by learning from the local village councillor (16.7%). The other ways were less than 10.0% (Figure 4).

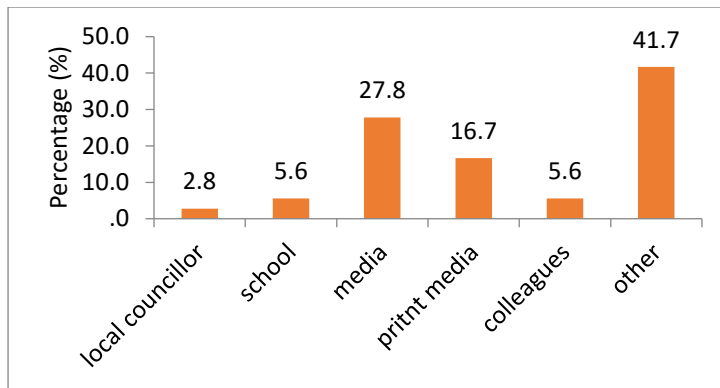


Figure 4: Sources of Climate Change

iii) Signs of Climate Change

Over forty percent (41.7%) identified sea level rise was the main sign of climate change. This is because both villages of Kalo and Keapara are coastal villages and signs of sea level rise are very obvious. In Imuagoro, no one mentioned sea level rise as the main sign for climate change rather most of them mentioned drought as the main sign of changes in climate patterns of the globe. Drought (38.9%) was mentioned as the second main sign of climate change. Other signs recorded minimal responses less than 10% (Figure 5).

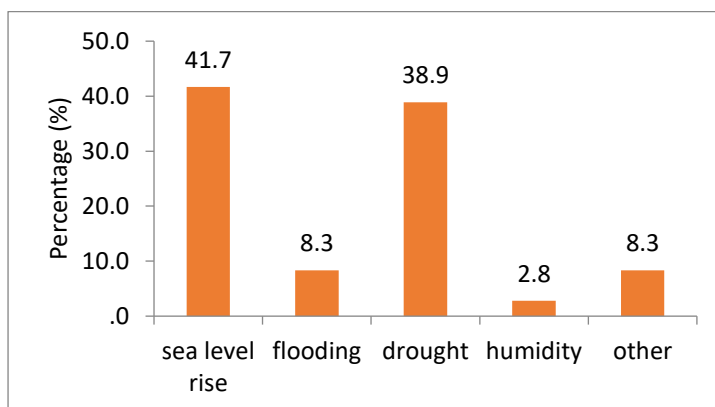


Figure 5: Signs of Climate Change

iv) Causes of Climate Change

Half (50.0%) of the respondents mentioned that climate change was caused by droughts while 16.7% identified sea level rise as the second common cause for climate change. All other responses were below 10%. Only 5.6% of the respondents said that the main cause of climate change was global warming and pollution from industrialized countries (Figure 6).

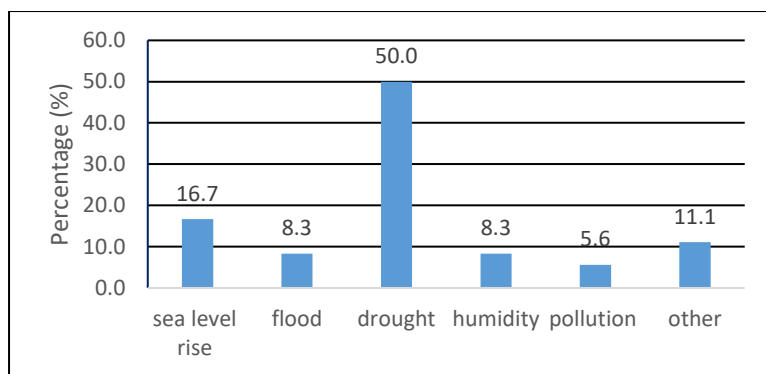


Figure 6: Causes of Climate Change

3.1.2 Attitude and Behaviour

i) Effects of Climate Change Real?

Nearly all the respondents (97.2%) agreed to the statement that climate change was real (Table 3).

Table 3. Effects of Climate Change Real

Response	Count	Percentage (%)
Yes	35	97.2
No	1	2.8
Total	36	100.0

ii) Do you think climate change causing these problems?

Similarly, nearly all the respondents (97.1%) stated that climate change was causing problems in the community.

iii) Problems of Climate Change

Food shortage (55.9%) was the most common problem caused by climate change followed by land problems (29.4%), and other minimal problems such as law and order and water shortage were also indicated as problems caused by this occurrence (Figure 24).

iv) Seriousness of Problem

Nearly half (47.1%) of those who knew about climate change indicated that climate change is not a serious problem while 32.8% said it is a very serious problem. These responses indicated about half the population were very concerned of the problems of climate change (Figure 25).

v) Responsible for Climate Change Issues

Over forty percent (41.2%) and 26.5% concurred that issues of climate change were the responsibility of the local and national respectively. The village community (3.9%) and family (1.3%) were not considered as responsible for the issues of climate change (Figure 26).

3.1.3 Practice

i) Do you feel well-informed about climate change issues?

Over seventy percent (74.3%) were not well-informed about climate change issues. This is quite contrasting because when the first question was asked on whether people knew about climate change, a high percentage of them answered yes to the question however as the interview continued, they realised that many of the issues of climate change raised in the questions were not understood by many of them. Although 20% were well informed and these were former public servants or people employed in the private sector, teachers and health workers (Figure 7).

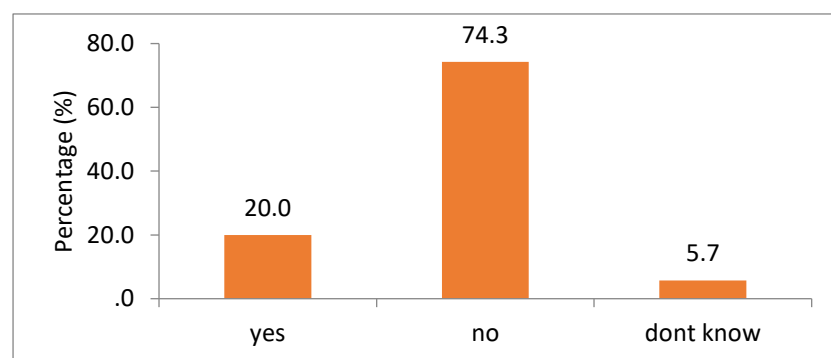


Figure 7. Informed about Climate Change

ii) Knowledge about where and how to receive Climate Change Information

Over sixty percent (63.6%) of 35 respondents did not know where and how to receive about climate change and only 30.3 % knew while 6.1% were confused (Figure 8).

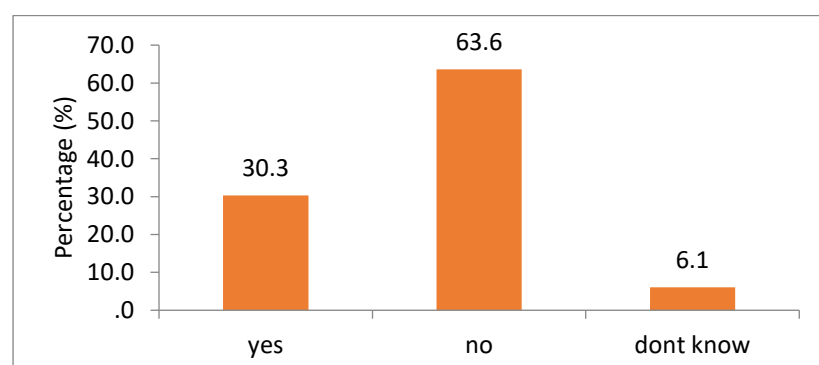


Figure 8: Where to receive information about Climate Change

iii) Place to receive Climate Change Information

Of those respondents who knew where to obtain information on climate change issues (10), 70.0% mentioned CCDA while the LLG office, district and provincial government offices all recorded a similar response of 10.0%. This knowledge to obtain information may have only emerged since the visitation of CCDA officials for the launch of this project (Figure 26).

iv) Reasons for Not Knowing Climate Change Issues

Of the 26 respondents who did not know where to receive information on climate change, a large percentage mentioned that there was no awareness from government (88.5%) and no education on this issue (11.5%) (Figure 9).

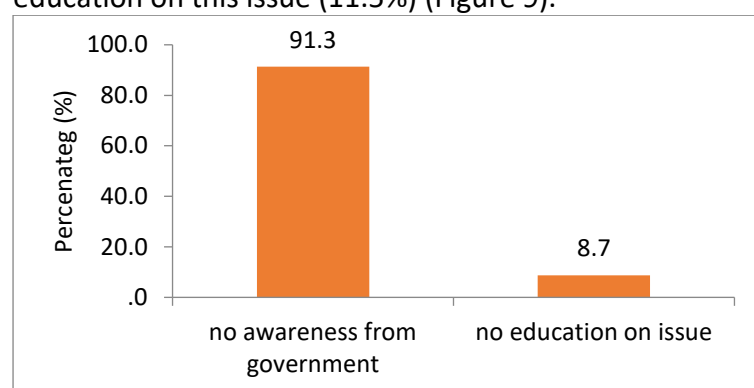


Figure 9. Reasons for not getting Climate Change information

v) Measures to Combat Climate Change

Of the 36 who knew about climate change, only 14 (38.9%) used measures to combat the negative effects of climate change using various ways. The most common way of combating the effects of climate change was through education and awareness (7.8%), while the rest of the responses such as food security, gardening practices, sea walls and other suitable infrastructure were all very low (less than 5%) (Figure 27).

3.2 Water Supply

3.2.1 Knowledge

i) Main Source of Water

The main source of water was in the River (63.6%), followed by well (15.6%) and water tank (11.7%) (Figure 10).

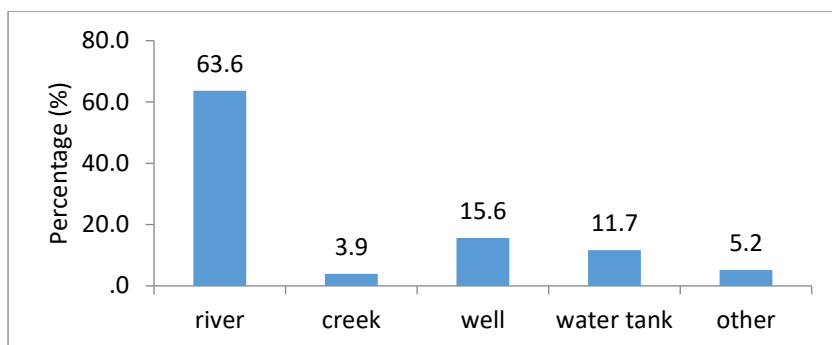


Figure 10. Main source of water

For Kalo, the main water source was the river (Kemp Welsh), Keapara the well and for Imuagoro, the water tank and spring and other sources (Table 4).

Table 4: Main Water Source by Community

Water Source	Community			Total
	Keapara	Imuagoro	Kalo	
River	0	0	49	49
Creek	0	3	0	3
Well	10	0	2	12
Water Tank	3	5	1	9
Other	0	4	0	4
Total	13	12	52	77

ii) Main Use of Water

The main uses was for drinking (63.6%), followed 'all other uses' such as washing, laundry, cleaning (and also including drinking and cooking) and thirdly cooking separately (7.8%) (Table 4). This result clearly shows that water for all persons interviewed is considered important for drinking and cooking and then for other uses such as washing, laundry and cleaning purposes (Figure 11.).

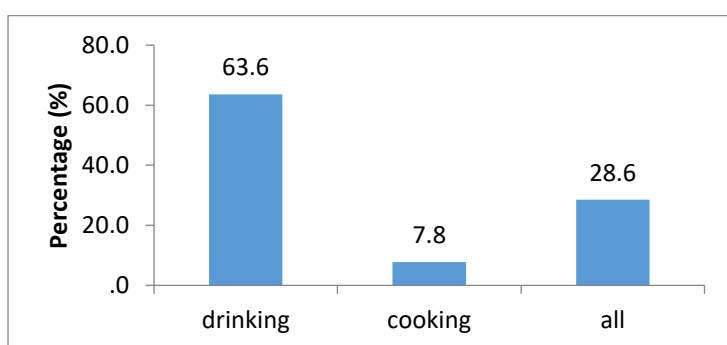


Figure 11. Main uses of Water

iii) How far is water source?

Travel to the water source for all communities differs. For Keapara, the average time was 3.3 minutes. Most of the wells are either next to their houses or under their houses. For Imuagoro, it took 30 minutes to get to the spring. The spring is about half a kilometre away from the village is on the other side of the mountain that separates the village. To get there

requires going around the mountain and uphill to the water source. There is also a creek on the opposite side of the village. For Kalo, the Kemp Welsh River is close to most houses and 7.7 minutes is the average time.

iv) How many times do you fetch water?

In a day, the mean time for water collection is 3.12 times (Figure 28). However, this would largely depend on the usage of water and the purpose of usage. When there is a celebration or festival than the average becomes higher. In Keapara, because of the close proximity of the water source, water can be fetched more than 3 times per day.

v) How do you transport water?

Water is carried by women in a bag or 'bilum' and transported to the house. Of the total respondents interviewed, 97.4% mentioned that water is mainly transported by women on foot and only 2.6% transported by wheelbarrow. The wheelbarrow was only used in Kalo.

vi) Who usually carries water?

Women carried water in the three communities (49.4%). This was closely followed by 'all' persons (44.2%) (Figure 12). This 'all' category consists of girls and children who accompany their mothers and carry little containers or plastic bottles. Although, men also mentioned that they assisted women in carrying water, although this was not a daily chore for them. They would assist in water collection mainly during large community activities or occasions, church events and social or ceremonies such as thanksgiving and bride price ceremonies. During the survey, no men carried water.

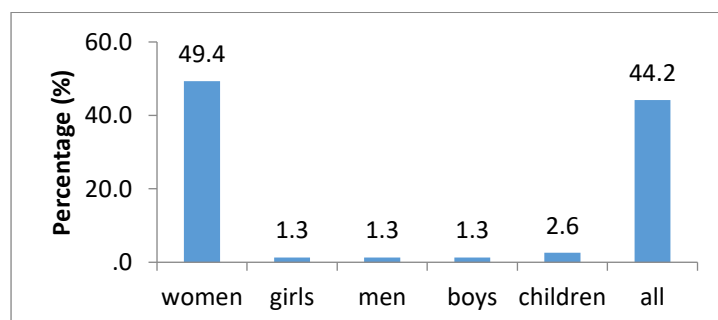


Figure 12: Transportation of water

vii) Do you get sick from drinking and washing from water source?

Over half (53.2%) of the community stated that they got sick from either drinking or washing from this water source while 36.4% did not get sick and 10.4% were not sure.

viii) What disease you get from drinking from water source?

Over eighty percent (82.9%) mentioned that sometime in their life they got diarrhoea by drinking water from this source. Over ten percent (12.2%) stated they got other diseases while 2.4% each said they got dysentery and typhoid by drinking from this water source.

Those who said other disease referred to diseases such as malaria, fever and other diseases (Figure 29).

ix) What disease you get from washing from water source?

Over thirty percent (34.1%) stated that they obtained grille by washing from this source, while 29.3% stated that they got scabies while 19.5% got other diseases and 17.1% had rashes. Most of the people who mentioned skin diseases were from Kalo. This is because Kalo is situated at the mouth of the Kemp Welsh River with many villages upstream who use the river for washing and laundry (Figure 30).

3.2.2 Attitude and Behaviour

i) Use water effectively?

Regarding water use, a very high percentage (93.5%) of the respondents stated that they used water effectively while only 5.2% said they did not use water effectively and 1.3% did not understand this question or did not know.

ii) Water Use

A very high percentage (92.2%) stated drinking as the most important use of water followed by cooking (5.2%) and washing (2.6%).

iii) How long to use water stored?

The mean number of days water was stored before being fully used up indicated an average of 3.05 days for all three villages combined (Figure 31).

iv) Why clean water is good?

Nearly seventy percent (69.7%) of the respondents acknowledge that clean water was good for cleanliness and health, 15.8% stated 'all' stated reasons, 9.2% mentioned to improve village standards of living, 3.9% help women from hard work and 1.3% stated that it saved cost of time and labour (Figure 13).

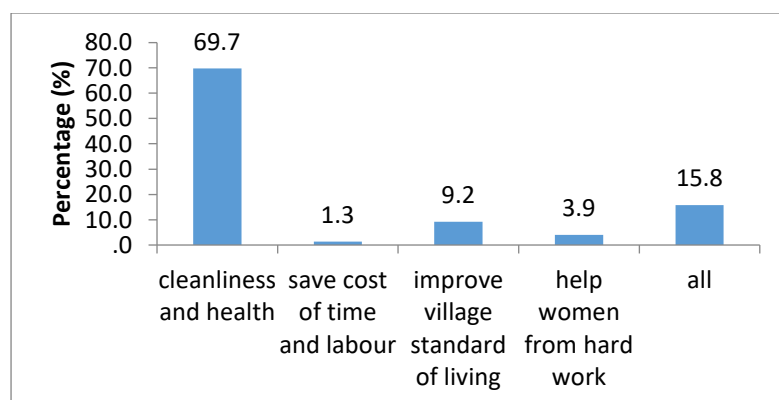


Figure 13: Reasons for clean water

3.2.3 Practice

i) Importance of Water for Health Centre

All respondents agreed that water was important and needed for the operation of the health centre in each community.

ii) Health Centre

The importance for water in the health centre was for patients (drinking, washing (53.2%) followed by 'all' stated reasons in the questionnaire at 24.7%, followed by 3.0% who mentioned to keep health centre clean and finally 6.5% who mentioned that importance of cleaning medical equipment.

iii) Water Projects

On the knowledge of any water project established in the communities in the past, 88.3% knew of a project established while 11.7% did not know.

iv) Purpose of Water Project

On the question of the purpose of establishing these water projects in their respective communities in the past, 55.3% mentioned for socioeconomic development, 38.3% said to improve livelihood, and 6.4% mentioned for other reasons (Figure 14).

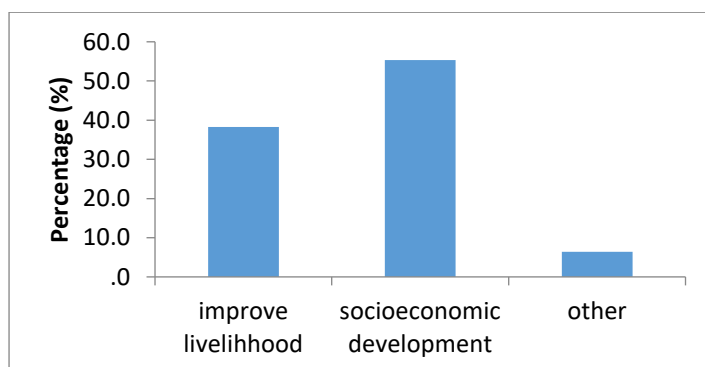


Figure 14: Purpose of water project

v) Project successful or failure?

Asked whether the past water projects were a success or a failure, a very high proportion (96.2%) mentioned that they were failed projects while only 3.8% mentioned that these water projects were successful.

vi) Why water projects failed?

Asked why the water projects failed, many said due to careless and vandalism (56.0%), 22% mentioned other reasons, 8.0% said lack of ownership shown by villagers, 6.0% mentioned no support from government, 6.0% also mentioned no support from the LLG and 2.0% indicated 'all' reasons in the questionnaire.

vii) Do you know people in community with technical skills?

Asked on the knowledge of technical persons in the village who have the skills regarding maintaining water projects, 87.0% of the respondents knew people with these skills and expertise, 3.9% said no and 9.1% did not know.

3.3 Sustainable Energy

3.3.1 Knowledge

i) Source of Energy

Regarding knowledge of energy, over sixty five percent (66.2%) noted firewood and solar as the major sources of energy in the communities. For lighting, 95.9% used solar lights while, battery and others made up the 4.1%.

On the use of energy, for cooking, firewood was the dominant fuel (98.0%) For lighting, solar use was the predominant source (95.9%), followed by other sources (2.7%). Portable generators were used for refrigeration (50%) while solar and 'other' uses recorded 25.0% respectively. Music and television and charging of mobile phones and boom boxes use was popular regarding the uses of energy. To power tools, the generator was used more by the respondents (60%) compared to solar (40%).

3.3.2 Attitude and Behaviour

i) Use Energy Effectively

On the issue of effective energy use, a very high percentage (96.9%) said they used electricity effectively while 3.1% did not know.

ii) Main Use of Electricity

The main use of electricity was lighting (87.7%), followed by cooking (10.8%) and music/TV/entertainment (1.5%) (Figure 15).

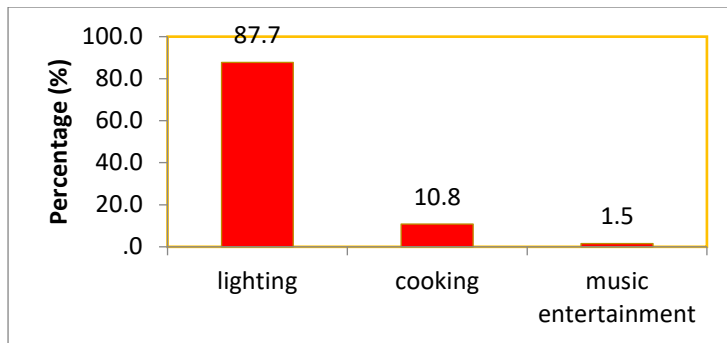


Figure 15. Main use of electricity

iii) Electricity good for community?

All the communities agreed that electricity is good for the community (100%).

iv) Why good for community?

When asked why electricity is good for the community, 36.9% mentioned to make the place safer, 33.8% to improve living standards, 19.2% indicated 'all' stated reasons and other reasons where all below 5% (Figure 32).

3.3.3 Practice

i) Importance of Energy for Health Centre

All the communities agreed that energy (electricity) is important and needed for the operation of the health centre.

ii) Health Centre

Asked why energy is important for health centre, 58.7% mentioned 'all' reasons stated in the questionnaire, 39.7% agreed for the need to sterilise and boil medical equipment such as syringes, 38.1% mentioned the importance preserving and cooling medicine and 30.2% indicated the need to treat patients in the night particularly emergency cases (Figure 33).

i) Energy Projects

On the knowledge of any project established in the communities in the past, 90.2% knew of a project established while 9.8% did not know.

ii) Purpose of Electricity Project

On the question of past electricity projects, 54.2% mentioned for socioeconomic development, 29.2% said to improve livelihood, 14.6% mentioned 'other' reasons and 2.1 % mentioned for 'all' reasons in the questionnaire (Figure 34).

iv) Project Successful or Failure

When asked on the past energy projects, a high proportion (80.9%) mentioned that they were failed projects while only 19.1% mentioned that these water projects were successful.

v) Why Project a Failure?

When asked why the energy projects failed, 45.7% said due to 'other' reasons besides those stated in the questionnaire, 28.3% indicated careless and vandalism or theft or bad attitude as a reason for failure, and 2.7% mentioned lack of technical training for local people to maintain the projects (Figure 16).

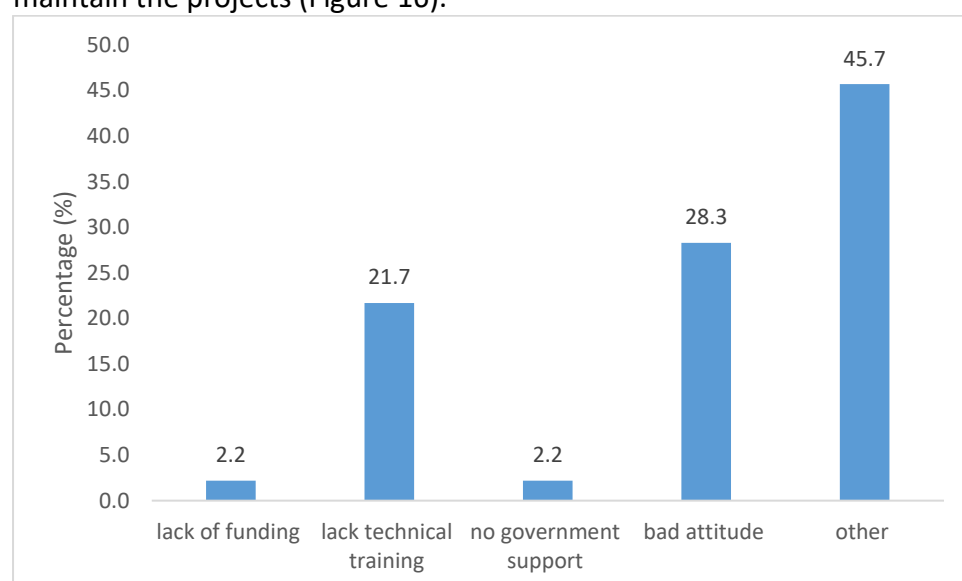


Figure 16: Reasons for the failure of energy project

vi) Do you know people in community with technical skills?

Over eighty percent (81.3%) stated that there were skilled people to oversee energy projects in the community while 8.0% said no and 10.7 did not know.

4.0 Summary and Conclusion

4.1 Climate Change

4.1.1 Knowledge

A large percentage (53.2%) of the community did not know or knew very little about climate change.

In most cases, they would have seen it through the news media but never took much notice of it. They also did not consider this as an issue that can be brought to the attention of the community councilor.

Over forty percent (41.7%) of the community noted sea level rise as the main sign that climate change is occurring and these were observed mainly by Keapara and Kalo residents. Respondents from Imuagoro mentioned drought as the most common sign for climate change.

For causes of climate change, majority of the respondents did not know the causes but rather mentioned the effects of climate change as causes. 50% of the respondents stated that drought is the main cause for changes occurring in climate patterns and levels with sea level rise second most common (16.7%).

4.1.2 Attitude and Behaviour

Nearly all the respondents (97.2%) agreed to the statement that the effects of climate change were real. They also agreed that climate change was causing problems in the community.

The signs of climate change were food shortage (55.9%), land problems (29.4%), and other minimal problems such as law and order and water shortage were also indicated as problems caused by this occurrence (Figure 23).

About half (47.1%) of those who know about climate change did not consider climate change as a serious problem although more than thirty percent (32.8%) stated otherwise. This indicated that only half of the population knew about climate change and its impacts (Figure 24).

The responsibility for addressing climate change was vested in local (41.2%) and national governments (26.5%) respectively. The village community (3.9%) and family (1.3%) were not highly considered as responsible for the issues of climate change.

4.1.3 Practice

As to the awareness, over seventy percent (74.3%) were not well-informed about climate change issues although they earlier said they knew about climate change. A similar percentage (65.7%) did not know where and how to receive information about climate change.

Of those respondents who knew where to obtain information on climate change issues (10), 70.0% mentioned CCDA while the LLG office, provincial government office and provincial government office all recorded a response of 10.0% each. This knowledge of where to obtain may have only emerged since the visitation of CCDA officials for launching of this project.

A large percentage (88.5%) noted an absence of awareness as well as education (11.5%) from the government. To combat climate change, of the 36 who knew about climate change, only 14 (38.9%) used measures to combat the negative effects of climate change using varies ways. The most common way of was through education and awareness (7.8%), while the rest of the responses were based on food security, gardening practices, sea walls and other suitable infrastructure.

4.2 Water

4.2.1 Knowledge

On the use of water, over ninety percent (93.5%) stated that they used water efficiently. Drinking (92.2%), cooking (5.2%) and washing (2.6%) were the uses. On average water was stored for three days before it was gathered again.

Nearly 70 percent (69.7%) noted clean water for cleanliness and health while less than sixteen percent (15.8%) was to improve village standards of living, reduce the women's load.

The main sources of water in Keapara was from wells and tanks while for Imuagoro, it was from tanks, spring, creek and other sources. For Kalo, the Kemp Welsh River provided the main source of water as well as water tanks for some households.



Figure 17: The source of the spring at Imuagoro

The distance to the water source for all communities' differed. For Keapara, it was 3 minutes while Imuagoro was half an hour and 7 minutes for Kalo.



Figure 18: Kemp Welch River, Kalo's main source of water

Daily water collection was 3.12 times. Although this would be higher during festive seasons and church meeting or social gatherings such as bride price. Water is ported by women in a bag or 'bilum' to the house except for a few (2.65) using wheelbarrows.



Figure 19: Water been ported from the river in Kalo

Besides women, children also assisted in carting water. Men assisted only on community occasions where large amounts of water were needed.

More than half (53.2%) of the community noted sickness to be caused by drinking or washing in these water sources although less than forty percent (36.4%) did not get sick from drinking or washing from these water sources and 10.4% did not know.

Water borne diseases noted by the communities sometime in their life were diarrhoea (82.9%), dysentery (12.2%) and typhoid (2.4%) Other diseases were malaria and fever.

Skin diseases as noted in the past from contact with water were grilles (34.1%), scabies (29.3%), other diseases (19.5%) and rashes (17.1%)

4.2.1 Attitude and Behaviour

As for knowledge, similar statistics were for the using of water efficiently (93.5%) while 5.2% did not use water effectively and 1.3% did not understand this question or did not know.

Similarly, drinking (92.2%), cooking (5.2%) and washing (2.6%) were the main uses of water. Likewise for knowledge, similar statistics were for clean water usefulness for cleanliness and health and reduced women's work

4.2.2 Practice

The health centre was an important infrastructure in the community and all respondents noted that water was imperative for its operation. It was important for patients (drinking & washing) - 53.2% as well as for the washing and cleaning of instruments and equipment.

The knowledge of past water projects were well known (88.3%) while only a few (11.7%) did not know. These were established for socioeconomic development (55.3%), improve livelihood (38.3%) and for other reasons (6.4%).

The past water projects were a failure (96.2%) while only 3.8% mentioned that they were successful. The projects failed from carelessness and vandalism (56.0%) and other reasons (23.8%). Lack of ownership by villagers (8%) and well as no support from government and LLGs (6.0%).

For skilled persons in the community for water maintenance, 87.0% knew about these persons and 3.9% said no and 9.1% did not know.

4.3 Sustainable Energy

4.3.1 Knowledge

Over sixty five percent (66.2%) noted firewood and solar as the major sources of energy in the communities. For lighting, 95.9% used solar lights while, battery and others made up the 4.1%.

Firewood was also the dominant fuel (98.0%) and solar recorded 2.0%. For refrigeration, generator was used by 50% of the respondents while solar and 'other' uses recorded 25.0% respectively. Half of the community (50%) played music and watched television while charging mobile phones and boom box and solar according for 30.0% of that number while the generator accounted for 20.0%. Powering tools used the generator (60%) compared to solar (40%).



Figure 20: Solar panel on roof to power the TV reception disk in Keapara

4.3.2 Attitude and Behaviour

Nearly everyone in the community (96.9%) used electricity effectively while 3.1% did not know. Lighting accounted for 87.7%, cooking (10.8%) and music/TV/entertainment (1.5%). Electricity was also unanimously agreed to be essential for a community.

Electricity is essential for the community as it made the place safer, (36.95), improved living standards (33.8%) while 19.2% indicated 'all' stated reasons as noted in the questionnaire.



Figure 21 Solar street light in Imuagoro

4.3.3 Practice

Likewise for water, the communities reiterated that energy (electricity) was important and imperative for the operation of the health centre. It provided for the sterilization of the medical equipment and syringes (39.7%), preserving and cooling medicines (38.1%) and to treat patients at night such as the emergency cases (30.2%). A cumulative total of 58.7% also stated 'all reasons' in the questionnaire.

The knowledge of past energy in the communities were well known (90.2%) while only a few did not know. These were established for socioeconomic development (54.2%), improve livelihood (29.2%) and for other reasons (16.7%).

The past energy projects were a failure (80.9%) and only 19.1% stated were successful. The projects failed from 'other reasons' (45.7%), carelessness and vandalism (28.3%) and lack of technical training to maintain the projects (2.7%).

There are technical and skilled persons in the communities as stated by 81.3% while 8.0% said no and 10.7% of the community were not sure.

5.0 Focus Group Discussions

Focus Group Discussions

The discussion of the Focus Group Discussion (FGDs) reiterated the outcomes of the survey. The key issues are stated here under the sub-themes of the survey: climate change, water supply and sustainable energy. Special concerns was another area that is stated here.

Climate Change

When people in the three communities were asked on whether the issue of climate was recognised as a problem faced by the community today, many responded positively stating that this was a major concern and that it was real and affecting the livelihoods of the local people. The most common signs of this phenomenon were that of continuous sea level rise, droughts, and soil erosions, flooding and hot temperatures.

Many also mentioned about the small yields of produce they harvested from their gardens, the reducing size of coconuts and betel nut, the changing tastes of fruit and nuts and the irregular seasons and climatic patterns they noticed now.

In addition, they mentioned that the dry and wet seasons were now irregular and fruiting seasons for mangoes and other fruit trees were also irregular. Although this was their main concerns, many of the villagers interestingly did not know what the phenomenon of climate change is.

As reiterated by a woman church representative that climate change is not an issue because it is a natural process and she saw no problem with this. According to her ***“this is a natural process and we do not have much control over these processes. It is God’s business”***.

Others also mentioned that they noticed the rising sea levels and the washing away of the shoreline and the long periods of drought as problems more commonly faced today than before however could not explain the causes of these natural occurrences.

The washing away of the cemeteries in Alukuni village (an adjacent village next to Keapara), the social and health consequences on the communities and the contamination of the water wells that people use for drinking and washing were some of the major concerns that were raised especially in Keapara.

Only a number of the respondents such as teachers and health workers stated that they recognized these occurrences as the direct effects of climate change that they learnt from the media and through their professional work and networks they have as teachers.

When asked about ways in which these problems could be minimised or solved, many of the respondents did not know. These were mostly the youths, women and elderly. In general, men were quite well informed in this regard due to the positions they held in community organisations both government (public) and non-government (church, civic society).

Groups in which men were active such as LLG and various village committees, they could identify with such problems and therefore provide suggestions for minimising these climate-change-problems. Many participants suggested useful ways such as building sea and river walls, jetties, new irrigation systems for agriculture, introducing drought resistance crops such as African yams, growing grass and sprinkling water on sand to stop dust, use of dung for bio-energy and solar power generation that could be utilised in reducing these problems.

Although many of the respondents saw these mechanisms as not viable such as seawalls and river walls, others they believed had potential in minimising these problems through external funding and technical assistance from international donor organisations.

As highlighted by a former community ward councillor, ***“projects that are established and funded by international donors such as the UN, EU, AusAID, USAid and so on should meet the needs of the local people and in the long run (after the lifecycle of the project) should be owned and operated by the local people for the future. This in many cases is not what happens”.***

In terms of actions that communities can take in mitigating these problems, many suggestions were made. However, these suggestions were mainly made by people who were exposed to the media or other external sources of information or were people in positions that required some knowledge of these issues. These included mainly teachers, health workers, ward councillors and former or retired public servants.

Others did not know about climate change issues and its relevance and relationship to their current natural, physical and socioeconomic conditions. These were mainly the marginalised in communities such as women, children, youths, disabled and the elderly people. On the issue of mitigation, a number of teachers made suggestions of having community awareness on the topic of climate change and also integrating this topic into their school curriculum and taught with examples from a local context.

Many participants in the FGDs agreed that having more awareness on climate change would be very useful and helpful for the local people. A teacher suggested having more community programs to include tree planting, mangrove planting, food security, making of fire and the importance of having access to clean drinking water. He further made a strong remark stating that ***“we need more awareness on climate change to teach our village people and children about its causes and impacts for now and the future generations. I am quite worried knowing that the drought and sea level rise and hot temperatures will continue. What will become of our future?”***

Water Supply

When people in the three communities were asked whether water is a real need for them, many responded positively stating that this is a major concern and that it is greatly affecting the livelihoods of the local people today with the unpredictable changes in the climatic patterns of the world. In all communities, everyone agreed that it is hard work to look for and

collect clean water especially during dry seasons. The distance to water sources was also highlighted as a major problem to some especially those in Imuagoro village where it took about 20 minutes on average to get to the water source. A woman participant stated that ***“the task of carrying water was a hard work – done every day”***. She further mentioned that ***“it is women’s work to collect water as this is the cultural way of life – women use water to cook, clean the dishes and wash clothes. Men have other things to do. They do not carry water”***.

The issue of dirty and contaminated water was a concern raised during the FGDs. It was suggested that animals especially pigs should be kept in fences and away from water sources. This point was reiterated by a health worker who advocated having more and continuous community awareness programs on cleanliness of village communities. She strongly commented that ***“pigs and other animals should be kept in fences and away from water sources. Having a clean supply of water every day is healthy for the community. This includes having proper toilets and clean and healthy habits of living”***.

As seen from the FGDs, water fetching and transportation is hard work and in all these communities this task is seen as a female’s daily chore. Many villagers protested that water should be supplied to all households for consumption. In this way everyone’s needs (including persons with disabilities and the elderly) are met and individual people or households take full ownership of the usage and consumption of water responsibly. A youth representative mentioned that ***“we are tired of carrying heavy loads of water every day. Water should be supplied to our houses. That will be good and it will make life easier for us”***.

A participant strongly commented that in the past, water and other development projects that were established in the village were without proper community consultation and as a result failed due to technical, logistical and community issues. For example, he mentioned that the PVC⁷ pipes were clogged with mud and created a blockage in which there was no technical expertise to rectify the situation.

Furthermore, he stated that due to the lack or improper community consultation and suspicion, many people were not happy with the project. In his own words he mentioned that ***“people deliberately meant to spoil the project by stealing PVC pipes and solar and other equipment that were installed. This was bad but maybe it is a result of people not been given the opportunity to own the project”***.

Besides this reason, other reasons for the failure of past projects also emerged regarding that of mismanagement. A particular case was in the distribution of water tanks and the houses that were selected for these tanks to be situated did not go down well with many villagers. People whose houses these tanks were placed gradually became owners of the tank and did not allow the community to use these tanks.

Ownership of these tanks became individual or household-owned rather than for the community. These created tension, suspicion and conflict in the community and thus as a result similar projects were not encouraged since then.

⁷ Polymerizing vinyl chloride - plastic

Regarding the payment of this service, the general view was for the community to own this project and manage and facilitate the operation, maintenance and sustainability of this project. Now that the IWASE project has been launched and the KAP survey carried out, the issue of ownership and maintenance has emerged, with all communities taking the initiative to set up special committees to be responsible for these issues. Many participants echoed similar sentiments on this issue of having a local committee to be responsible for the management of the water project.

One ward councillor stated clearly that they would establish under the leadership of the ward councillor to manage this resource. He further reiterated that ***“giving the responsibility for the local community to manage the water project would be good so that we can own and have a say in the management of the project. If it fails it is our fault – if it succeeds it our hard work and pride”***.

A church leader also mentioned that it could also be managed under the church management system as the church was very dominant in these communities and people are more obedient and engage more in church activities than other activities that occur in the community.

Sustainable Energy

When people in the three communities were asked whether electricity is a real need for them, many responded positively stating that this is a major concern and that it is greatly affecting the livelihoods of the local people today in terms of lighting, refrigeration and storage of fresh produce. The main concern is that sustainable energy is greatly needed to improve the livelihoods of people in these villages.

The main purpose was for street lighting in the community to minimise stealing, vandalism, alcohol and other law and order problems. A woman participant commented that ***“it is no longer safe for women and children now to roam freely at late hours of the night as there were plenty young men who drink and take drugs. It is good to have street lights”***. Another elderly person clearly commented on this issue that ***“it will be good to have street lights because many people are still fearful of sorcerers and evils spirits”***.

Other concerns and needs for electricity were also raised including providing lighting for the schools, aid posts and refrigeration for storing fish and other marine products. Although lighting is important for studying (not only for school students but also church workers and anyone who reads and uses the internet for sourcing information), it clearly showed from the FGDs that many people were not aware of electricity and its relevance to these specific people and the aspects of education and knowledge.

Most concerns were mainly focussed on economic and other social needs. These included the need for goods to be preserved and frozen for sale or later use (as highlighted by many especially people who had business interests or those who are fishermen) and for medical purposes.

A businessman mentioned that he is currently using a generator for refrigeration but having a consistent supply of sustainable electricity will boost his business and reduce costs in operating a generator set. A community representative mentioned that fishermen will greatly benefit from having electricity in that that can store their fresh marine produce and sell at a later date without the products going bad very quickly.

For the health sector, there is a great need for electricity as highlighted by a community health worker, ***“aid posts or health centres need a consistent supply of electricity to sterilise medicine and also sterile syringes and treat patients at night especially those in emergency cases such as snake bites which is common here and delivery of babies. Without these it makes it very difficult for us to work effectively and may also lead to death of patients”.*** This was the case at Keapara.

Like water, all participants in the FGDs agreed that electricity should be supplied to all households and in regard to everyone’s needs including persons with disabilities, children and the elderly people. Many participants protested that electricity should be supplied to all households for their daily use. In this way everyone’s needs including persons with disabilities are met and individual people or households take full ownership of the usage of electricity responsibly.

A youth representative mentioned that ***“we need a good supply of electricity to study and do our homework and charge our mobile phones for communication”.***

Regarding past electricity projects in the communities, the most recent being the solar lighting project funded by Kila Haoda in 2015, have not proven successful due to many reasons. One of which is common and highlighted in the report as similar to that of water and other development projects that have been established in these communities in the past is the concept of ownership.

Other reasons include vandalism, law and order, lack of technical training, lack funding issues, lack of government support and also lack of community support. One retired senior public servant mentioned that ***“when development projects are owned by local communities by way of consultation, management (using local management structures), capacity building and education and tangible benefits seen from these projects, there is a bright future..... Everyone needs to participate in development processes of a community. We are the starting and ending point of development”.***

Special Concerns

Other special concerns in regard to persons with disabilities and the elderly were also raised in the survey. These included concerns mainly relating to accessibility, affordability and sustainability of water and electricity.

A respondent with disabilities highlighted the difficulties of having access to water and electricity. He raised the concern that ***“disabled people are usually ignored in the community in terms of having easy ways to drink water, wash and toilet. As persons with disabilities,***

they also need to get their phones charged, see television". He further stated ***"that persons with disabilities should and enjoy life like another person"***.

This means making these services to the houses so that people like him will not have problems in accessing these services. Other concerns regarding this issue were also raised such as designing and building houses that could cater for easy accessibility and also having these structures that could be sustained for a long period of time. Elderly persons in most communities also shared similar sentiments.

6.0 Conclusion

The findings from the KAP survey on the knowledge, attitude and practice of the local people in regard to climate change, water and energy use and consumption are as follows:

- All three communities are homogenous in their culture, religion, geography and therefore results from the survey for all communities were quite similar.
- The church is a very dominant and active partner in service delivery, implementing government policies and projects and therefore must be involved in development projects including the IWASE Project.
- The Ward Development Committees will also need capacity support to better manage new projects
- A high proportion of the community did not know about climate change issues.
- The community agreed on an urgent need for water and energy projects to be established in the communities.
- All respondents wanted water and electricity to be provided to their houses.
- These projects should benefit not only able-bodied persons but should also be inclusive of the needs of old people and also persons with disabilities.
- Women fetched water and this was burdensome.
- Energy used was mainly for lighting, refrigeration and cooking.
- Community lighting is essential for safety, it will reduce vandalism and clear out the fear of sorcery practices.
- Very few respondents mentioned the need for students to study during the nights or use this to broaden their education (internet, laptop use etc.).
- Past water and other projects to be fully investigated to enable better installation and management of projects.

In conclusion, the project through CCDA and all stakeholders must strengthen awareness programs on the thematic areas and campaigns in the targeted communities. In addition, clear roles and responsibility for the project on the part of households, communities, LLGs and provincial government assistance must be defined.

The synergies of economic activities such as fishing and agriculture together with the project will improve the lifestyle of the community. In addition, improved road infrastructure (for Imuagoro and Kalo) will provide effective accessibility to urban markets for the communities.

7.0 Recommendations

The recommendations are presented here and can be explored as part of future projects and are not in any order of priority.

7.1 Climate Change

- Awareness on climate change its causes and impact on the community such as food security is urgently needed in the communities.
- The communities require education on climate change and its relationship to water, energy and use and vice versa
- Adaptation and mitigation measures for climate change such as possible mangrove planting are urgently needed for the communities

7.2 Water Supply

- Increased awareness on water sources, use and consumption behavior and patterns is urgently needed in the communities.
- Appropriate measures must be put in place for water consumption, payment and management of project
- Water if possible to be supplied to all households (including those with disabilities), schools and health centres
- Need for identification of local persons to be trained in maintaining system.

7.3 Sustainable Energy

- Awareness on energy source and consumption behaviour and patterns is urgently needed in the community.
- Appropriate measures must be put in place for energy consumption, payment and management of project.
- Electricity if possible to be supplied to all households (including people with disability), schools and health centres.
- Local experts must be trained to maintain installed system
- Repair and technically enhance recent installations of street lights in Keapara and Imuagoro.



Figure 22: Solar panel need to be re-orientated to face the north

7.4 Project implementation

- In the implementation and management process, the United Church must be involved.
- Capacity support for the proposed Ward Development Committee to better manage new installation.
- Past water and energy projects need to be fully investigated to enable better installation and management of new installations.

References

NRI, 2010, Papua New Guinea Provincial and District Profiles, National Research Institute, Port Moresby.
NSO, 2011, National Population & Housing Census 2011, National Statistical Office, Waigani, Port Moresby.

Annexes

Annex 1	Figures from the KAP Survey
Annex 2	Structured Questionnaire for Household Survey
Annex 3	Semi-structured Questionnaire for Focus Group Discussions

Annex 1: Figures from the KAP Survey

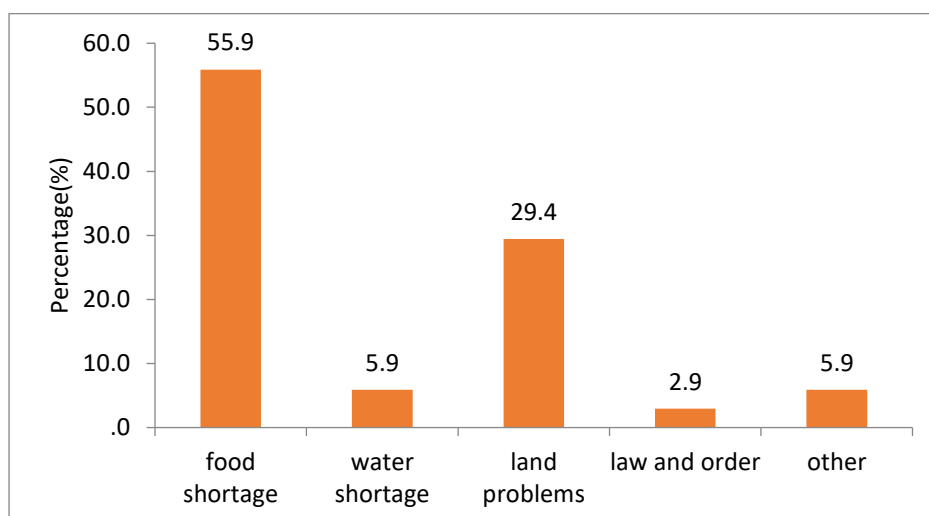


Figure 23. Problems of Climate Change

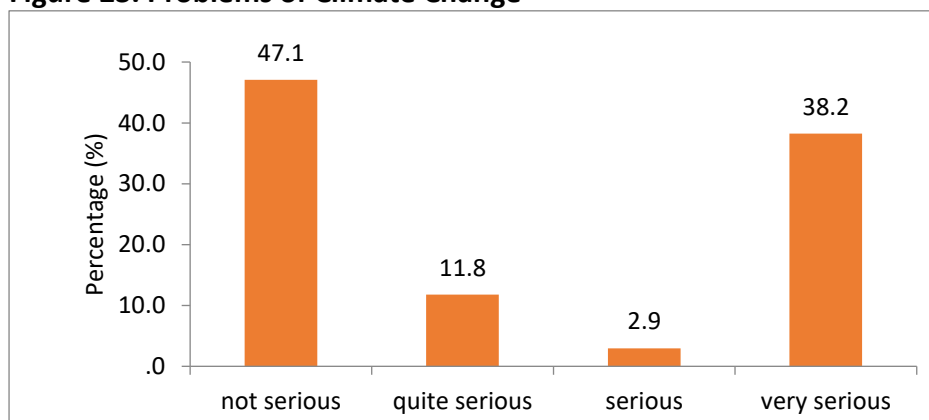


Figure 24: Seriousness of Problem

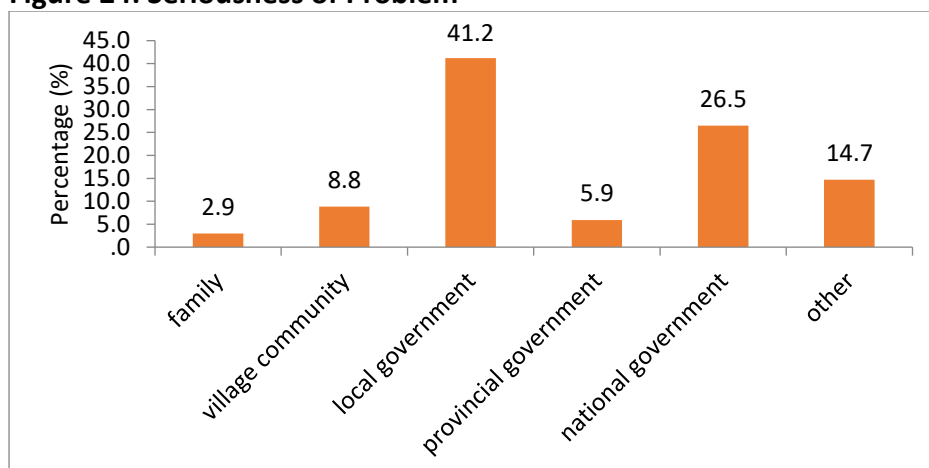


Figure 25. Responsible for Climate Change issues

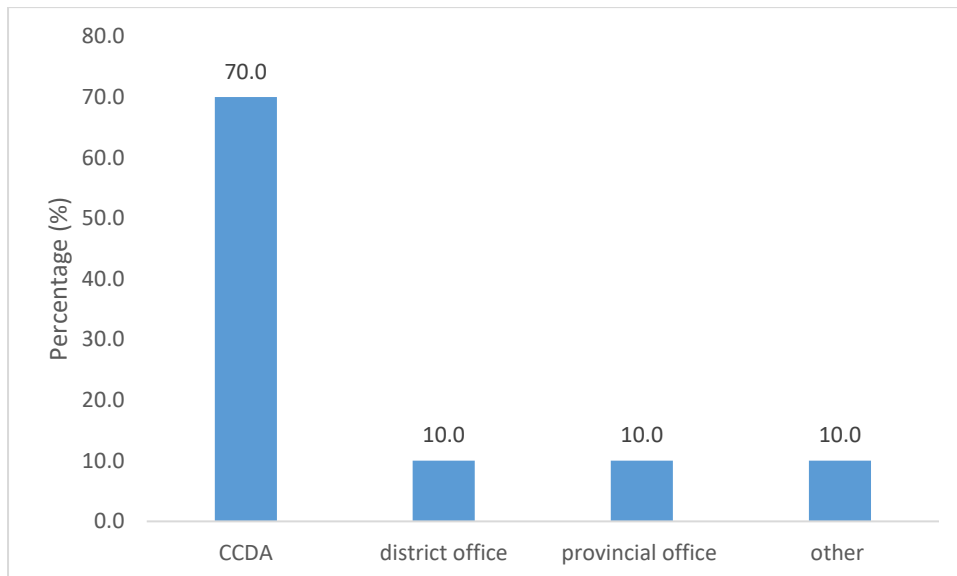


Figure 26. Place to receive Climate Change information

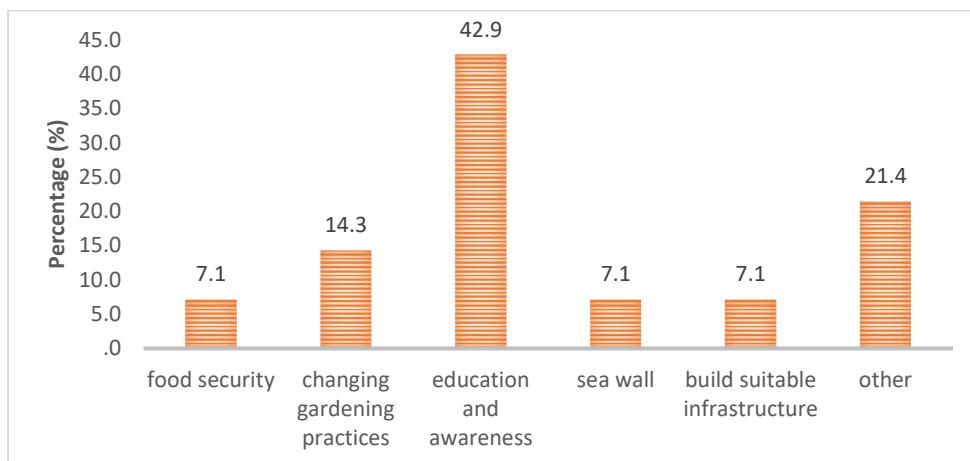


Figure 27. Measures known and used to combat negative impacts of Climate Change

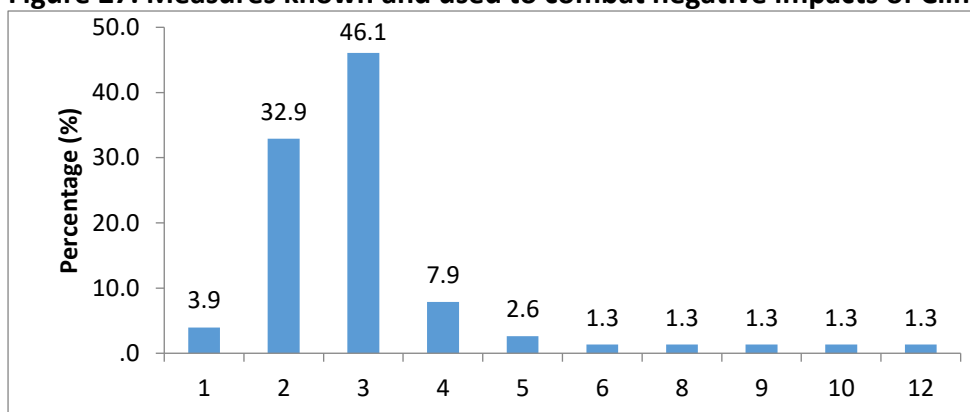


Figure 28: Times water fetched per day

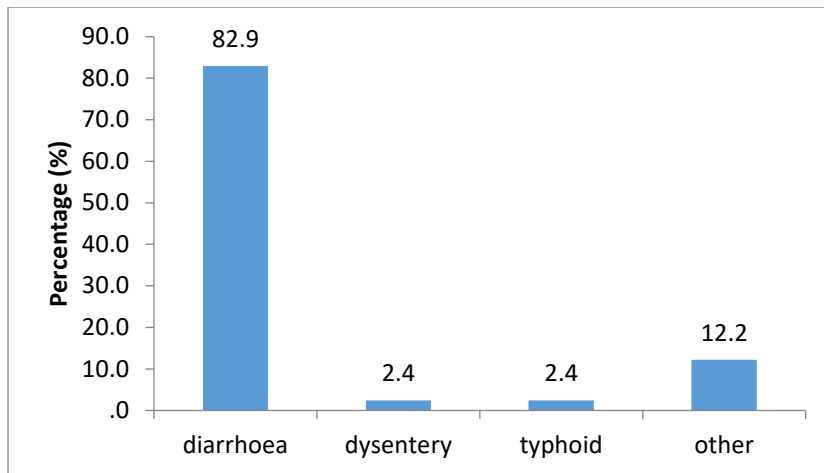


Figure 29. Diseases from drinking water

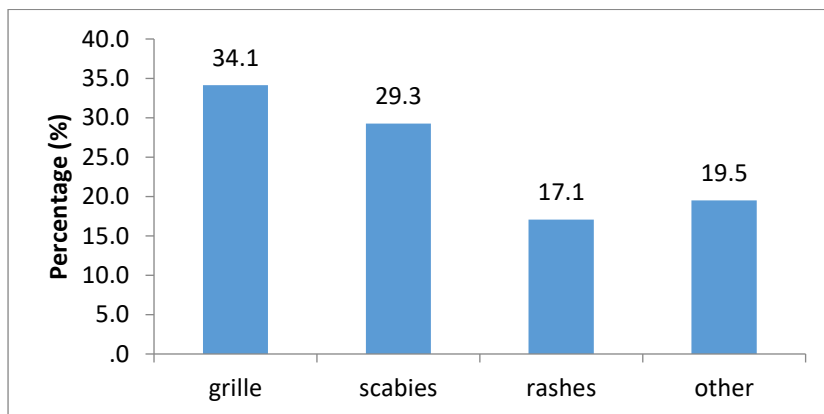


Figure 30: Skin diseases from washing

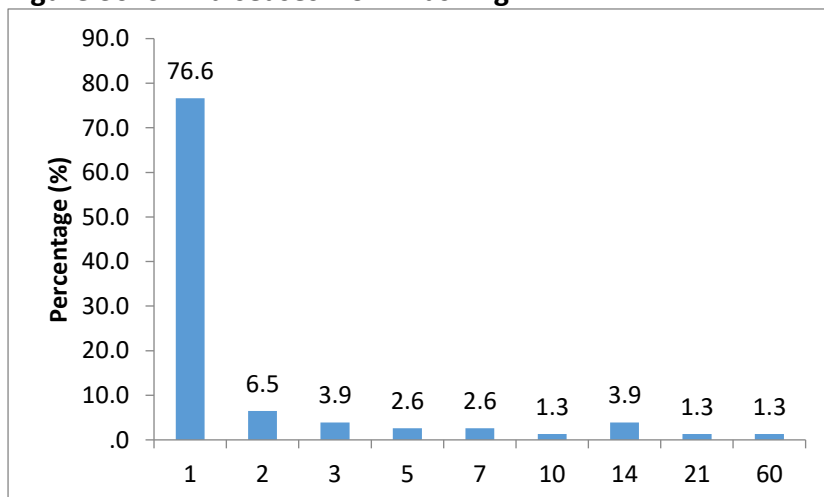


Figure 31: Duration of water storage

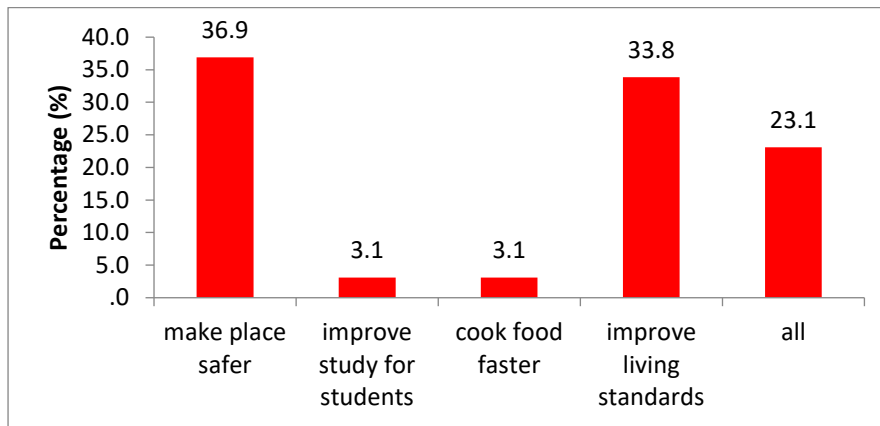


Figure 32: Benefits of electricity to the community

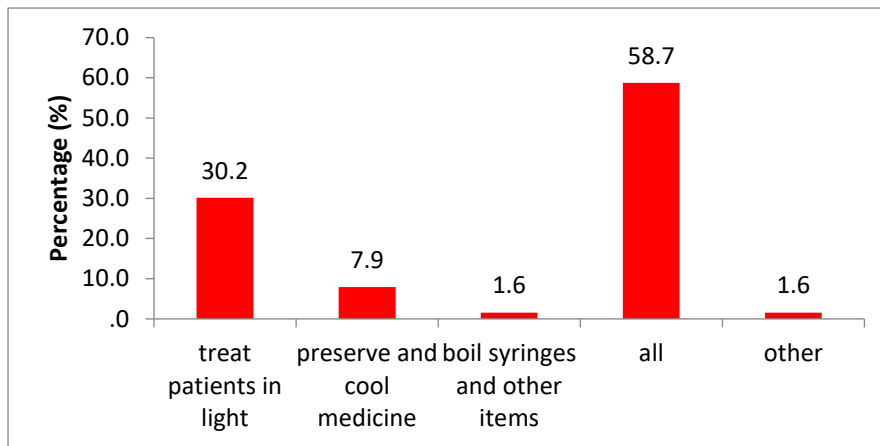


Figure 33: Importance of Electricity to Health Centre

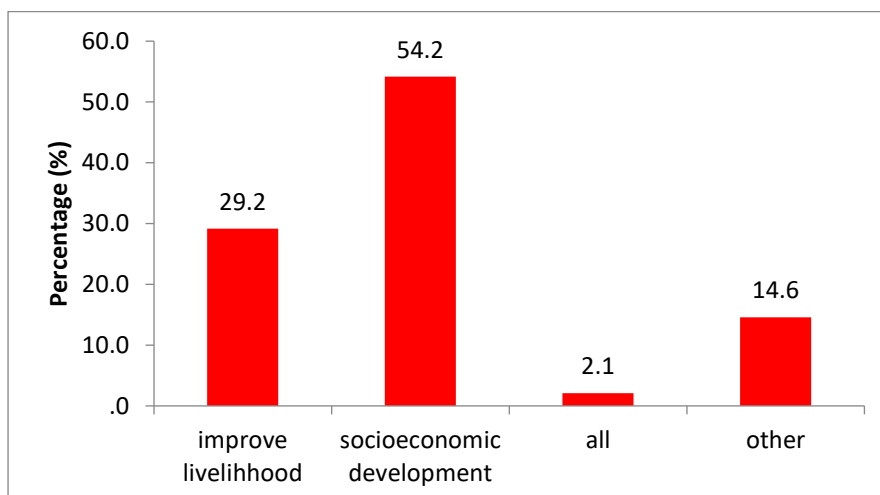


Figure 34. Purpose of Electricity project

Annex 2: Survey Questionnaire

KAP Survey for the Water-Energy Integrated Project in Rigo District, Central Province

QUESTIONNAIRE

Village: _____

Household No: _____

15th July 2017

**KAP Survey for the Water-Energy Integrated Project in Rigo District,
Central Province**

Survey Objective:

To explore Water-Energy related knowledge, attitudes and practices among the people of Kalo, Keapara and Imuagoro Villages in the Rigo District of Central Province.

Base Data Collection**Date:****Village:****Information to read to respondents:**

We wish to learn about your knowledge, attitudes and practices to climate change, water supply, lighting and refrigeration systems. We would like to find out and understand your needs and the best way to bring information to you as well as barriers to these projects. The information you will provide for us will be used to assist us in efficiently implementing these projects to meet your needs as much as possible and improve your livelihoods.

Your answers to our questions will not be released to anyone and kept strictly confident and used only for the purposes of this study. Your name and personal details will be kept anonymous. Your participation in this survey is voluntary and you may choose to stop the interview at any time if you are not happy to continue.

Thank you so much for your time and we look forward for a good interview.

Interviewer:

Place a X in the box of the selected answer(s).

Do not read responses unless given the directions to do so.

1 July, 2017

Check:

Check Date:

Section A: Demographic and Socioeconomic Background

1. Name of Household Head: First Name/Surname: _____

2. Are you the Head of Household?

1. Yes ☐

2. No ☐

3. Demographics

No	Name	Relationship to head	Sex	Year of Birth	Province of Birth	Highest education achieved
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Coding:

Relationship to Household Head:

1. Spouse
2. Child
3. Grandchild
4. Affinal Relative
5. Marriage Relative (tambus)
99. Other

Gender:

1. Male
2. Female

Highest Education:

1. No education
2. Primary
3. Vocational
4. Secondary
5. Technical
6. Upper Secondary
7. Tertiary (university)
8. Postgraduate
9. Religious schooling only
10. Literacy classes only

4. Total number of people living in your house: _____

5. Employment Status (Paid):

1. Schooling
2. Not Employed
3. Self- Employed
4. Employed
66. Not Applicable

Type: _____

Occupation: _____

6. If not employed (with regular paid job) source of income/economic activity:

1. Subsistence (farmer/gardener)
2. Subsistence (fisherman)
3. Subsistence (hunter)
4. Subsistence (all/both)
99. Subsistence (other)

Specify: _____

7. Number of people formally employed? _____

Name	Occupation	Company/Org	Location	Pay per fortnight (K)
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

Total Income per fortnight (K): _____

Average net pay per fortnight (K): _____

8. Number of people in informal employment: _____

Name	Type of Activity	Location	Takings per day (K)
1.			

2.			
3.			
4.			
5.			
6.			
7.			
8.			

Total amount of takings (K) for household per day: _____

Average daily takings (K) for household per day: _____

15. Number of unemployed household members (above 15 years old)? _____

Name	Currently schooling (Yes/No)	Name school/location
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Section B: Climate Change

Section B.1 Knowledge

16. Do you know about climate change and its impact on the environment/communities?

1. Yes (go to question 17 to 41)
2. No (go to question 41)

17. If yes, where did you learn about climate change?

1. Local Councillor
2. School
3. Media (TV/Radio)
4. Print Media (newspaper)
5. Church/Fellowship
6. Government (CCDA)
7. Colleagues, friends/relatives (communication)
8. Books/Magazines etc
99. Other specify: _____

18. What signs of climate change you know/observed in your village or outside?

1. Sea Level Rise
2. Flooding/Heavy Rainfall
3. Drought/Dry Spell
4. Humidity/Hot
5. Dew/Mist

99. Other specify: _____

19. What causes of climate change you know/observed in your village or outside?

1. Sea Level Rise
2. Flooding/Heavy Rainfall
3. Drought/Dry Spell
4. Humidity/Hot
5. Dew/Mist
6. Global warming
7. Pollution from Industrialised countries

99. Other Specify: _____

20. What are some of the effects of climate change you know/observed in your village or outside?

Physical

1. Washing away of shoreline
2. Water level low
3. Long/short season of drought/flood
4. Irregular seasons (flowering etc)

99. Other Specify: _____

Socioeconomic

1. Food Shortage/Hunger
2. Water Shortage
3. Sickness
4. Law & Order
5. Psychological Disturbance/Stress

99. Other Specify: _____

21. Do you know some measures that can be used to combat the negative impacts of climate change?

1. Yes *(go to question 22)*
2. No *(go to question 23)*
3. Don't know *(go too question 23)*

22. What are some of the measures that you know of that can be used to combat the negative effects of climate change?

1. Food Security
2. Changing Gardening Practices
3. Education and Awareness

4. Incorporate Indigenous Knowledge
5. Emergency Plan
6. Culling Odd Weak Livestock for Food
7. Shift to Hunting Practices
8. Sea Wall
9. Wind Mills
10. Out-Migration
11. Build Surveillance
12. Build Suitable Infrastructure
13. Suitable Energy Source
14. Suitable Water Source
99. Other

Specify: _____

Section B.2 Attitude and Behaviour

23. Do you think the effects of climate change are real to your community?

1. Yes
2. No

24. Do you think the effects of climate change are important to your community?

1. Yes *(go to question 24)*
3. No *(go to question 33)*
2. Don't know *(go to question 33)*

25. Do you think these effects are negatively affecting your community now?

1. Yes *(go to question 26)*
2. No *(go to question 33)*
3. Don't know *(go to question 33)*

26. Do you think this is causing problems in the community?

1. Yes *(go to question 27)*
2. No *(go to question 33)*
3. Don't know *(go to question 33)*

27. If yes, what problems?

1. Food shortage/food security
2. Water shortage
3. Sickneses
4. Land problems
5. Stealing/Arguments (law and order)
6. Resettlement/migration/displacement
99. Other

Specify: _____

28. How serious do you think the problem is?

1. Don't know
2. Not serious

3. Quite serious
4. Serious
5. Very Serious

29. Do you want to talk to someone about this problem?

1. Yes *(go to questions 30 to 32)*
2. No *(go to question 32)*
3. Don't know *(go to question 32)*

30. If yes, who would you talk to about these negative impacts of climate change affecting your community?

1. Family members
2. Village Chief/Elder
3. Local Councillor
4. Priest/Pastor
5. Church/Fellowship
6. Teacher
7. Health worker/nurse
8. Family/Friends in Town
9. CCDA official or any relevant government official
99. Other

Specify: _____

31. Do you think they would help?

1. Yes (why) _____
2. No (why) _____
3. Don't know

32. Whose responsibility do you think it is to deal with such issues?

1. Family/Household
2. Village Community
3. Church
4. Local Government
5. Provincial Government
6. National Government
7. NGOs
99. Other

Specify: _____

Section B.3 Practice

33. Do you feel well-informed about issues of climate change?

1. Yes *(go to question 35)*
2. No *(go to question 34)*
3. Don't know *(go to question 38)*

34. If no, do you think you need to know more information about climate change?

1. Yes *(go to question 35)*

- 2. No (go to question 38)
- 3. Don't know (go to question 38)

35. If you want to know more information about climate change, do you know where and how you can receive information about climate change?

- 1. Yes (go to question 36)
- 2. No (go to question 37)
- 3. Don't know (go to question 38)

36. If yes, where would you go to receive this information?

- 1. CCDA Office
- 2. District Office
- 3. Provincial Office
- 4. School
- 5. Church
- 6. Other

Specify: _____

37. If no, why do you think you do not know where to go to get information on climate change?

- 1. No awareness from government
- 2. No education on issue
- 3. Ignorant attitude and behaviour
- 4. Not my problem
- 99. Other

Specify: _____

38. Do you worry about the impacts of climate change in your village or community?

- 1. Yes (go to question 39)
- 2. No (go to question 40)
- 3. Don't know (go to question 40)

39. If yes, what worries do you have about climate change?

- 1. Washing away of land
- 2. Food shortage
- 3. Water problem
- 4. Drought
- 5. Flooding
- 6. No land
- 7. Resettlement/Migration
- 99. Other

Specify: _____

Section C: Water Supply

Section C.1 Knowledge

40. What is the main source of water you obtain water from?

- 1. River
- 2. Creek

3. Water fall
4. Swamp
5. Well (bore water)
6. Water tank
99. Other

Specify: _____

41. What do you mainly use water for?

1. Drinking
2. Cooking
3. Washing/Bathing
4. Laundry
5. Cleaning
6. Watering garden
7. Toilet
99. Other

Specify: _____

42. How far is the water source from your house? _____ (minutes by walk)

43. How often do you fetch water? _____ (per day)

44. How many times do you fetch water per day from this source? _____ (per day)

45. How do you normally transport water from the water source to your house?

1. Carry and walk
2. Wheelbarrow
3. Vehicle
99. Other

Specify: _____

46. Who usually carries water from the source area to the house?

1. Women
2. Girls
3. Men
4. Boys
5. Children
6. All

47. Is the water source clean?

1. Yes
2. No
3. Don't know

48. Have you suffered from any diseases caused by *drinking* or *washing* from this water source?

1. Yes
2. No
3. Don't know

49. If yes, what diseases did you get from *drinking* from this water source?

1. Diarrhoea
2. Dysentery
3. Typhoid
4. Cholera
99. Other

Specify: _____

50. If yes, what diseases did you get from *washing* in/from this water source?

1. Grille (sipoma)
2. Scabies
3. Thick skin
4. Rashes
99. Other

Specify: _____

Section C.2 Attitude and Behaviour

51. Do you think you use water effectively?

1. Yes
2. No
3. Don't know

52. In terms of the usage of water, rank these in order of importance to you? (Rank top 3 and show in the answer box).

1. Drinking
2. Cooking
3. Washing/Bathing
4. Laundry
5. Cleaning
6. Watering garden
7. Toilet

53. How many times do you use water per day/what time of the day? (morning/midday/afternoon/evening/night)

Use	Times per day	Time of the day
Drinking		
Cooking		
Washing/bathing		
Laundry		
Cleaning		
Watering garden		
Toilet		

54. How long does it take for the household to use all the water stored/fetched?
_____ (days)

55. Do you think it is good to have clean and available water for each household and the community?

1. Yes *(go to question 56)*
2. No *(go to question 57)*
3. Don't know *(go to question 57)*

56. If yes, why do you think so?

1. Cleanliness and health
2. Save cost of time and labour
3. Improve village standard of living
4. Help women from hard work
99. Other

Specify: _____

Section C.3 Practice

Health Centre and Human Capacity

57. Do you think it is important to have a good water supply and source for the health centre?

1. Yes *(go to question 58)*
2. No *(go to question 59)*
3. Don't know *(go to question 59)*

58. If yes, why do you think so?

1. Patients drink/wash/laundry using clean water
2. Medical instruments are washed in clean water
3. Health centre is clean with clean facilities
99. Other

Specify: _____

59. Was there any water supply project established in your village in the past?

1. Yes *(go to question 60)*
2. No *(go to question 62)*
3. Don't know *(go to question 62)*

60. If yes, do you know some information about the project?

1. Yes *(go to question 61)*
2. No *(go to question 62)*

61. If yes, what information do you know about the project?

Item	Know - Yes/No	Information
What project?		
Funding organisation		
Year		
Purpose		
Failure or success?		
Why failure/success?		

62. For the maintenance, operation and sustainability of the water supply project, it is important to have skilled personnel such as plumbers. Do you have people in the village with these skills?

1. Yes
2. No
3. Don't know

63. What do you think should be done for the project(s) to be successful or sustainable?

Section D: Electricity, Lighting and Refrigeration

Section D.1 Knowledge

64. What source(s) of electricity/energy do you have or use? (Tick more than one answer if you have or use these at home).

1. Fuel-wood/firewood
2. Charcoal
3. Solar
4. Generator
99. Other

65. What specific electricity energy do you use for:

1. Lighting: _____
2. Cooking: _____
3. Refrigeration: _____
4. Music/Entertainment/TV: _____
5. Powering electrical tools/workshop: _____
6. Others: Specify: _____

66. Do you know about rural electricity?

1. Yes
2. No
3. Don't know

67. Why do you think electricity is important to you?

1. Lighting
2. Cooking
3. Refrigeration
4. Music/Entertainment/TV
5. Powering electrical tools/workshop
6. All
99. Other

Specify: _____

68. Do you want electricity (lighting) for your house?

1. Yes *(go to question 69)*
2. No *(go to question 70)*
3. Don't know *(go to question 70)*

69. How do you think having electricity (lighting) will benefit your household?

1. Safety for all
2. Efficiency and convenience
3. Study improvement for children schooling
4. Improve standard of living
99. Other

Specify: _____

70. Do you want electricity (street lighting) for your community?

1. Yes *(go to question 71)*
2. No *(go to question 72)*
3. Don't know *(go to question 72)*

71. Why do you think electricity is important for the community?

1. Lighting
2. Cooking
3. Refrigeration
4. Music/Entertainment/TV
5. Powering electrical tools/workshop
6. All
99. Other

Specify: _____

72. How do you think having electricity (lighting) will benefit your community?

1. Safety for all
2. Efficiency and convenience
3. Study improvement for children schooling
4. Improve standard of living
99. Other

Specify: _____

73. Do you think it is important for the health centre to have electricity?

1. Yes *(go to question 74)*
2. No *(go to question 75)*
3. Don't know *(go to question 75)*

74. Why do you think it is important for the health centre to have electricity?

1. Lighting
2. Refrigeration -cooling and preservation of medicine
3. Boling of syringes and other items

99. Other

Specify: _____

Section D.2 Attitude and Behaviour

75. Do you think you will use electricity effectively?

1. Yes
2. No
3. Don't know

76. What do you use electricity mainly for? (Indicate top rank 3 responses in the answer box).

1. Lighting
2. Cooking
3. Refrigeration
4. Music/Entertainment
5. Powering electrical tools (workshop etc)

99. Other

Specify: _____

77. How many times do you think you will use electricity per day/what time of the day? (morning/midday/ afternoon/evening/night).

Use	Times per day	Time of the day
Lighting		
Cooking		
Refrigeration		
Music/entertainment		
Powering electrical tools		
Other		

78. Do you think electricity of good for the community?

1. Yes *(go to question 79)*
2. No *(go to question 80)*
3. Don't know *(go to question 80)*

79. If yes, why do you think so?

1. Make place safer
2. Improve study for students
3. Preserve food
4. Cook food faster
5. Improve living standards

99. Other

Specify: _____

Section D.3 Practice

Health Centre and Human Capacity

80. Do you think it is important to have electricity for the health centre?

1. Yes *(go to question 81)*
2. No *(go to question 82)*
3. Don't know *(go to question 82)*

81. If yes, why do you think so?

1. Treat patients in light
2. Preserve and cool medicine
3. Boil syringes and other items

99. Other

Specify: _____

82. Was there any electricity project established in your village in the past?

1. Yes *(go to question 83)*
2. No *(go to question 85)*
3. Don't know *(go to question 85)*

83. If yes, do you know some information about the project?

1. Yes *(go to question 84)*
2. No *(go to question 85)*

84. If yes, what information do you know about the project?

Item	Know - Yes/No	Information
What project?		
Funding organisation		
Year		
Purpose		
Failure or success?		
Why failure/success?		

85. For the maintenance, operation and sustainability of the electricity project, it is important to have skilled personnel such as plumbers and electricians. Do you have people in the village with these skills?

1. Yes
2. No
3. Don't know

86. What do you think should be done for the project(s) to be successful or sustainable?
(user-pay policy, organisation of service delivery and monitoring etc)

End of interview. Thank you for your cooperation and participation.

Annex 3: Focus Group Discussion

KAP Survey for the Water-Energy Integrated Project in Rigo District, Central Province

DRAFT – SEMI-STRUCTURED QUESTIONS FOR FOCUS GROUP DISCUSSIONS

Village: _____

Date: _____

Focus Group

Representatives	Origin	Attendance
Youth	Church, Business, Govt	
Women	Church, Business, Govt	
Men	Church, Business, Govt	
Village Councillor	Ward/LLG	
Pastor/Minister/Deacon	Church	
NGO	NGO	
Teacher(s)	Education	
Health Worker/HEO/Nurse	Health	
Village Recorder	Govt	
Village Ward Committee	Ward/LLG	

15th July 2017

Semi-Structured Interview Questions

Climate Change

1. As a community do you recognise climate change as a problem?
2. What do you want done to minimise or deal with this problem/issue?
3. What areas do you think should be focused on at the community level?

Water Supply

4. Do you think there is a real need for water in the community?
5. Any water projects in your village in the past?
6. Project

- a. What project?
- b. Funding organisation?
- c. Year?
- d. Purpose?
- e. Failure/success?
- f. Why? Failure/success?
- 7. How do you think water should be supplied? household/hamlet?
- 8. How paid? (like Eda Ranu - meters? household/clan?
- 9. Who manages this aspect – payment/sustainability?
Household/Clan/Hamlet/Community/Eda-ranu?
- 10. How managed? Committee set up or already in place?

Electricity

- 11. Do you think there is a real need for electricity in the community?
- 12. Any electricity projects in your village in the past?
- 13. Project
 - a. What project?
 - b. Funding organisation?
 - c. Year?
 - d. Purpose?
 - e. Failure/success?
 - f. Why? Failure/Success?
- 14. How do you think electricity should be supplied? Household? Hamlet?
- 15. How paid? (like Esi-Pay – PNG Power? meters? Household/clan)
- 16. Who manages this aspect – payment/sustainability?
Household/Clan/Hamlet/Community/Esi-Pay-PNG Power Limited?
- 17. How managed? Committee set up or already in place?

