SURVEY REPORT

Knowledge, Attitudes and Practices in Responding to climate change-induced flooding in Middle Ramu Usino-Bundi Districts of Madang Province, Papua New Guinea

Project: "Ramu Early Warning and Climate Change Adaptation"

FPCD
Foundation for People and Community Development Inc
PAPUA NEW GUINEA

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acronyms

Acronyms

CCA	Climate Change Adaptation
CCCCA	Child-Centred Climate Change Adaptation, also referred to as 4CA.
DoE	Department of Education
DRM	Disaster Risk Management
~~3.~~ DRR	Disaster Risk Reduction
FPCD	Foundation for People and Community Development, Inc.
FSPI	Foundation of the Peoples of the South Pacific International
IPCC	Intergovernmental Panel on Climate Change
KAP	Knowledge, Attitudes and Practices
LLG	Local Level Government
MDGs	Millennium Development Goals
NWO	National Weather Office
OCCD	Office of Climate Change and Development
PMIZ	Pacific Marine Industrial Zone
PNG	Papua New Guinea
UN	United Nations
UNDP	United Nations Development Program
UNICEF	United Nations Children's' Education Fund

Picture 1: *Two fourth year Environmental Health students from Divine Word University, Madang, talk to members of Tutere Community at Usino Station, Usino-Bundi District. Tutere community is located next to one of Madang's most destructive river, Bikei, which constantly flooded the District Headquarters at Usino and caused its relocation to Walium recently.*

Definition of Terms

Children	Are individuals under the age of 18, as defined by the Convention on the Rights of the Child.
Child-centred	Activities, programmes, plans, and initiatives targ children.
Child-led	Activities, programmes, plans, and initiatives developed by children and initiated by children.
Climate	Average weather of an area over time (typically, 30 years).
Climate Change	A change in the climate that persists for decades or longer, arising from natural causes or human activity.
Climate Change Adaptation	Adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects that moderate harm and exploit beneficial opportunities. (UNISDR, 2010)
Disaster Risk Reduction	Refers to the actions directed at reducing disaster risks through analysis and management of their causal factors. It reduces exposure to hazards, lessens the vulnerability of people and assets, improve management of the land and environment and preparedness for adverse events. (UNISDR, 2009)
Momase Region	Refers to the region covering the northern coastal provinces of PNG's mainland. MOMASE combines the prefixes of the four provinces in this region – Morobe, Madang and Sepik.

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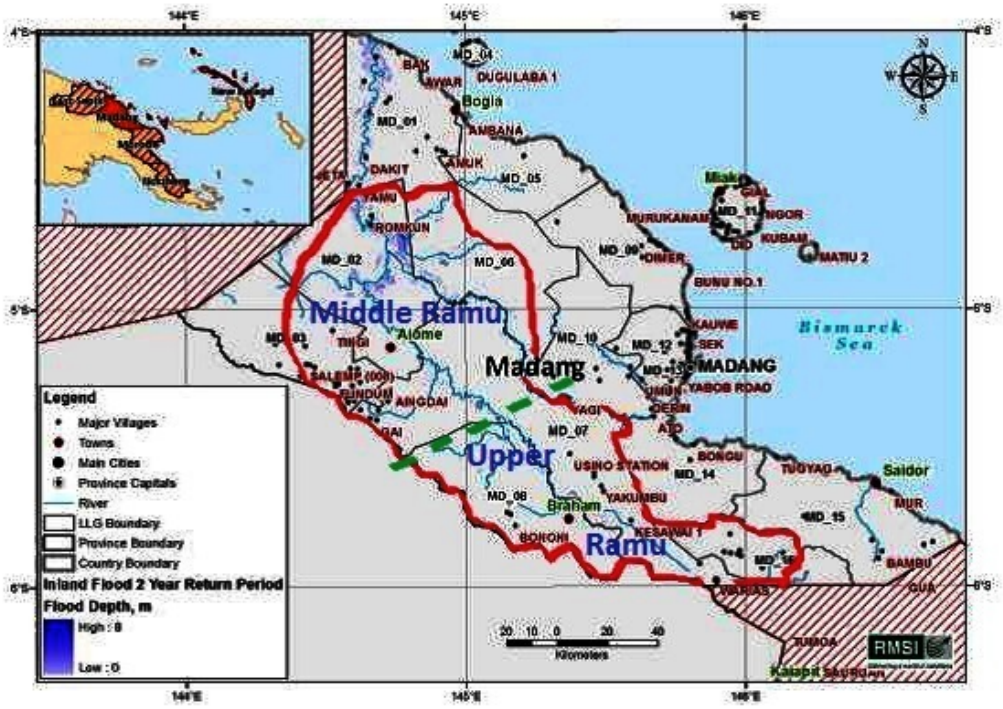
project location in papua new guinea

Project Location in Papua New Guinea

1. Papua New Guinea

2. Madang Province (Target Area Indicated with Red Line)



1. Introduction and Background

i) Papua New Guinea

Papua New Guinea (PNG) is comprised of 600 islands covering 475,369 square kilometers of Earth's surface; total land area is 462,840 square kilometers that cover mountains, dense rainforests and swamplands. Only 60,235 square kilometers of this land is arable, or suitable for agricultural purposes. The nation itself includes the eastern half of the island of New Guinea (the world's largest tropical island), the two northernmost islands of the Solomon chain (Bougainville and Buka), the Bismarck and Admiralty archipelagos.

With 7,059,653 citizens (NSO, 2012) PNG is the Pacific's most populous country. It is culturally and linguistically diverse with a total of 820 languages, and tribal groups. English, *Tok Pisin* (Pidgin), and *Hiri Motu* are the three main *lingua franca. Tok Pisin* was developed by slave traders in the 19th Century as a way to communicate with local people with too many languages. English, however, is the official language spoken in education, business and government circles. With just 13 percent of the population living in urban centres in 2006 (UNESCO 2008) PNG is one of the least urbanized countries in the world.

Ninety-seven percent of all land in PNG is customary-owned, either by individuals or under some form of clan ownership and is governed by traditional land tenure systems, enforced by the Customary Land Administration Act of 1996. The state only owns or controls three percent of all lands, alienated from 47 million hectares of PNG's landmass to build administrative centres, mainly in urban areas. This means that the government has very limited access to land for development purposes.

In terms of governance, PNG has a decentralized system of government. It is divided into 22 provinces, 89 districts, and a national capital district for political and administrative purposes. At the sub-national level, there are three levels of administration: the provincial, district and Local Level Government (LLG).

The majority of the national population, 87 percent, is rural-based who mostly meet their basic needs through subsistence agriculture. As 55 percent of the population is below the age of 25, it means most of the economically active persons are engaged in subsistence activities for household consumption. (UNESCO, 2004:8) It must also be stressed here that the large contribution of the subsistence sector is very inadequately incorporated into the accounts of PNG's national product.

The rural sector is mostly inaccessible due to bad infrastructure, or lack of it. Because of high rainfalls and unstable mountainsides, important infrastructure like roads and bridges get washed away. Often repair and maintenance work are seldom carried out regularly and many of these infrastructures run down due to neglect by relevant authorities. In order for the rural populace to access basic government services they migrate into urban centres. This rural-urban migration is now creating a landless class of people as these migrants live in shanty dwellings on state and/or customary lands. These communes are commonly referred to in PNG as squatter settlements. An additional factor preventing timely and cost-effective service delivery to the rural populace is the high transaction costs mainly attributed to the rugged geographical nature of PNG. For instance, the Gulf Province Administrator recently revealed that it costs up to K40,000 to mobilise a payment of K25,000. (Yala, 2013:41)

According to UNICEF (2008:2), the Pacific, including PNG, has a long way to go in achieving the United Nations Millennium Development Goals (MDGs), in particular MDG 4, which seeks to reduce under-five mortality rates by two-thirds between 1990 and 2015. (Refer to summary of PNG's MDG targets by 2015 and beyond in Fact Box 1.1) In contrast, the same report revealed that "Eastern Asia, and to a lesser extent, South-Eastern Asia, are on track to meet most of the health-related MDGs".

In terms of universal basic (primary) education (MDG 2), though some progress has been made, PNG is far from achieving its targets of enrolling 85 percent of children at primary levels by 2015. Although there were some positive gains in national and gender-based access rates between 2007 and 2009, about 500,000 to 600,000 children were yet to have access to basic education. (Waima, 2013) More needs to be done to achieve universal basic education goals by 2015.

A recent study was carried out by the PNG National Research Institute comparing results of public investments into the education and health sectors between 2002 and 2012. The most striking difference is that number of children recorded as being present at school increased by 69 percent. However, during this same period the average number of patients utilizing a health clinic fell by 18 percent. During this same period too, PNG's population increased by 30 percent, and the number of schools increased slightly while the number of health clinics fell. In contrast, the proportion of children attending primary schools in PNG increased to over 40 per cents, whereas the proportion of population utilizing health clinics fell by more than 50 percent. (Howe, *et. al,* 2013:40)

Fact Box 1.1: Summary of the eight UN Millennium Development Goals, to which PNG is a signatory and PNG's targets by 2015 and beyond.

MDG Goal Number	Description of targets by 2015 and Beyond
1	Eradicate extreme poverty and hunger. - The national poverty target for 2015 is to decrease the proportion of people below the poverty line by 10 per cent.
2	Achieve universal primary education. - The national target is to achieve a Gross Enrolment Rate of 85 per cent at the primary level by 2015.
3	Promote gender equality and empowerment of women. - The national targets are to eliminate gender disparity at the primary and secondary levels by 2015, and above by 2030.
4	Reduce child mortality. - The national targets are to reduce infant mortality rate to 44 per thousand, and the Under Five Mortality Rate to 72 per thousand by 2015.
5	Improve maternal health. - The national target is aimed at reducing maternal mortality rate to 274 per 100,000 live born children by 2015.
6	Combat HIV/AIDS, malaria and other diseases. - The national targets are to control the spread of HIV/AIDS by 2015, and stabilize its spread by 2020.
7	Ensure environmental sustainability. - The national targets are; i) To implement principles of sustainable development through sector specific programs no later than 2015. ii) To increase by 2020 commercial use of land and natural resources through environmentally friendly technologies and methods of production. iii) To increase to 60 per cent the number of households with access to safe water.
8	Develop a global partnership for development. - To ensure available resources (internal and well as external) are used effectively and in an accountable manner with the objective of achieving the MDGs.

Source: UNICEF, 2004.

The present government is taking bold steps to ensure the target is achieved, if not in 2015, then by 2019. Some of these steps include introducing tuition-free education in all primary schools across the country; subsidized tuitions for high schools, colleges and universities; and compulsory primary education for all children from 2014 onwards.

PNG has been enjoying steady economic growth at 5.5 percent gross domestic product over the last ten years. (Kero, 2013) This has been the case, apart from Australia, since the global financial crisis in 2008. The World Bank has predicted that PNG's GDP will continue to increase significantly in 2014 and 2015 when the country begins exporting liquefied natural gas (LNG). (Mauludo, 2013:46) One of the direct benefits of this steady economic growth and increased government income is now translating into the education sector. The tuition-free and compulsory primary education is a plus for the country's investment for the future in terms of human resource development.

PNG is sub-divided into four regions. These are the Southern, Highlands, Momase and New Guinea Islands. The Southern Region consists of Western, Gulf, Central, National Capital District, Milne Bay and Oro. The Highlands region consists of seven provinces – Southern Highlands, Enga, Western Highlands, Simbu, Eastern Highlands and the two new provinces of Jiwaka and Hela. The New Guinea Islands Region consists of Manus, West New Britain, East New Britain, New Ireland, and the Autonomous Region of Bougainville. And finally, the Momase Region is made up of West Sepik, East Sepik, Madang and Morobe Provinces. Madang Province is part of the Momase Region.

ii) Madang Province

A stunningly beautiful province, Madang is situated on the northern coast of mainland PNG. Madang Township is surrounded by picturesque islands, coastal floodplains, and highlands. It is a serene and majestic waterside haven. Visitors are drawn to the town which is surrounded by crystal clear waters, coral reefs, white sands and a beauty that can only be dreamed about.

Madang Township's economy grew largely out of the production of copra (or dried coconut flesh) which is one of the world's richest crops due to the fact that once crushed, it produces 70 percent oil.

Madang Township is one of PNG's top five fastest growth centres in the last ten years having recorded 487,460 persons in 2011, as compared to 365,105 in 2000. (Burke, 2012; Kenneth, 2012) This trend has been attributed to the province's major economic developments in mining, commercial logging, manufacturing including a couple of meat and fish canneries, a cigarette factory, and numerous developments in the tourism and hospitality industry. At the same time a good number of higher learning institutions have been developed over the years in Madang Township both by state and non-state actors. These include Divine Word University, Madang Teachers College, PNG Maritime College, Lutheran School of Nursing, and the Madang Technical College. The new National Urbanisation Policy 2010–2030, adopted by the national government in May 2012, identified Madang Township as a future city within the Momase region. (Kep, 2013) This new policy interprets the national government's Vision 2050, Development Strategic Plan, and Medium Term Development Plan into projects and programs to be undertaken in the next twenty years. (The seven pillars of PNG Vision 2050 are summarized in Fact Box 1.2.)

Madang Province is sub-divided into six districts with a total land area of 28,886 square kilometers. Of the six districts, Middle Ramu and Usino-Bundi (or Upper Ramu), have a combined population of 97,958, which is only 20 per cents of the total population occupying just over half (51.6 percent) of the province's total land area. (Refer Fact Box 1.3) This means population in Middle and Upper Ramu targeted by this project is sparsely populated, particularly in Middle Ramu where communities are widely distributed and more time is required to travel between villages, and schools with project interventions. At the same time people in Middle Ramu still live a nomadic lifestyle, according to the former Middle Ramu District Administrator (*pers. comm., November 18, 2014).*

Madang is one of the leading provinces in PNG's timber, cocoa and copra production. Only recently oil palm plantations have been introduced into the province, mainly in the Ramu plains of Usino-Bundi District. PNG is a small player in the world market, contributing just one percent of the total world supply of cocoa. Over the last ten years cocoa production had averaged 40,000 tonnes per year valued at an average of K300 million annually. However, 2012 recorded the worst year as income dropped to K185 million. This was because production of cocoa was impacted by the cocoa pod-borer disease, and the appreciation of kina against US dollar.

Fact Box 1.2: Summary of Papua New Guinea Vision 2050.

Pillar Number	Description of the National Pillars
1.	Human Capital Development, Gender, Youth and People Empowerment. - Our people must be developed and empowered to take ownership of their own livelihoods.
2.	Wealth Creation. - Ensure a strong, dynamic and competitive economy focusing on manufacturing, agriculture, forestry, fisheries and tourism ventures to generate around 70 percent of GDP, with balance coming from mining. Petroleum and gas ventures in the non-renewable sector.
3.	Institutional Development and Service Delivery. - Improve present administration and management systems need to be improved to minimize inadequacies and inefficiencies.
4.	Security and International Relations. - Ensure that all security agencies, and strategic plans and goals are adequately supported and funded in order to maintain law and order, including national security and consciousness.
5.	Environmental Sustainability and Climate Change. - Sustainable development measures developed in all sectors to increase resilience to the impacts of climate change and environmental changes.
6.	Spiritual, Cultural and Community Development. - Instill positive attitudes and values of respect, integrity, excellence, and discipline in people. - Involve churches and NGOs as equal development partners in development and service delivery.
7.	Strategic Planning, Integration and Control. - Ensure all bilateral and multilateral arrangements, as well as foreign and trade policies, are continuously aligned to Vision 2050 to ensure consistency to PNGs development agenda.

Source: Government of PNG. 2009. Papua New Guinea Vision 2050. Waigani, Papua New Guinea.

Fact Box 1.3: Madang Population Figures by District, 2011

District Name	Land Area (sq.km)	Population Count
Bogia	3,978	57,104
Madang	2,565	86,693
Middle Ramu	7,222	57,879
Rai Coast	5,433	56,299
Sumkar	2,001	67,052
Usino-Bundi	7,687	40,079
Totals	***28,886***	***487,460***

Source: PNG National Statistics Office, 2012.

In terms of timber production, Madang Province is one of the most heavily logged provinces in PNG targeted mainly by Asian giants in the likes of Jant Timbers (Japan), Santi Forest (The Philippines), and Rimbunan Hijau and LandEx (Malaysia).

All forest resources along the coastline of Madang, and those in more accessible areas are depleted. The last remaining natural forest of approximately 400,000 hectares is found along the western banks of Ramu River in Middle Ramu district. (*Mamu*[1], *pers. comm., July 10, 2012)*

There are two new mines in Madang Province, both located in the project target area. One is the Chinese government-operated Ramu Nickel-Cobalt Mine on Mount Kurumbukari; and the other is by Marengo Mining Limited at Yandera. Both these projects are in Usino-Bundi District, or in the Upper Ramu catchment. The former is already exporting, while the latter is set to begin construction in a couple of years' time.

Often these developments come at the cost of rapid social and environmental change for local communities. In Madang, there is a potential risk of environmental pollution from spills along the pipeline stretching from Kurumbukari in Usino-Bundi District to Basamuk in Rai Coast District. These areas experience constant landslides and land slips, and are still unstable. At the same time, mine tailings are directly being discharged into the Basamuk Bay and Bismarck Sea through a submarine tailings disposal system.

Madang is one of the most vulnerable provinces to natural disasters due to its direct location on the Pacific Ring of Fire. It has three of the eight active volcanoes in PNG – the Karkar, Manam, and Bam volcanic Islands. Manam Island exploded its top almost ten years ago, affecting more than 10,000 villagers who were relocated to four care centres in Bogia on the mainland. These people remain internally displaced persons, with no long term provincial and national government plans for settlement on the mainland, or relocation back to Manam Island. Social problems particularly land and resource use issues with local Bogia people have been major concerns preventing Manam Islanders from cultivating garden food crops and access forest products for their needs, including medical and recreation. Reports of fights have broken out, with some casualties, including loss of lives. Recently, the Islanders have been demanding to be returned to Manam as their security is not guaranteed. Yet their volcanic island is still active and thus unsafe for their return.

[1] Kenneth Mamu, Madang Provincial Forest Authority.

iii) Climate Change and It's Potential Impact to PNG Children

Children are the world's youngest citizens, and "half of them live in the vast Asia-Pacific region". (UNICEF, 2008) PNG alone, with an annual growth rate of 2.3 percent (NSO, 2012), has 75 percent of the Pacific's under-fives and about 40 percent under the age of 15 (*Ibid.* 2008:6). School-aged children alone number up to a staggering 2.3 million in PNG. Of these, only 78 percent are attending some form of schools while the remaining 22 percent are doing nothing either in the villages or in urban settlements[2]. This implies that PNG has a very high youth dependency ratio as compared to other Pacific island countries.

PNG and the Pacific island nations contribute little amounts of carbon problems in the atmosphere, but are at the forefront of climate impacts. The Pacific people suffer the most from this problems induced by climate change created mostly by first world nations. For instance, PNG already has the first case of climate change refugees. The Carteret Islands of the Autonomous Region of Bougainville is sinking from rising sea levels. A total of 250 islanders, which included 40 families, as well as children, are being relocated to the 500 hectare Karoola plantation in the Halia Constituency of Buka. An additional 20 families are on standby.

Children in PNG are especially vulnerable to disaster risks like earthquakes and landslides. Similarly, children are vulnerable to changes in climate. Major diseases induced by climate change present further threat to child survival in PNG. Many widespread diseases are highly sensitive to changing temperatures and precipitation. The incidence of malaria, for instance, has increased and migrated to highlands environments which previously had nil to low malaria cases. The disease is now endemic in every province in the country. Malaria, dengue, pneumonia, and other common vector-borne diseases account for one-third of all deaths in PNG. And tuberculosis incidence is also rising, with other major killers such as under-nutrition and diarrhea. (UNICEF 2009:45).

Changes in climate are influenced in several factors;

- *Precipitation* – causing drought, which affects drinking water directly and food security through disrupted farming.
- *Sea surface temperatures* – generating coral bleaching, which affects artisan fisheries and reduces storm surge protection.
- *Extreme events* – affecting infrastructure and agriculture and causes salt water intrusion in the freshwater lens. (UNICEF 2009:46)

[2]Department of Education. Post-Courier, October 10, 2013. Pg. 4.

2. Objectives of 4CA and KAP Survey

This KAP survey and analysis is part of a national project titled "Enhancing adaptive capacity of communities to climate change-related floods in the North Coast and Islands of Papua New Guinea" facilitated through the Office of Climate Change and Development. In Madang Province, this project was sub-contracted to a number of non-state actors and supervised by the Provincial Disaster and Emergency Coordination office.

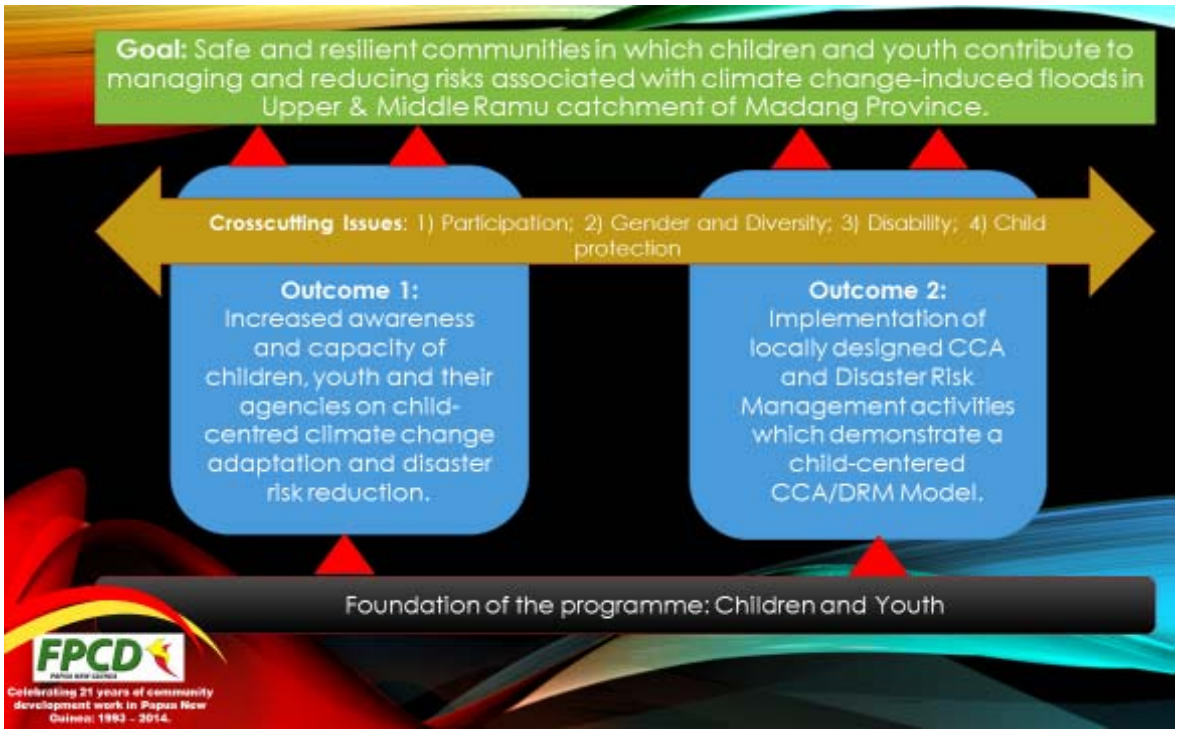
FPCD was sub-contracted to especially undertake climate change education and facilitate the establishment of a simple early warning system for climate change-induced floods in close collaboration with the National Weather Office. The simple early warning system would involve the setup of a network of rainfall and stream flow gauges in Middle Ramu and Usino-Bundi Districts.

FPCDs proposal titled, "Ramu Early Warning and Climate Change Adaptation (REWACCA) Project", planned to undertake this work utilizing its experience and expertise through a child-centred approach, known as Child-Centred Climate Change Adaptation (or 4CA).

4CA works specifically in contexts where climate change is impacting children, young people and their communities. As a model it proposes that FPCD and its partners both locally and internationally work in partnership with children (as agents of change), their communities and local governments to raise awareness of climate change, in order to create locally appropriate climate smart solutions to protect children, their communities, and fulfill their human rights.

The 4CA model utilized in the REWACCA project is best summarized in the diagram shown in Figure 2.1, below.

Figure 2.1: *Aims and Objectives of REWACCA Project for July 2014 to June 2015.*



The 4CA Model will build safe and resilient communities in which children and young people contribute to managing and reducing the risks associated with changes in climate. Through a process of child-centred climate change adaptation children, young

people and their communities will be supported to build their own skills and knowledge to identify, prepare for and respond to risks associated with climate change and related disasters.

The KAP survey, conducted during the initial stages of the project, is purposely to grasp an understanding about climate change at the community, family and individual levels and recommend possible interventions to address and enhance these in terms of climate change adaptation, while at the same time establishing interventions aimed at working closely with children and youths as agents of change.

The objectives of the KAP survey were specifically to compile a situation analysis on;

1. Perspectives of children and youth on climate change and disaster risks in Middle Ramu and Usino-Bundi Districts; and

2. Existing practices and interventions and partnerships at national level and also in project areas.

Picture 2: *Two fourth year Environmental Health students from Divine Word University, Madang, talk to Wanang Conservation Elementary School pupils during the KAP survey in October 2014, Middle Ramu District.*

3. Research Methodology

This KAP survey and analysis was undertaken after compilation of findings from the three tools described below.

Literature Review

A literature review kick-started this activity. The team researched various publications and documents relating to climate change, especially children and youth decision-making and participation in PNG. Some of the literature included annual reports, discussion papers, and workshop reports from international, regional and national institutions.

Stakeholder Interviews

Specific stakeholders within the development, environment, conservation, and education sectors were met through a stakeholder consultation workshop and one-to-one interviews. These were particularly aimed at identifying issues to and foster partnerships between and amongst stakeholders.

Knowledge, Attitudes and Practices (KAP) Survey

A KAP survey was conducted using a set of questionnaires. Information was obtained through one-to-one interviews, and focus group discussions in target communities, specifically Sogeram, Yamagi, Banu, Waringri, Yakumbu, Korona, Koroba, Ranara, and Waput. Schools visited included Wanang Elementary and Primary, Usino Primary, Ranara Elementary and Primary, Yakumbu Elementary, and Waput Elementary and Primary. Some out-of-school children and youths were also interviewed.

Picture 3: *The KAP survey team talk to receive responses from members of Sausi community in Usino-Bundi District, Madang, under a house while taking shelter from rain.*

4. Research Findings:

4.1 Description of Target Population:

The survey involved a total of 274 respondents. (Refer to Table 4.1.1) Forty-seven percent, or 128, of the interviewees were female while approximately fifty-three percent (or 146) were males. There were no age categorization of respondents. It is the surveyors' strong belief that the preferred population of interest, children, although comprising 21% of respondents, was fairly covered and represented in this survey.

The communities covered by this survey included Koromasaric, Wanang, Yamagi, Tutere, Banu, Yakumbu, Koroba, Ranara, Sausi and Waput. These communities have a total estimate population of 18,500, and are all accessible by road – Trans-Gogol Highway in Middle Ramu, and Ramu Highway in Usino-Bundi (Upper Ramu). People in Middle Ramu still live nomadic lives while people in Usino-Bundi live in permanent settlements. Three of the communities, namely Banu, Koroba and Yamagi in Upper Ramu, have been created by settlers migrating from the highlands. While Banu and Yamagi consists mostly of people from Bundi from the highlands of Madang, Koroba is settled by internally displaced persons from Tairora village in Kainantu District of Eastern Highlands Province due to tribal conflict. Their camp here is temporary as they plan on returning to Kainantu when the situation returned to normal. They have settled here since 2011.

A total of fifteen schools are located within the target area. These schools, mostly elementary and primary, are both government-run and church-run. Government-run schools include Usino Primary; Sausi Primary; Wanang Conservation Elementary and Primary Schools; and church-run schools are Ranara Elementary and Primary under Lutheran Church; Holy Spirit High School under Catholic Church; and Waput Adventist Elementary and Primary Schools under the Seventh-Day Adventist Church. For other details, refer to Appendix 2.

A couple of health centres at Ramu Station operated by Ramu Agri-Industries Limited and Walium operated by the government serves the people well in Upper Ramu. However, this important service is lacking in Middle Ramu. Sick people, including women and children have to travel at least twenty-plus kilometers to seek medication in Madang Township.

Table 4.1.1: KAP Survey Respondents, Middle Ramu and Usino-Bundi Districts, October 2014

Particulars	**Summary of Respondents**		
	Totals	By Gender	
		Males	Females
Children	*58*	33	25
Community Leaders & Facilitators	*33*	27	6
Community	*117*	51	66
Schools Teachers	*15*	9	8
Youths	*38*	18	20
Government Officers	13	8	5
Totals	**274**	***146***	***128***

4.2 Main Results:

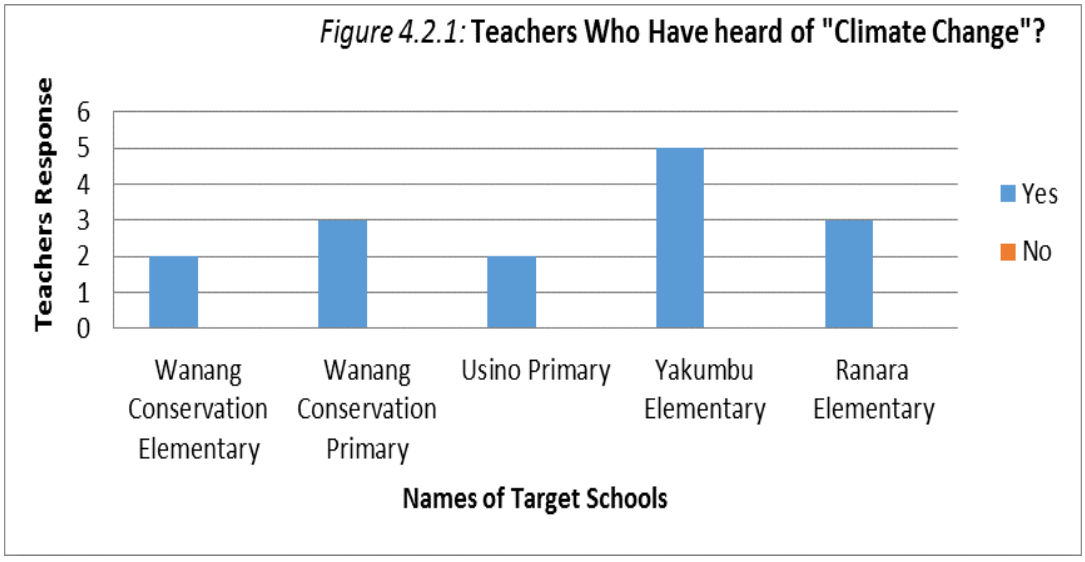
The KAP questionnaire was divided into six sheets for each target focus group. These included interviewing and meeting with school teachers, youths, children, community facilitators and leaders, the general community, and government officials. Hence, the results in the following pages are reported accordingly.

A: KNOWLEDGE OF CLIMATE CHANGE

Knowledge of the term 'climate change':

The first question posed to target groups was to map out whether they have ever heard of the term 'climate change'. Generally, it appeared most respondents have heard of this term, as it has been a hot topic nationally and internationally recently. Many initially heard 'climate change' being mentioned through the mainstream media including radio, newspaper, and television. A small proportion said they heard this term first through relatives, friends, and government officials. None of the respondents had direct access to internet. An interesting fact was that the elders knew there was change when they observed certain changes in the natural environment and their seasonal calendars. Yet they did not know what to call this change until they heard of the term 'climate change'. It would be interesting to identify what the elders called these changes in their local vernaculars before 'climate change' was coined to these changes.

On the other hand, there were respondents that indicated they have seldom come across this term. For instance, those who indicated they have never heard of climate change in the eight target communities included five percent (from a total of 38) youths interviewed; 17 percent (out of 58 children respondents); and 27.1 percent (out of 117 community members interviewed). These were mostly youth respondents in Koromasaric village of Middle Ramu District (Figure 4.2.2); school children at Wanang Elementary and Primary Schools also in Middle Ramu District (Figure 4.2.3); and community members from Wanang, Tutere, Yakumbu and Ranara villages. (Figure 4.2.5).



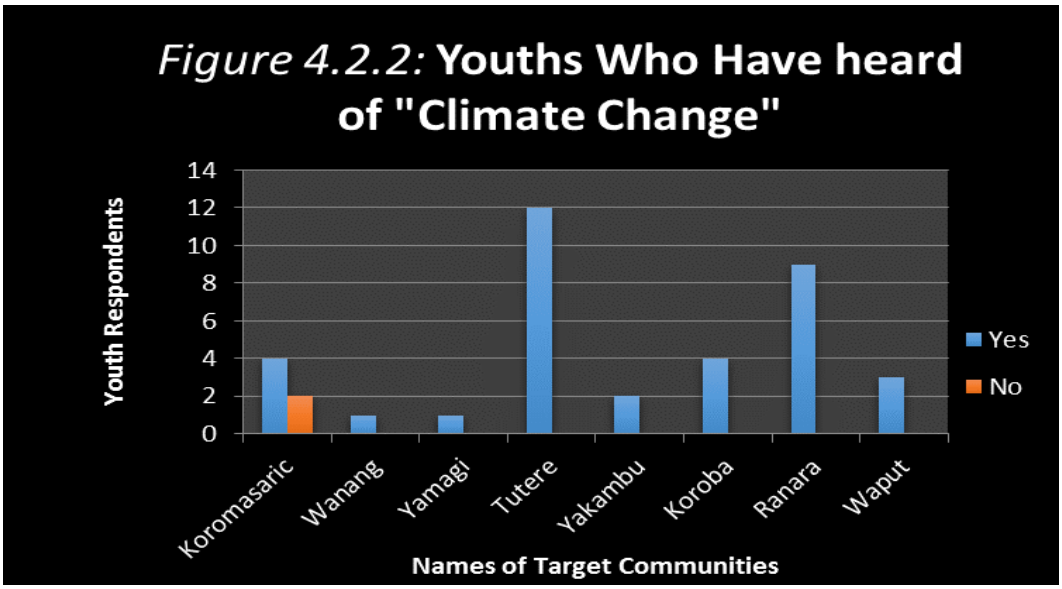


Figure 4.2.2: **Youths Who Have heard of "Climate Change"**

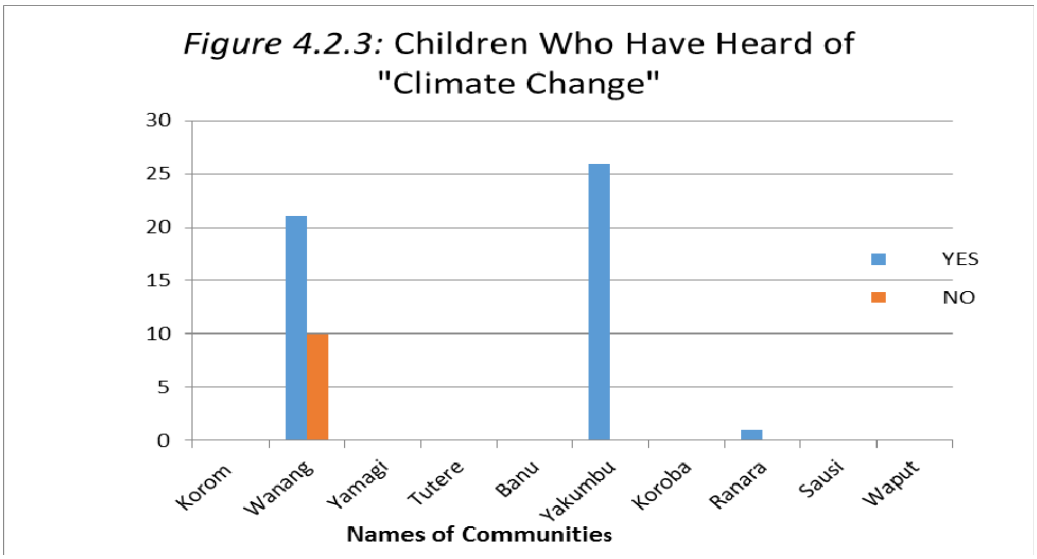


Figure 4.2.3: Children Who Have Heard of "Climate Change"

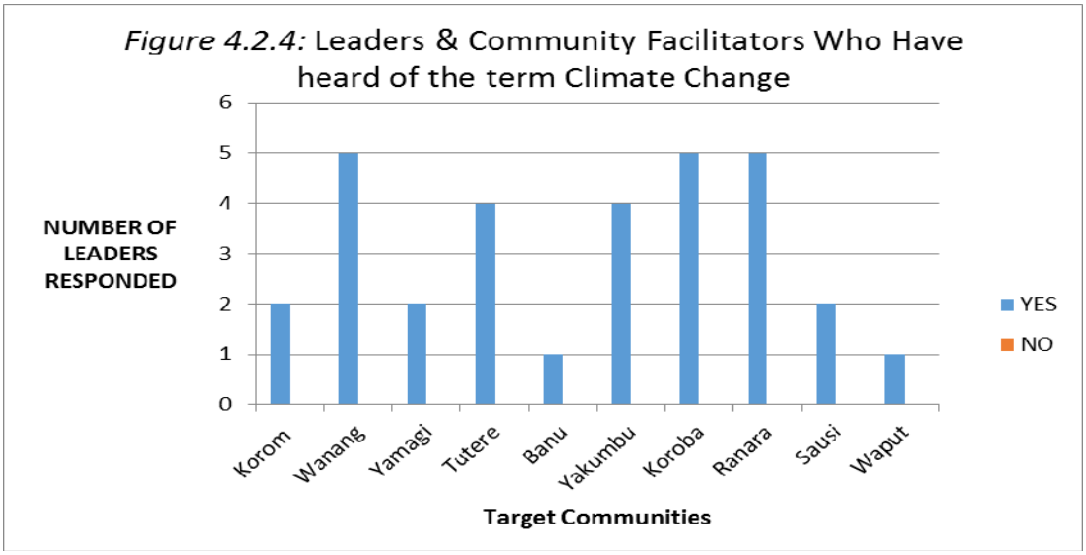
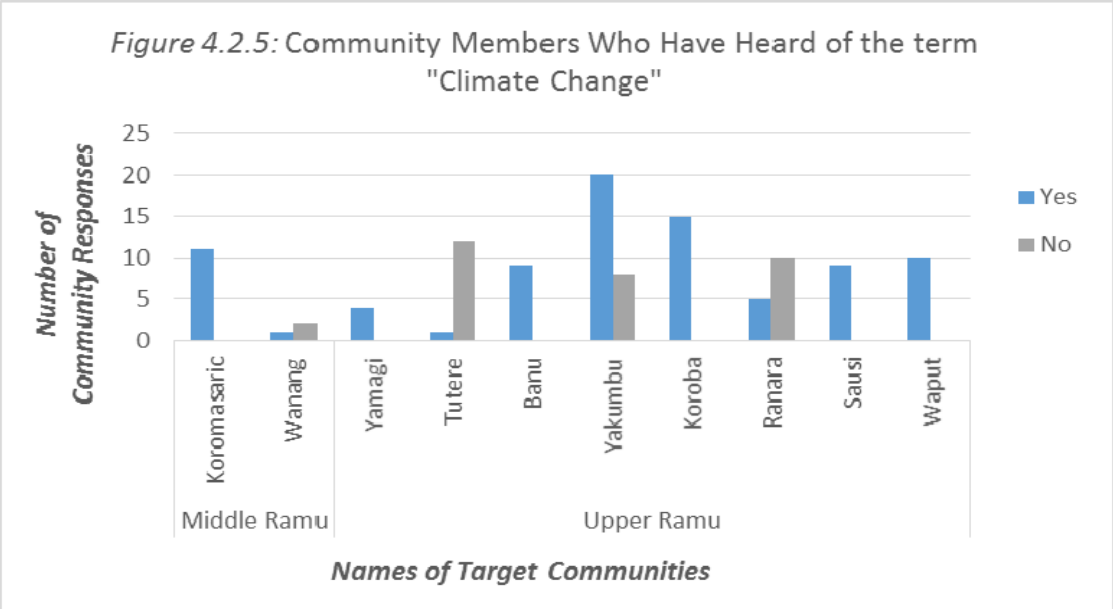


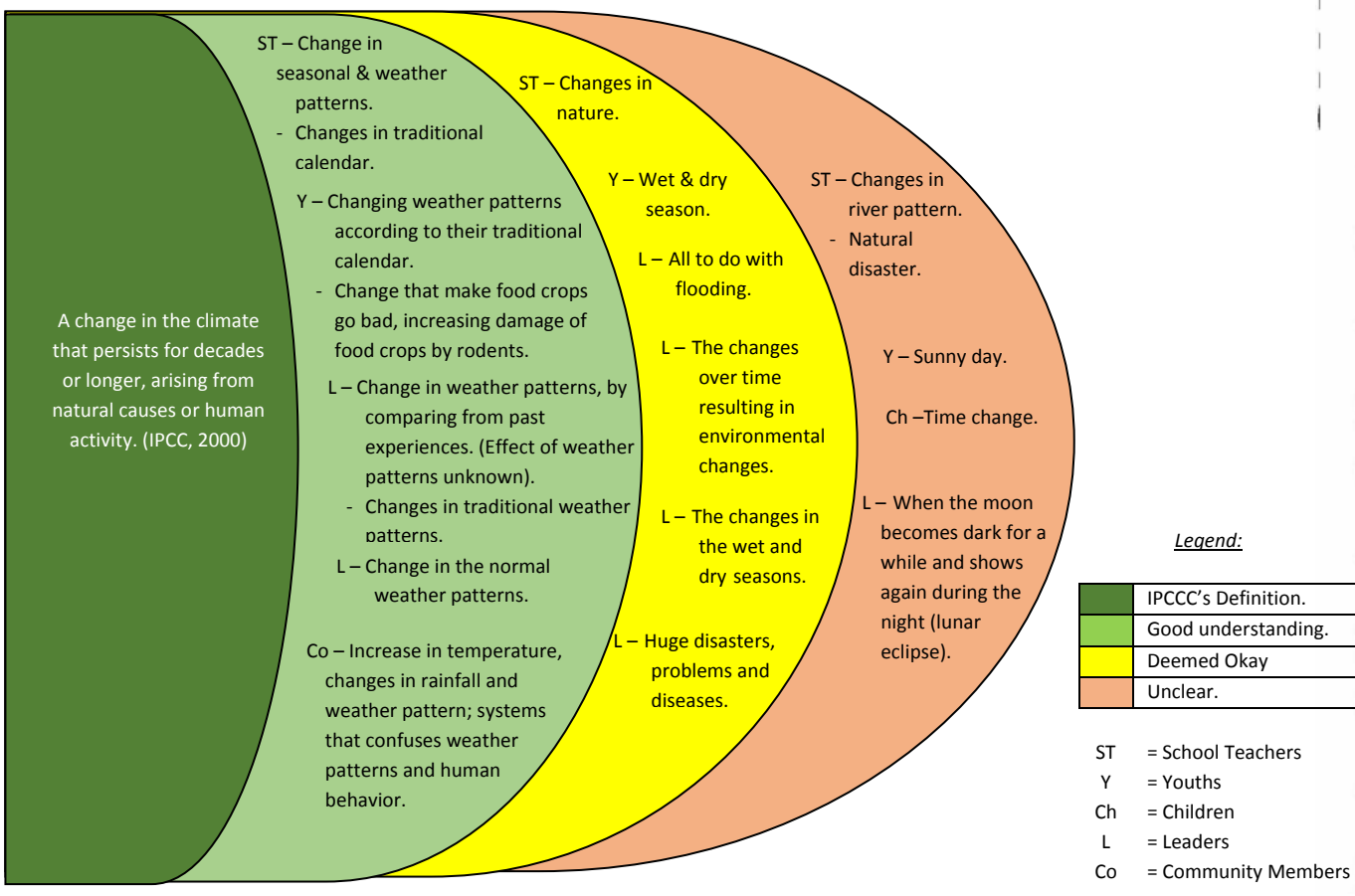
Figure 4.2.4: Leaders & Community Facilitators Who Have heard of the term Climate Change



Definition of 'climate change':

This question was aimed at scoping out how much each target focus group understood and defined the term 'climate change'. As it turned out there were interesting levels of definitions from all respondents, and these are captured in Venn Diagram 4.2.1.

Venn Diagram 4.2.1: Target Focus Groups in Middle Ramu and Usino-Bundi Districts, Madang Province, Defining Climate Change, in relation to IPCC's Definition.

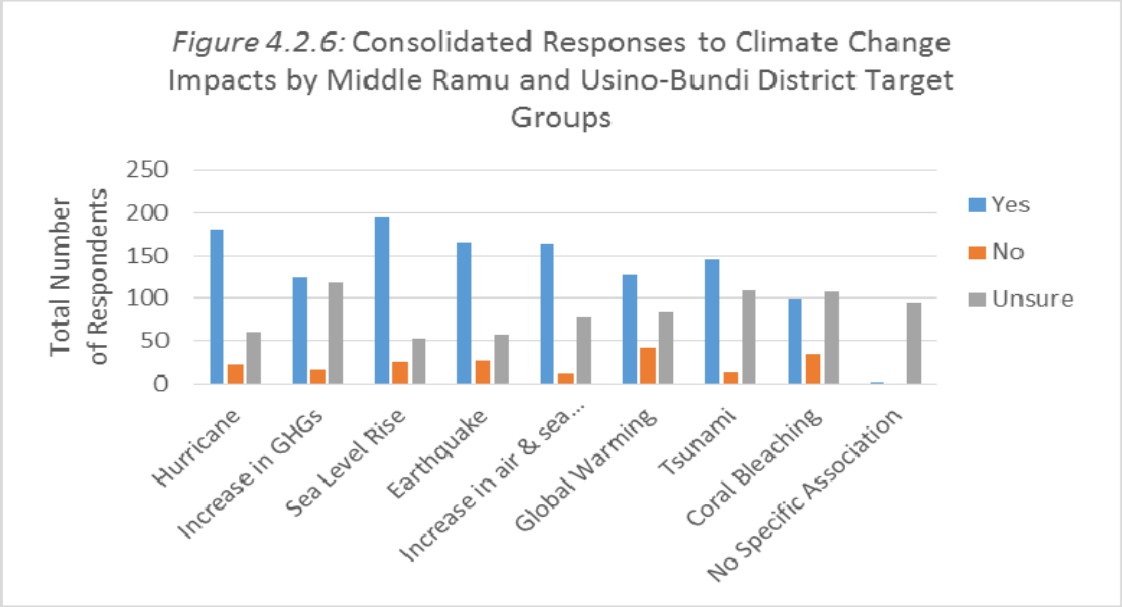


According to Venn Diagram 4.2.1, local definitions for climate change varied amongst respondents in the target communities. Most fairly defined climate change phenomenon as their definitions captured key constituents of climate change in relation to the official definition from the IPCC. These included aspects like changes in seasonal calendar, changes in weather patterns, and increase in temperatures. Moreover, their understanding is enhanced by their own experiences around their traditonal seasonal calendars.

Children turned out to be the group that needed more time and effort in explaining for a better understanding of climate change. This may also be true based on their limited experiences with local seasonal calendars and limited knowledge of global weather and climare chanfe issues other regions are experiencing.

Climate change impacts Verses Non-climate-related Hazards:

This question was posted to target communities to test whether they are able to differentiate between climate change impacts and natural disasters. According to Figure 4.2.6, below, showing the consolidated responses from all target groups, respondents are not clearly able to differentiate between climate change impacts and natural disasters. For instance, earthquake and tsunami, although are "non-climate-related hazards" (Turnbull, *et. al,* 2013), majority of respondents indicated these were also climate change impacts. Earthquakes and tsunamis are natural disasters directly linked with plate tectonic movements. Clearly, target groups needed to be educated on the differences.

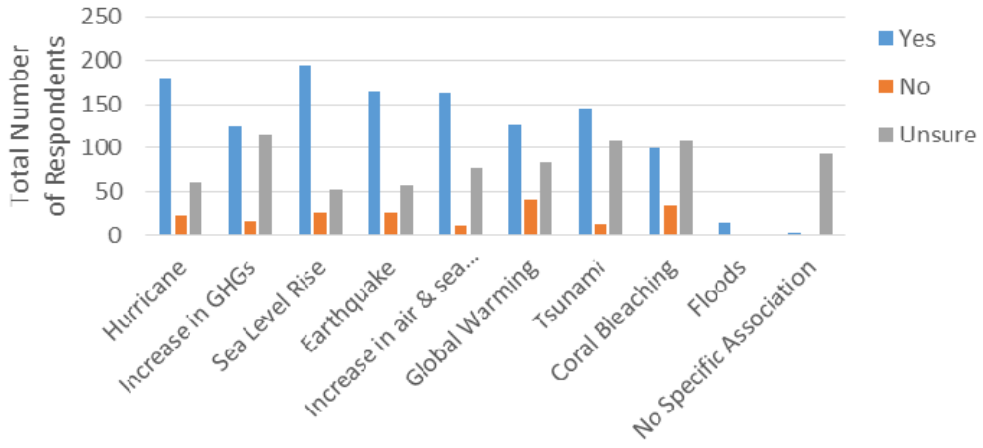


Links between Climate change and Climate Change impacts:

Similarly, when target communities were asked to identify if the same disasters listed above had links to climate change, majority of respondents answered 'yes'. This included the two non-climate-related hazards of earthquake and tsunami (refer Figure 4.2.7), which means that they are not able to differentiate between climate and natural disasters.

The two graphs, Figure 4.2.6 and Figure 4.2.7, clearly indicate that there is very little understanding of climate change, disasters, hazards, and risks. Future educational workshops would very much help the people to understand fully what these concepts are.

Figure 4.2.7: Consolidated Responses to Climate Change and Its Impacts by Middle Ramu and Usino-Bundi District Target Groups



Presently, with very little understanding, there is high level of fear. Many elders interviewed expressed that with the confused and disarrayed seasonal calendar, the term climate change when coined to these new conditions created some level of fear amongst them. This fear is compounded by the fact that the future under these circumstances are unknown and unpredictable. To make matters worse, they hear about predictions of increases in air temperatures, prolonged drought conditions, prolonged wet seasons and rainfall, to name a few. These created a certain level of fear in the minds of elders.

Causes of Climate change:

The responses for this section was quite interesting as the list of potentail causes included activities the respondents undertook daily for their survival.

Seventy-four percent of teachers [Figure 4.2.8(a)] responded that the causes listed in the questionnaire all contribute to climate change in one way or another. Interestingly, teachers thought burning fuelwood contributed less in causing climate change. Since these respondents were rural-based with nil to limited accessibility and knowledge to energy-saving means of preparing family meals, they depended heavily on burning fuelwood. Collecting dead wood, bamboos, and other matter home from the gardens were a daily activity. Yet, respondents argued that their contribution to changes in climate and weather was insignificant when compared to industrial emissions, vehicle emissions, deforestation, and burning household wastes, including plastics [Figure 4.2.8(a)]. It was clear to the survey team to argue that their actions contributed directly but in a minor way to changes in climate and weather patterns would be directly challenging their means of survival.

Youths (Figure 4.2.9), on the other hand, thought burning fuelwood and household waste, combined with industrial waste, contributed most to causing climate change while poor agricultural practices and deforestation contributed less.

Responses from children (Figure 4.2.10) showed burning household waste and fuelwood for cooking as main factors affecting climate change, while indicating that industrial waste, vehicle emissions, poor agricultural practices and deforestation did not

play any part in influencing climate change. This clearly indicated their lack of understanding of relationships between climate change concepts. Their responses were based entirely on their local environments and climatic conditions rather than externally.

Community Facilitators/Leaders thought all factors listed in the questionnaire (Figure 4.2.12) were responsible in one way or the other in impacting climate change.

Looking at the responses from the general community in the target villages (Figure 4.2.13), respondents were equally divided. While half of the respondents were not sure/don't know, the other half said these contributed to climate change. It clearly proved that many are still confused about the causes of climate change.

Figure 4.2.8(a): Percentage of Teacher Respondents on the Causes of Climate Change

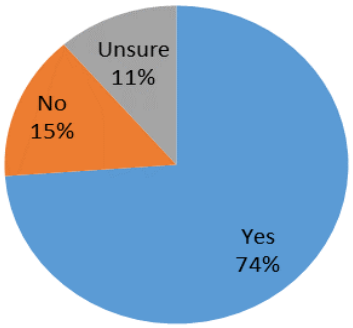
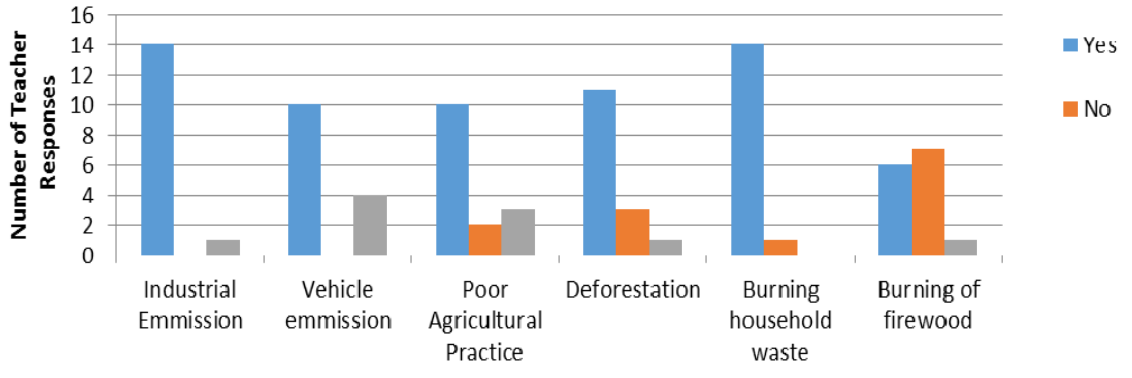


Figure 4.2.8(b): Teachers Knowledge on the Cause of Climate Change



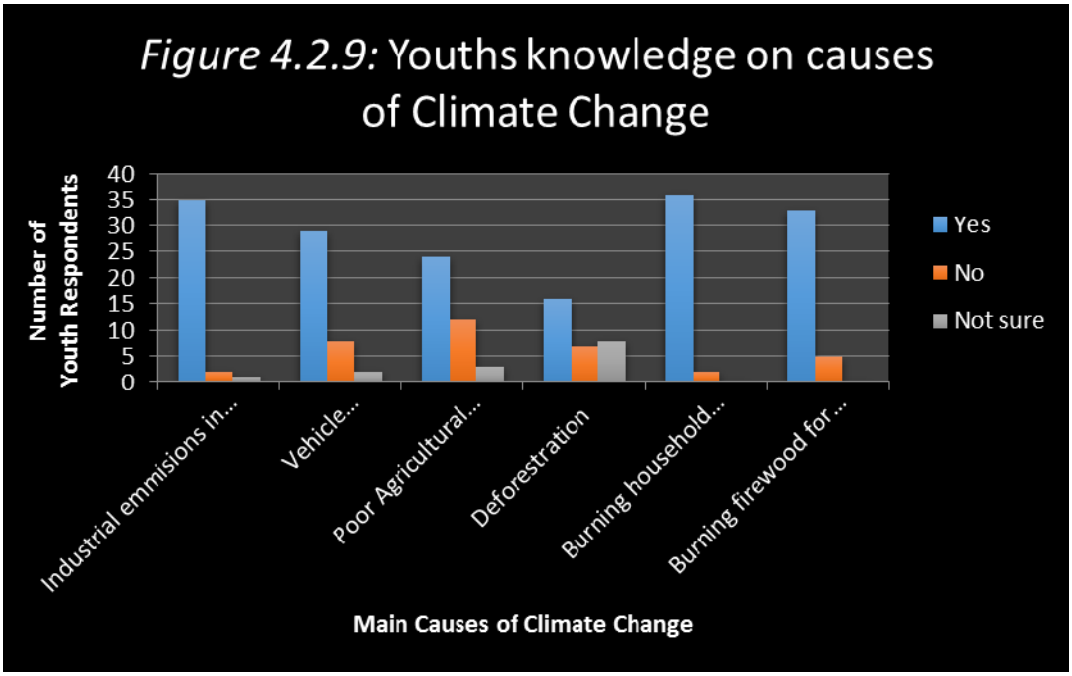


Figure 4.2.9: Youths knowledge on causes of Climate Change
Number of Youth Respondents
40
35
30
25
20
15
10
5
0
Yes
No
Not sure
Industrial emmisions in...
Vehicle...
Poor Agricultural...
Deforestration
Burning household...
Burning firewood for ...
Main Causes of Climate Change

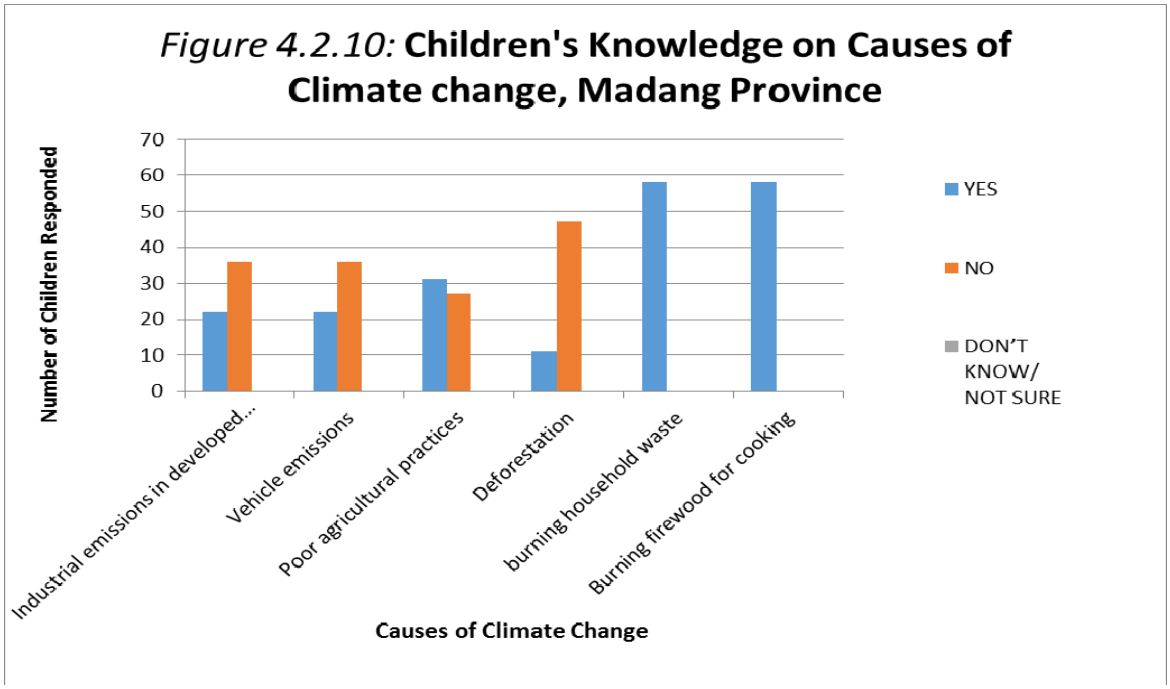
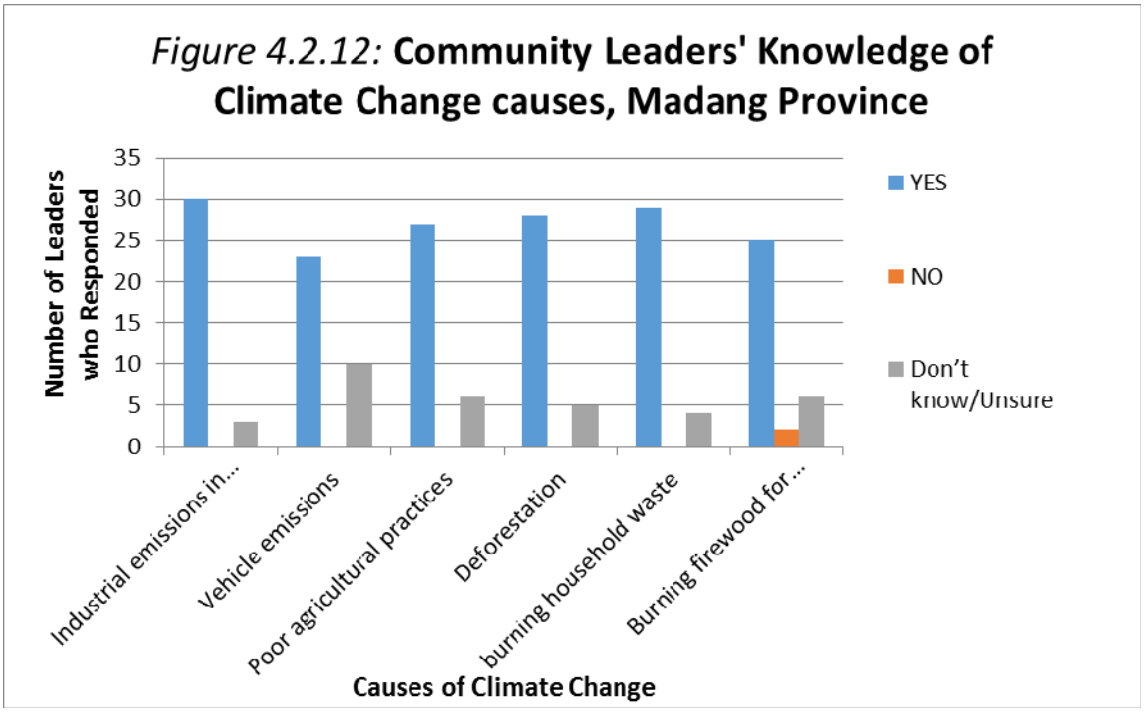
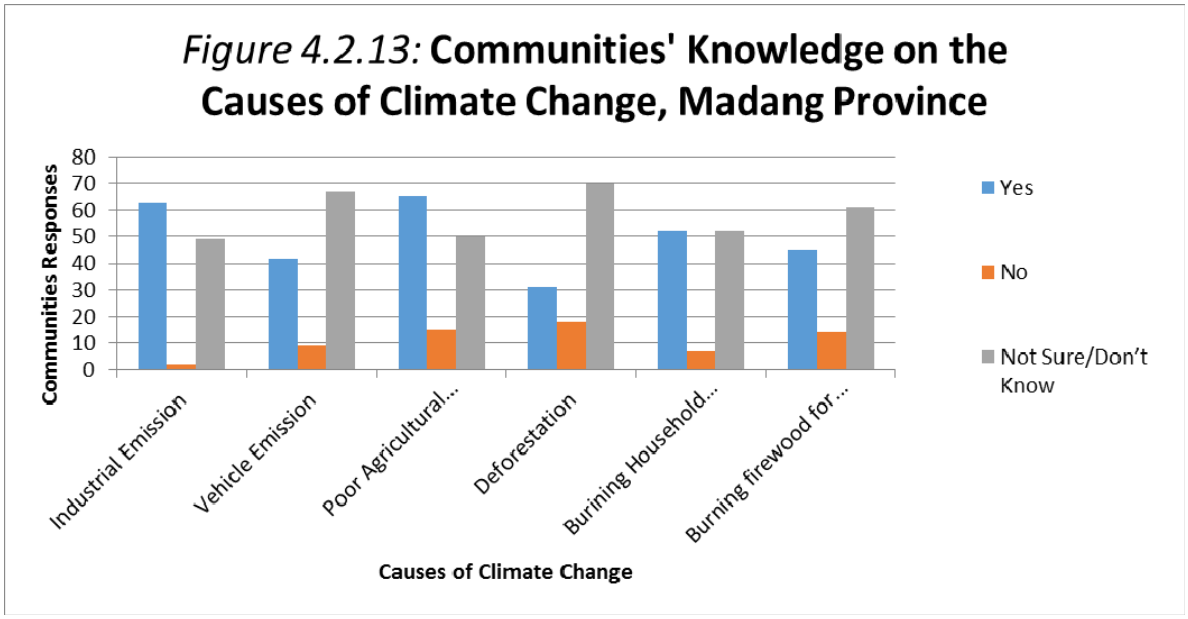


Figure 4.2.10: Children's Knowledge on Causes of Climate change, Madang Province
Number of Children Responded
70
60
50
40
30
20
10
0
YES
NO
DON'T KNOW/ NOT SURE
Industrial emissions in developed...
Vehicle emissions
Poor agricultural practices
Deforestation
burning household waste
Burning firewood for cooking
Causes of Climate Change





Examples of Natural Disasters that have affected PNG:

Based on responses from target communities, it was clear to surveyors that the respondents could easily identify and name examples of PNG's main natural disasters. They picked out the following as main natural disasters: drought, tsunami, cyclone, landslide, flood, and earthquakes. These are confirmed by Tables 4.2.1 and 4.2.2, below, which list major natural disasters in PNG based on numbers of people affected and killed since 1980.

Table 4.2.1: **Top Ten Reported Disasters (People Affected)**

Disaster	Year	Affected (no. of people)
Drought	1997	500,000
Storm	2007	162,140
Volcano	1994	152,002
Flood	1992	90,000
Flood	2008	75,300
Flood	1993	54,000
Storm	1993	40,040
Drought	1980	40,000
Flood	1999	38,000
Volcano	1983	25,000

Table 4.2.2: **Number of people killed**

Disaster	Year	Killed (no. of people)
Earthquake	1998	2,182
Mass mov. Wet	1991	200
Storm	2007	172
Epidemic	2002	122
Epidemic	1998	114
Epidemic	2009	83
Mass mov. Dry	1988	76
Epidemic	2009	62
Drought	1997	60
Earthquake*	1993	53

Source: Wani, A. H., September 2013, Disaster Preparedness Process in PNG (Consultation Report), pg. 9.

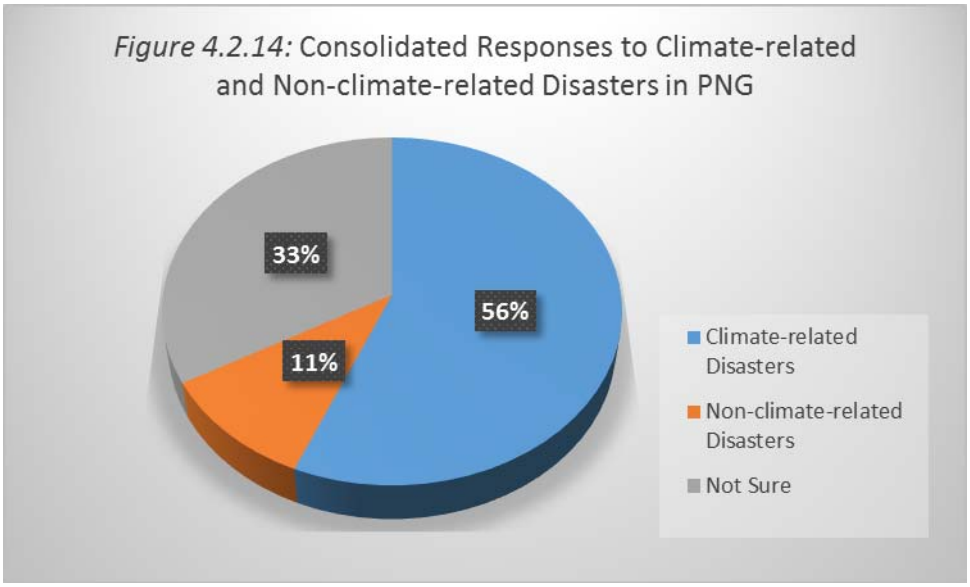
Knowledge of Climate-related and Non-climate-related Disasters in PNG:

When a list of disaster risks were posted to respondents (Table 4.2.3, part a)) most were unable to clearly identify which of these were directly related to climate change, and which were not, as shown in the second half of the same table. (However, note that landslide appears as both climate-related and non-climate-related disaster risk as it is a 'common concern'.) (Turnbull, *et. al,* 2013:7)

Table 4.2.3: Disaster Risks listed in Question 7 of Questionnaire

a) Disaster Risks listed in Questionnaire		b) Disaster Risks reclassified	
Flood		*i) Climate-related*	*ii) Non-climate-related*
Storm surge		Flood	Earthquakes
Coastal flooding		Storm surge	Volcanic eruption
Tropical cyclone		Tropical cyclone	Tsunami
Drought		Drought	Landslide
Earthquake		Landslide	
Volcanic eruption			
Tsunami			
Landslide			

Fifty-six percent of respondents agreed that all the disaster risks listed were directly related to climate change, while only 11 percent showed that they were not sure, or could not decide from the list provided. (Refer Figure 4.2.14; and also for a detailed tabulation of responses, see Annex 2.) More focus group-based educational workshops will help target populations to improve their conceptual understanding of disaster risks and be better positioned to make informed decisions in relation to climate change adaptation and disaster risk reduction activities within their respective communities.



Children and Youth – Vulnerable to Climate Change and Disasters:

The abilities of individuals and/or communities to cope with any stress brought on by disasters and/or climate change depends entirely on their levels of resilience and vulnerability. (Nakashima, *et.* al. 2012:39) Children, and youth for this matter, are generally the most affected (Turnbull, *et. al. 2013:17)* since they have lower resilience levels compared to adults.

All respondents unanimously agreed that children and youths were vulnerable to climate change and disasters. However, six percent of community facilitators and five percent of the general community indicated otherwise. (Refer Figures 4.2.15a and 4.2.15b, below.) Particularly, the small group of respondents at Banu Bridge in Usino-Bundi District said that adults will be affected at the same time and level as children and youths during onset of a disaster. So there was no reason to say children and youths alone will be affected. In other words, everyone is vulnerable.

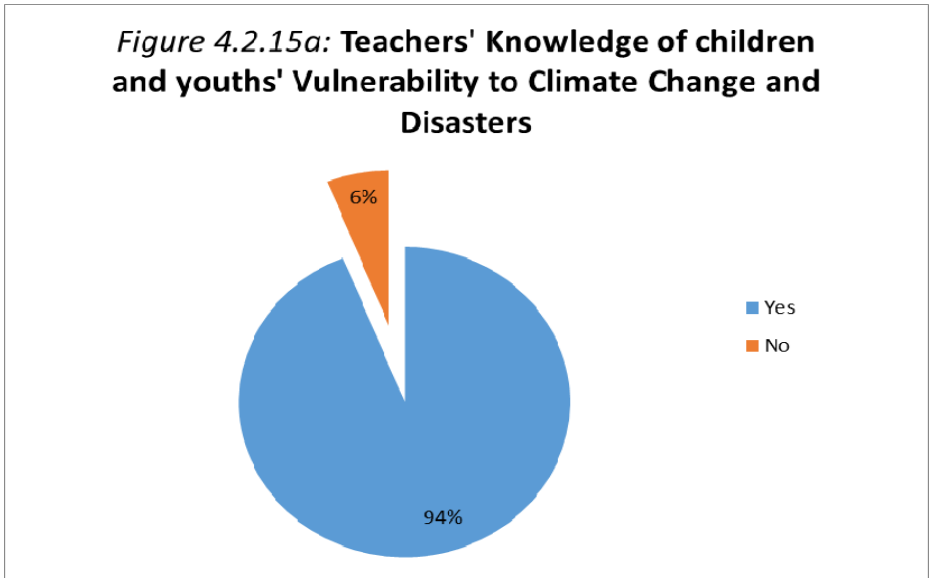


Figure 4.2.15a: **Teachers' Knowledge of children and youths' Vulnerability to Climate Change and Disasters**

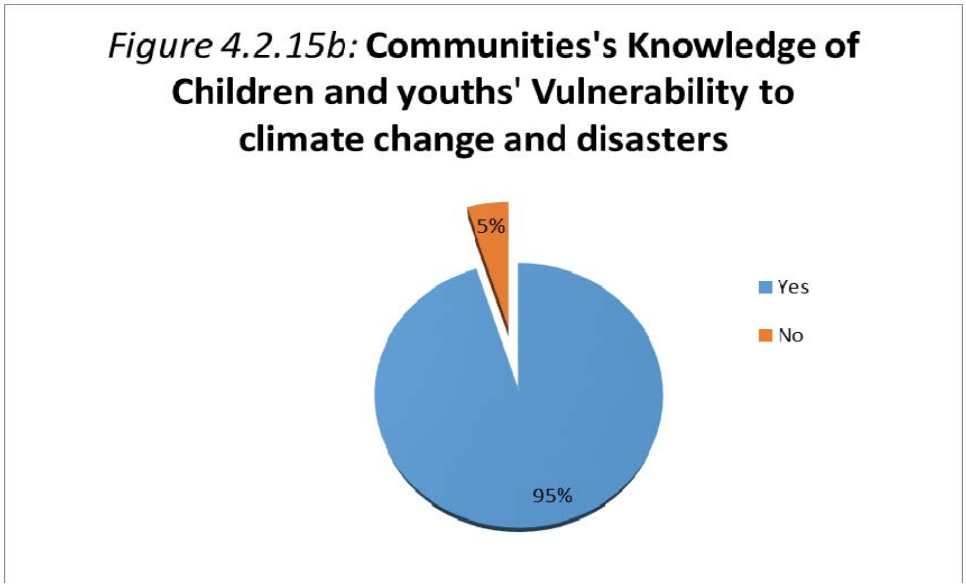


Figure 4.2.15b: **Communities's Knowledge of Children and youths' Vulnerability to climate change and disasters**

Ways Climate Change and Disasters Affect Lives of Children and Youths:

Some of the ways by which climate change and disasters affect lives of children and youths, as listed by respondents, were;

- Hinders children's learning. For instance, when a major river floods it is impossible for children and youths to cross rivers to attend schools.
- Most children become sick due to spread of diseases since children have a weaker immune system.
- Children are physically not strong enough to be resilient to disasters and climate change impacts.
- Children are weaker and cannot survive on their own.
- Disasters happen fast and quickly hence, causing confusion in the minds of children.
- Nature cannot be controlled and happens at its own timing.

Table 4.2.4, below, provides a composite list of problems faced by children (and youth) with disabilities based on respondents' knowledge and experiences in the target communities. Respondents also discussed how they can assist children with disabilities overcome their vulnerabilities and better adapt to climate change.

Table 4.2.4: Composite list of problems faced by Children with Disabilities and Possible Solutions, Middle Ramu, Usino-Bundi, and Rai Coast Districts, Madang Province.

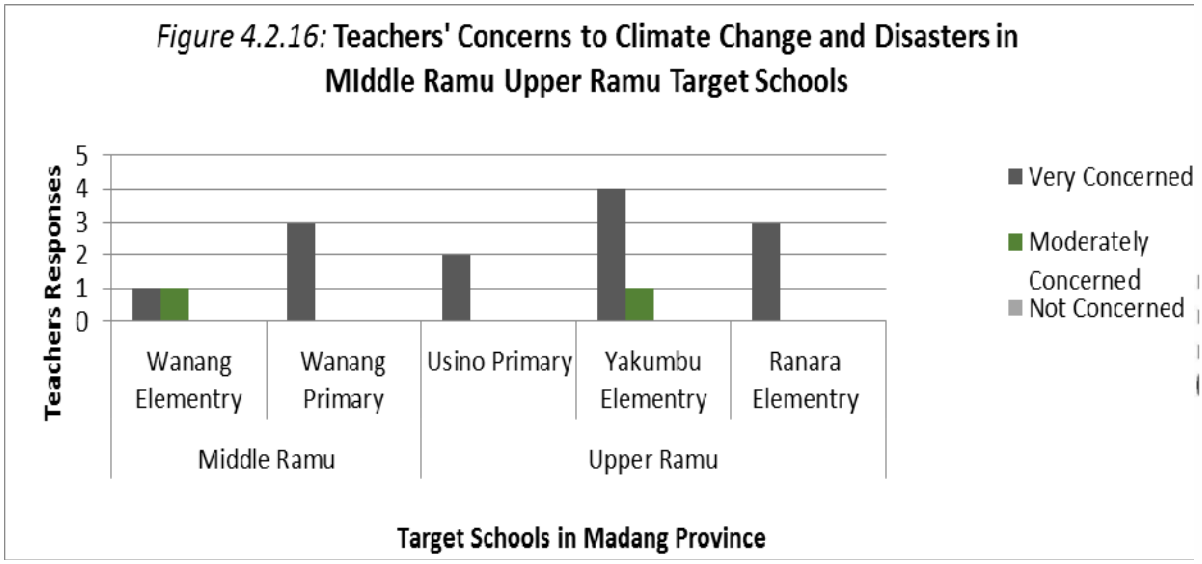
Ways Climate Change and Disasters Affect Lives of Children with Disabilities	**Ways Community can assist Children with Disabilities to Reduce their Vulnerabilities and better adapt to Climate Change**
Flood hinders learning where it makes it hard for them to cross rivers to schools.	- Build bridges over rivers for easy access to schools. - Teachers develop special schedules and lessons for home visitation of children with disabilities. - Community identify and understand the needs of children with disabilities and provide, or arrange, for appropriate assistance.
Landslide and continuous rain affects disabled children and youth's attendance to school thus it affects their learning.	- Teachers develop special schedules and lessons for home visitation of children with disabilities. - Community identify and understand the needs of children with disabilities and provide, or arrange, for appropriate assistance.
Disabled children are unable to escape disasters to safer areas on their own.	- Develop disaster plans for both schools and communities with special emphasis on children with disabilities.
Crippled students cannot walk during the wet season.	- Required a lot of assistance to move around and can become a burden to able-bodied relatives.

B: ATTITUDES TO CLIMATE CHANGE

People's Concerns to Climate Change and Disasters:

In the second part of the questionnaire, the survey team wanted to understand the people's attitudes towards climate change-induced changes in their respective communities. The first question was aimed at getting some indication of how people reacted to climate change and disasters.

Majority of respondents in the survey were very concerned about impacts of climate change and disasters, except for a few. For instance, elementary teachers from Wanang in Middle Ramu and Yakumbu in Upper Ramu (Refer Figure 4.2.16, below); eleven percent of youths (Figure 4.2.17); three percent of community leaders (Figure 4.2.19); and four percent of the general community (Figure 4.2.20) indicated they were moderately concerned. But most interesting is the fact that 19 percent of youths and 28 percent of the community were not concerned at all. (Refer Figures 4.2.17 and 4.2.20)



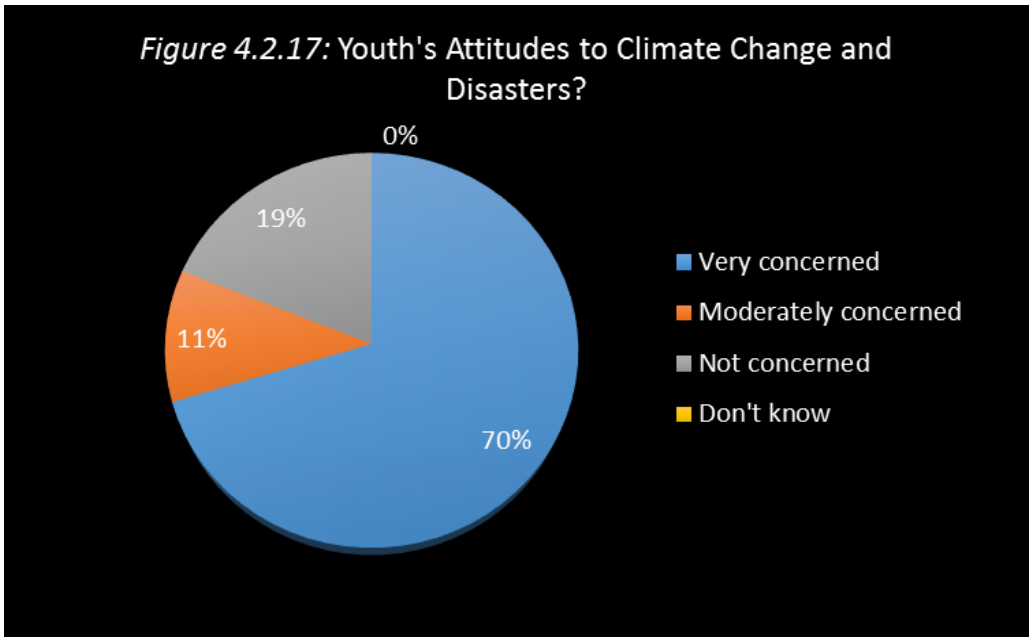


Figure 4.2.18: Childrens' Attitudes to Climate Change and Disasters

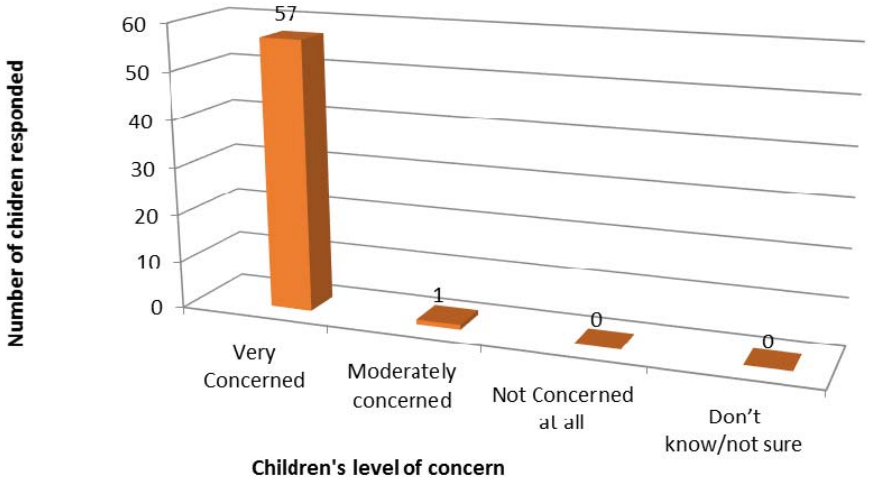
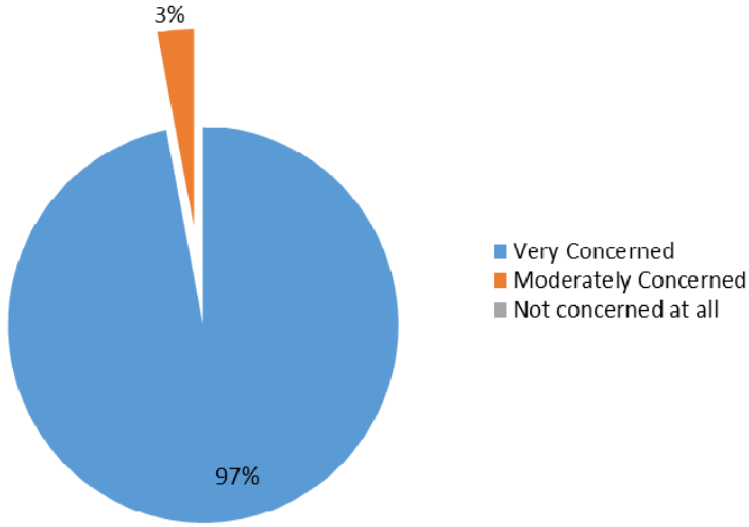
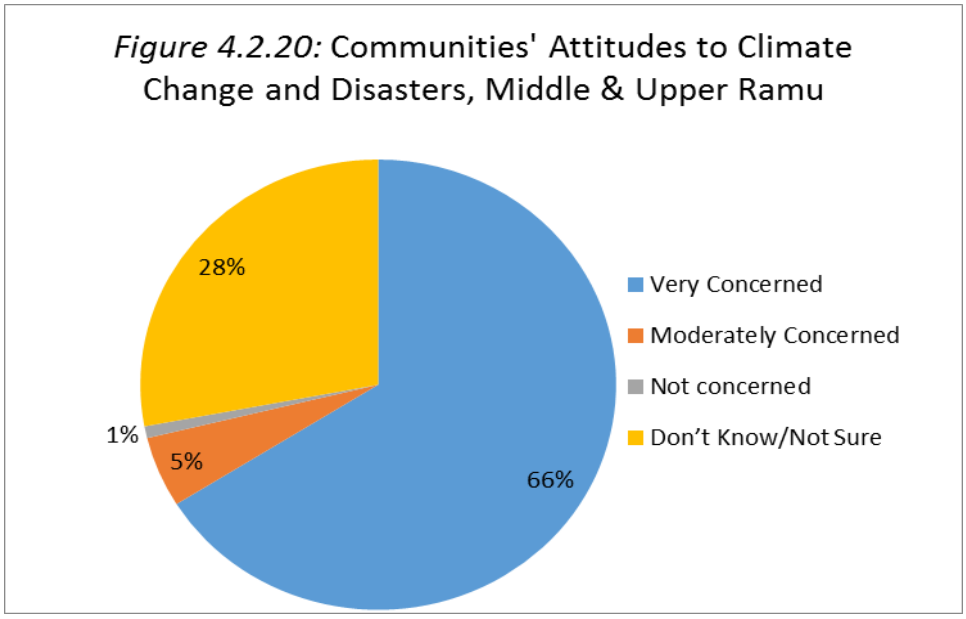


Figure 4.2.19: Community of Leaders' Attitudes to Climate Change and Disasters



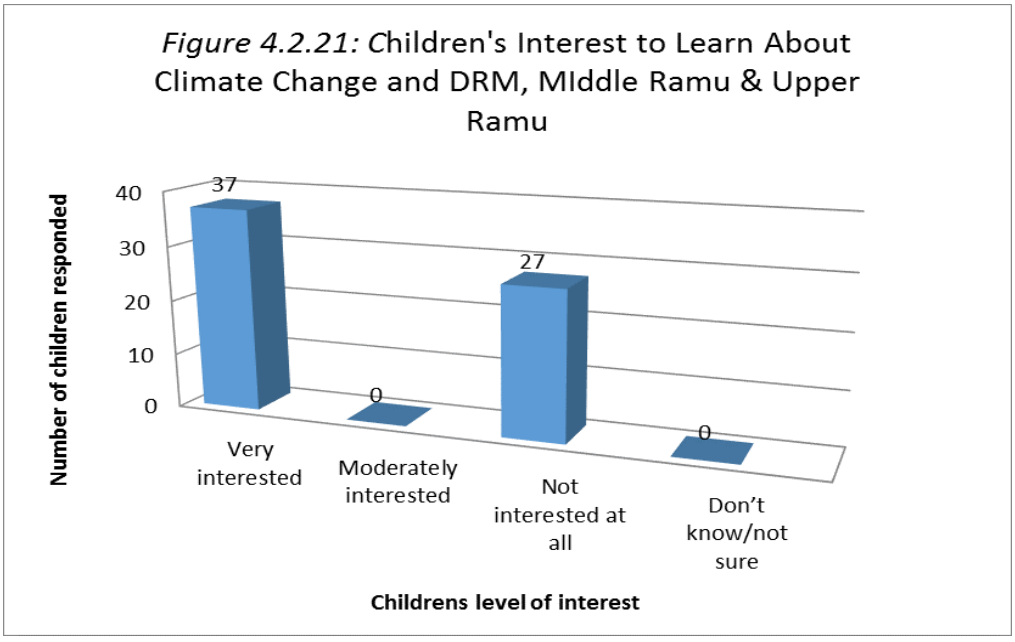


People's Interests to Climate Change and Disaster Risk Management:

All respondents showed keen interest to learn about climate change and disaster risk management. The levels of interest is very high because they mostly experienced climate change impacts, yet know very little about what this phenomenon was.

However, 27 children (or 42%) indicated that they were not interested at all (refer Figure 4.2.21). At the same time, five percent of youths (see Figure 4.2.22), and eight percent of community members refused to learn about climate change and DRM (see Figure 4.2.23).

Interestingly, also, ten percent of youths and 30 percent of community members respectively indicated whether or not to learn about climate change and DRM. It is assumed that the people did not perceive climate change as a severe issue.



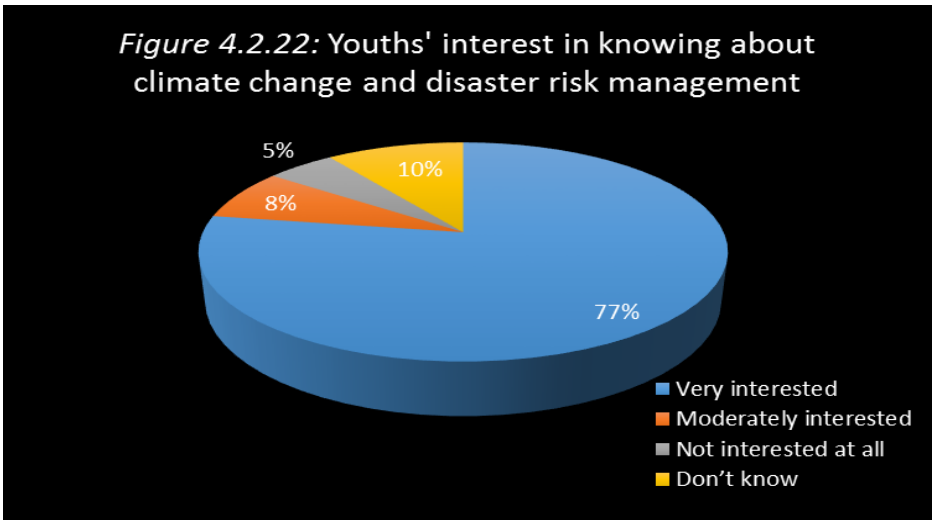


Figure 4.2.22: Youths' interest in knowing about climate change and disaster risk management

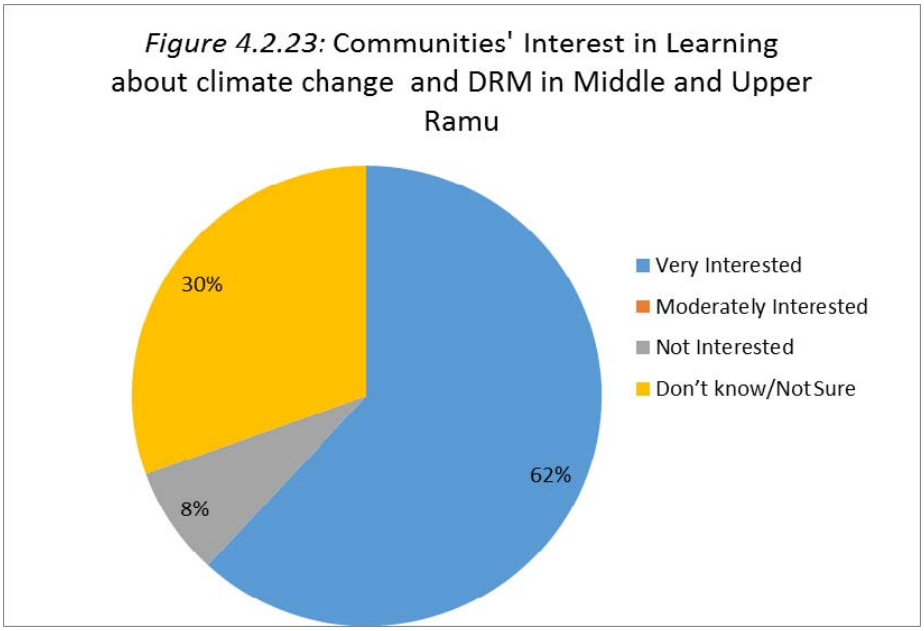


Figure 4.2.23: Communities' Interest in Learning about climate change and DRM in Middle and Upper Ramu

People's Attitudes to Climate Change and Disaster Risk Management Education:

A series of statements were presented to respondents to gauge their reactions based mainly around the theme of education to climate change and DRM. There were five statements contained in the original questionnaire. An additional one ("*I can reduce my vulnerability to climate change and natural disasters*.") was added by surveyors before conducting the actual survey. These are shown in Table 4.2.5.

All respondents 'strongly agreed' to the six statements. (Refer to Figures 4.2.24a and b; 4.2.25; 4.2.26; 4.2.27; and 4.2.28). In other words, they were convinced that the statements expressed in Table 4.2.5 were true in all totality.

However, there were few respondents that indicated 'agreed' or 'neutral'. And these were particularly elementary school teachers in the target area. (See Figure 4.2.24a and b).

With responses from youths the results were quite mixed reactions. However, if the statements in Table 4.2.5 is ranked for most preferred to the least, it would show that majority of the youths strongly agree with statement c., followed by statement b., statement a., statement d., statement e., and statement f. Interestingly, though few responded indicated that they can reduce their vulnerability to climate change and natural disasters actually meant that the majority need help in terms of climate change adaptation trainings and education in order to be more resilient. (Refer Figure 4.2.25).

Table 4.2.5: Statements Seeking Respondents' Reactions to Climate Change and Disaster Risk Management Education.

a. Children and youths are more vulnerable to the impacts of climate change and disasters, given that they are sensitive to changes and more likely to be injured or killed during disasters.
b. Children and youth have the equal rights to participate and be involved in climate change adaptation and disaster risk management work.
c. It is important to educate children and youths on climate change and disaster risk management in school to increase their capacity and awareness.
d. I want to become a trainer to train/educate others on child-centered approaches to CCA and DRM.
e. People have no control over climate change and disasters and it is an act of God.
f. I can reduce my vulnerability to climate change and natural disasters.

NB: *The last statement (f.) was added by surveyors.*

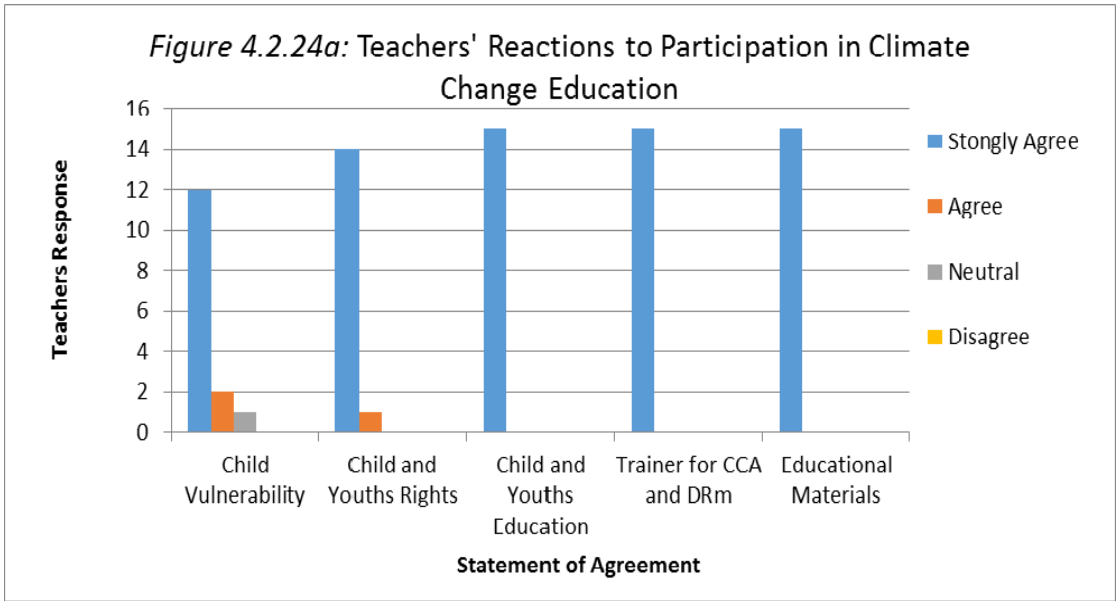


Figure 4.2.24a: Teachers' Reactions to Participation in Climate Change Education
Teachers Response
16
14
12
10
8
6
4
2
0
Child Vulnerability
Child and Youths Rights
Child and Youths Education
Trainer for CCA and DRm
Educational Materials
Statement of Agreement
Stongly Agree
Agree
Neutral
Disagree

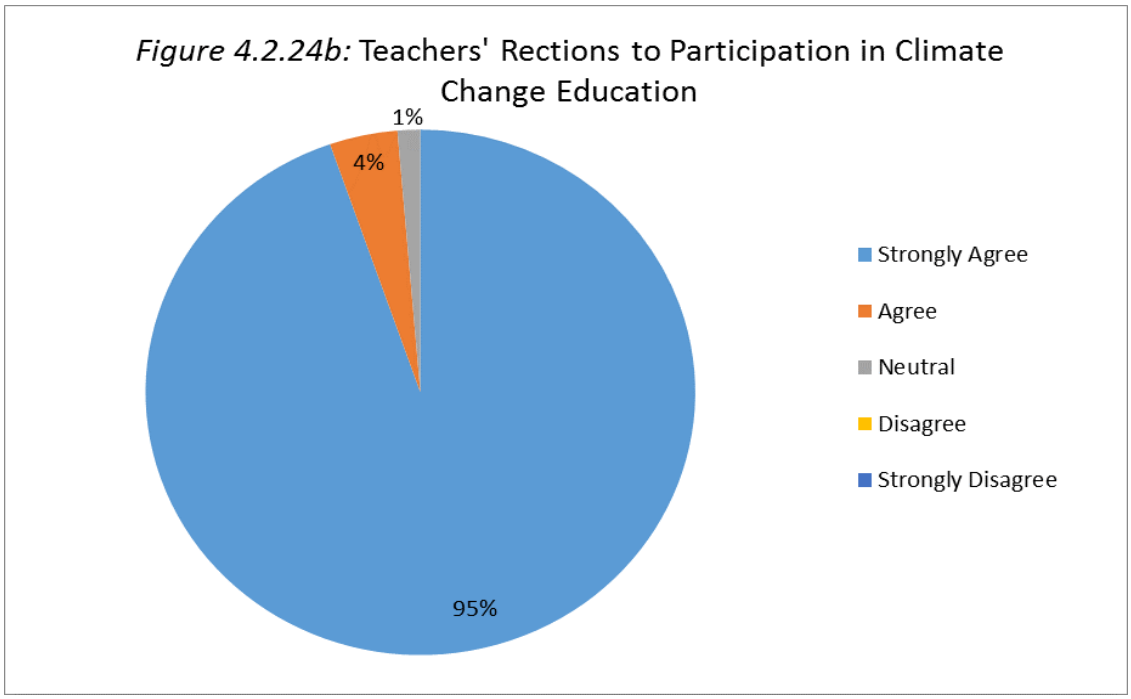


Figure 4.2.24b: Teachers' Rections to Participation in Climate Change Education
1%
4%
95%
Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree

Figure 4.2.25: Youth's Attitudes to CC/DRM Education, Middle & Upper Ramu, Madang Province

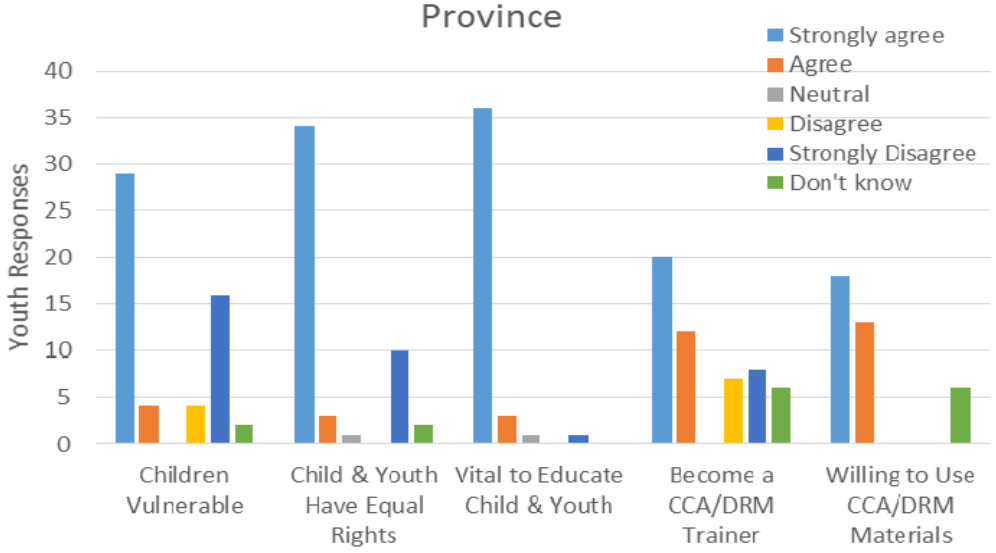


Figure 4.2.26: **Children's Attitudes to CC/DRM Education, Middle & Upper Ramu, Madang Province**

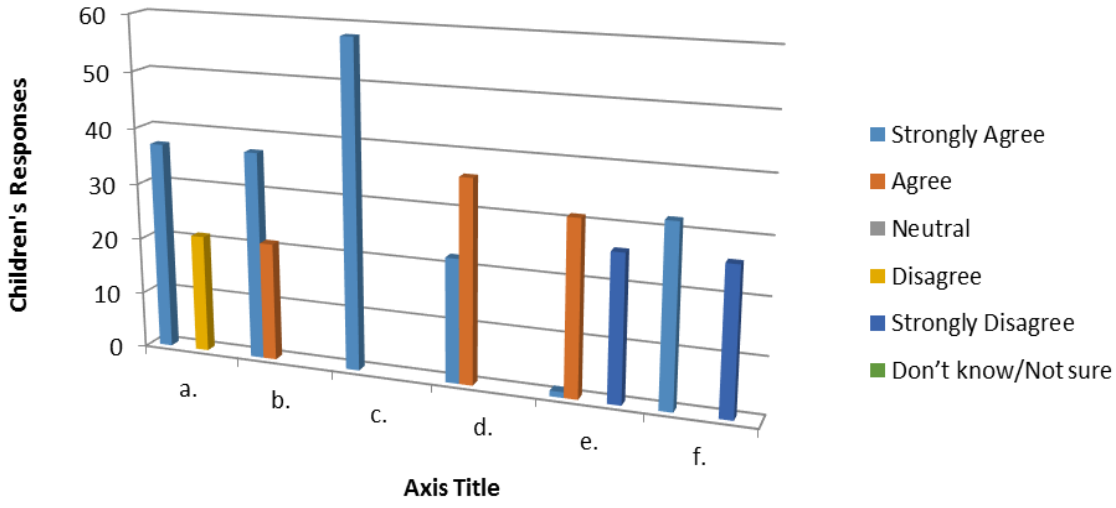


Figure 4.2.27: Community Facilitators' Attitudes to CC/DRM Education, Middle & Upper Ramu, Madang Province

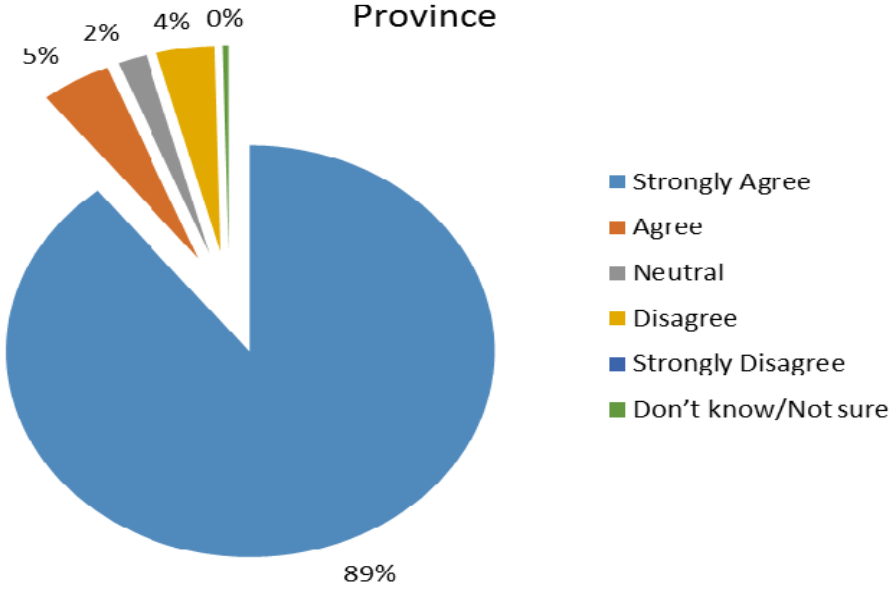
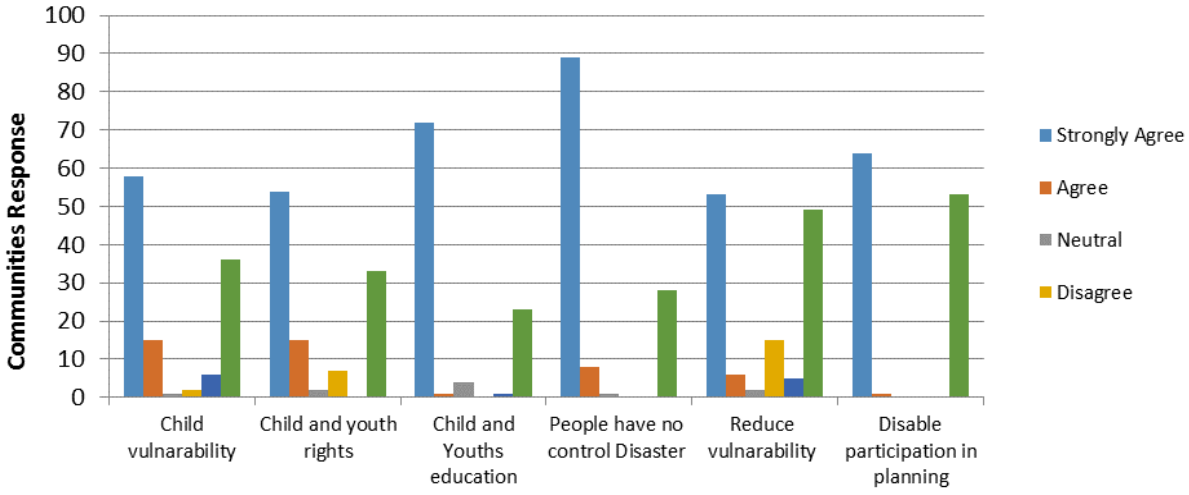


Figure 4.2.28: Communities' Attitudes to CC/DRM Education, MIddle & Upper Ramu, Madang Province.

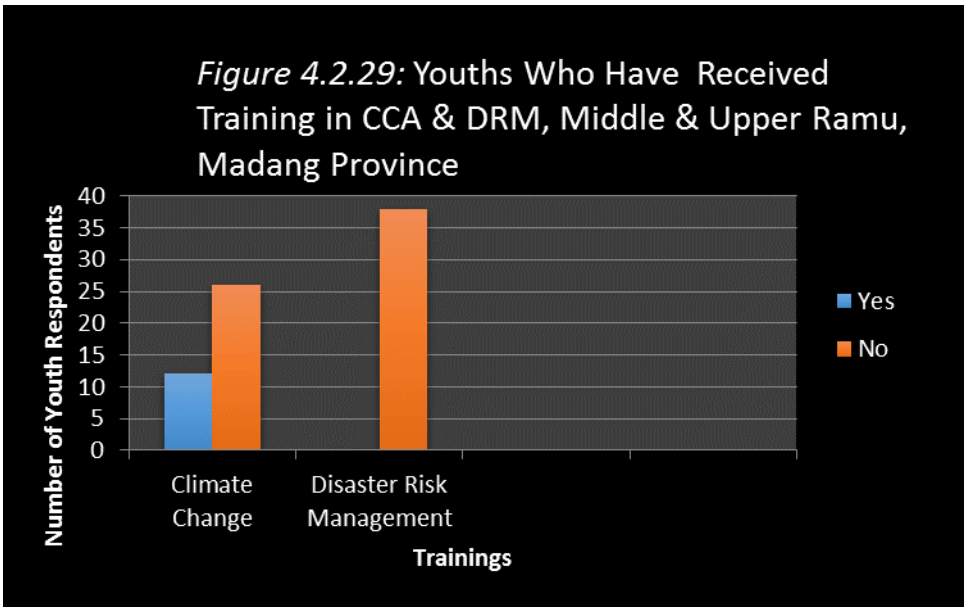


C: PRACTICES IN CCA AND DRM

In the third and final part of the questionnaire, the survey team wanted to understand the people's current practices in terms of adapting to the changes due to onset of climate change.

Previous Training in Climate Change and Disaster Risk Management:

The first and second questions under this section were aimed at determining whether any target focus group members participated in previous CCA and DRM trainings. It was unanimous from their responses that none of the respondents had participated in any formal or informal trainings on climate change and DRM. Only about twelve (or 32%) youths indicated they heard about climate change in their science lessons in school. But this was only briefly introduced. At the same time none of them had received any training in DRM. (Refer Figure 4.2.29, below).



Training/Lessons in Climate Change and DRM:

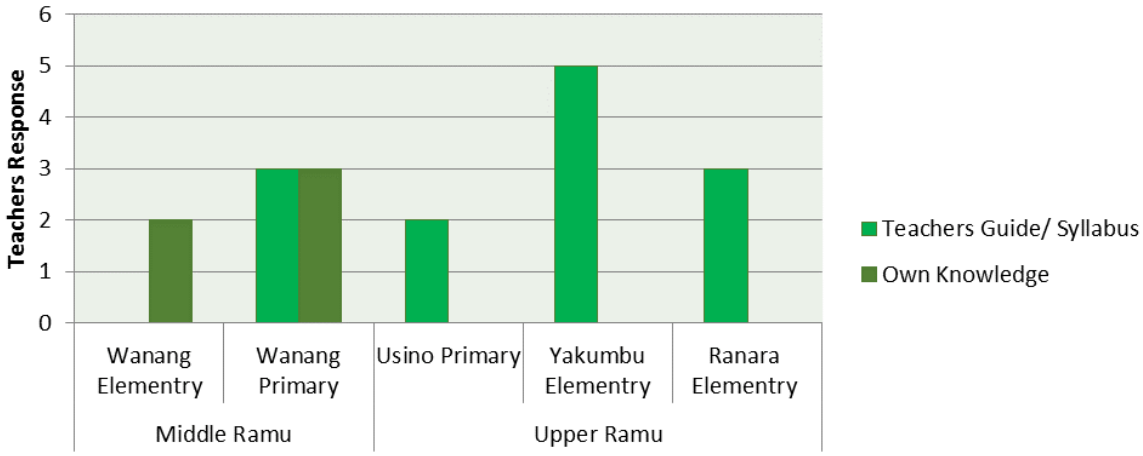
It was clear in the previous section of this report that none of the respondents had received training in CCA and DRM. However, the next question that needed to be answered was whether the respondents themselves had taken the initiatives to train others about CCA and DRM. And like the previous question, none of the respondents positively responded to this question, except for teachers.

Interestingly, all teachers indicated they have conducted formal lessons on CCA and DRM in class. Their response is captured by Figure 4.2.30. Most of the teachers used the national Teacher's Guide, or Teaching Syllabus, which is the formalized manual for all teachers in PNG. Some teachers used information they gained through their own research, including reading from print media, and information from relevant government sources. They then transferred this information to their students in class.

The survey learned that the Wanang Elementary and Primary Schools, because of their location within a declared Conservation Area, students from these schools were able to annually receive both international and national researchers who come to study the local

flora and fauna within the Wanang Conservation Area. These researchers are often invited to address students about their work, and other topics of concern. Some of these sessions included information about climate change and its related impacts. Hence, the teachers at this school were also well-informed about climate change, who then communicated these to their students, as the graph in Figure 4.2.30, below, indicated.

Figure 4.2.30: Teachers Who Have Taught CCA and DRM lessons in class, Middle & Upper Ramu, Madang Province



Are CCA and DRM in Formal Education System Sufficiently Covered?

All Primary school teachers interviewed mentioned that they cover a bit on climate change in their Science and Social Science lessons using syllabus provided by the national Department of Education. (Refer to Figure 4.2.30). They still needed in-depth information to supplement their teaching.

It was also interesting to note that all Elementary Schools in PNG have their teaching syllabus based on the local traditional seasonal calendars. For instance, lessons organized for the first term of the education calendar (February, March and mid-April) correspond with the wet season, flooding rivers and plains, harvesting of fruit crops, breeding season for certain birds and animals; lessons for the second term (mid-April, May, and June) corresponded with the first part of the dry season, harvesting of root crops like sweet potatoes, yams, cassava, and taro, fruiting of bigger tree crops like mangos, breadfruit, migrations of certain birds and insects; while in term three topics are based around advanced stages of the dry season and include soil tiling and preparation for replanting of root crops like taro, yams, sweet potatoes, in readiness for the wet season.

With onset of climate change, which drastically impacts and changes local climate and weather patterns, local traditional calendar has become more confusing. Harvesting and fruiting seasons have changed and become unpredictable. Consequently, the elementary education calendar and lessons that are based on local traditional seasonal calendar are impacted directly.

All teachers agreed that there is insufficient information provided by the Department of Education to teach climate change, though briefly covered in science and social science classes when discussing climate and weather. But there is no materials on CCA and DRM.

Teachers were of the opinion that the Department of Education was ignorant about key issues affecting the lives of rural people in PNG, and these included climate change and DRM. So the people are not being prepared sufficiently in adapting to the new changes in climate.

Hence, there is a need to include CCA and DRM information in elementary and primary education materials so that these are covered in-depth with students for a better understanding of the concepts. With very little information there is so much misconception, and misinformation which creates fear amongst people, especially in children and the elderly.

Should CCA and DRM be included in the education system in PNG schools?

Teachers unanimously agreed for CCA and DRM to be included in the education syllabus so that these are taught at the primary school level. This way children understand climate change and its impacts at an early age. When they become adults later they will be better prepared and adapt to the new climatic conditions.

Picture 4: *Ramu River at Banu Bridge, Usino-Bundi District, one of two proposed sites for river/stream flow gauge stations. Members of Banu settlement next to this bridge were met and made aware of this plan while participating in the KAP survey.*

5. Concluding Remarks and Recommendations

The KAP survey conducted in Middle Ramu and Usino-Bundi (referred to as Upper Ramu in this report) District of Madang Province, interviewed 274 respondents from ten target communities, and six schools. Forty-seven percent of respondents were female, while thirty-seven percent were children and youths. Although the survey only covered communities accessible by road we can confidently conclude that the results contained in this report is a fair representation of current field conditions, in terms of CCA and DRM.

Although the survey only covered communities accessible by road, it can be confidently concluded that the results are a fair representation of current field conditions in terms of CCA and DRM knowledge levels. The results are summarized below.

a) **KNOWLEDGE** of Climate Change:

i) Most respondents first heard of "climate change" through mainstream media.

ii) The elders "experienced" climate change before they came across the term "climate change". The changes were "experienced" during the implementation of their traditional village calendar.

iii) Many respondents were able to pick out the right words to define "climate change". These words did not differ too far from the definition as described by the IPCC.

iv) Respondents were clearly unable to differentiate between climate change and natural disasters, and their linkages.

v) With very little understanding of climate change concepts, compounded by ongoing misinformation, there is a certain degree of fear amongst the people, especially the elders since the future is unknown under the new conditions.

vi) There were mixed feelings in regards respondents' understanding of actions contributing to climate change. Adults squarely blamed industrialised nations as main contributors, while defending their fuelwood burning and poor agricultural practices as insignificant. Children and youths, on the other hand, indicated that all mankind whether in developed or third world nations must bear the blame as human activity contributed to climate change. Many respondents were still unsure about the causes of climate change.

vii) There were also mixed reactions, in regards children and youths' vulnerability to climate change and disasters. While many agreed children and youths were the most vulnerable, some argued that everyone, together with children, youths and adults were equally vulnerable.

b) **ATTITUDES** to Climate Change and Disasters

i) Majority of people interviewed were concerned about climate change and disasters, and were keen to learn more about them.

ii) There were few respondents who indicated they were not interested in learning about climate change and DRM. It was concluded that these people did not perceive climate change as a severe issue.

iii) Based on respondents feedbacks, the most preferred actions in terms of educating target groups on CCA and DRM is as follows;

c) **PRACTICES** in CCA & DRM**:**

i) None of the respondents had undergone any previous climate change and DRM training.

ii) Teachers indicated they made attempts at discussing climate change in their classes. But require additional information and material support to enhance their eagerness to teach the subject.

iii) The Wanang community, since they are located within a Conservation Area, have sufficient contact with external sources, including researchers that enlighten them with relevant information on climate change and DRM to some degree.

iv) CCA and DRM is insufficiently covered in the national school curriculum although elementary schools use traditional seasonal calendars. At the same time, primary schools briefly covered climate change in science lessons.

v) Respondents have requested that CCA and DRM be included in the education syllabus. More information and resources should be provided to teachers who are struggling to educate the next generation in their care.

Priority Level	Actions in CCA & DRM
Most Preferred **Least Preferred**	1) It is important to educate children and youths on climate change and DRM in school to increase their capacity and awareness. 2) Children and youth have the equal rights to participate and be involved in CCA and DRM work. 3) Children and youths are more vulnerable to the impacts of climate change and disasters, given that they are sensitive to changes and more likely to be injured or killed during disasters. 4) I want to become a trainer to train/educate others on child-centered approaches to CCA and DRM. 5) People have no control over climate change and disasters and it is an act of God. 6) I can reduce my vulnerability to climate change and natural disasters.

Based on this report, the following recommendations are proposed as the way forward, but are not in order of priority.

Recommendation 1:

The concept of climate change is fairly new amongst target communities in Middle Ramu and Usino-Bundi Districts. There is clearly hunger for information. So much has been said but with insufficient detail as mainly these information is highly technical and complex for villagers to comprehend, let alone teachers. Clearly, the people are confused as to what climate change phenomenon really is. Associated with insufficient information, is an increasing level of fear, especially amongst the senior population.

It is recommended that FPCD, with support from Office of Climate Change and Development (OCCD) and concerned stakeholders in Madang, including World Vision International, Red Cross Madang Branch, and the Madang Provincial Disaster and Emergency Coordination Office, through the 4CA concept be the catalyst these people have been seeking to enlighten their lack of information on climate change and DRM. This can be achieved through;

i) A series of workshops targeting focus groups (women, youths, teachers, old people, and people with disability, and school children) carried out over the duration of the project.

ii) In-services for teachers, facilitated by a climate change expert, during term breaks when teachers are free from their teaching commitments.

iii) Facilitate competitions amongst schools like spelling, debates, drawing, and fun games as a means of educating school children with CCA and DRM themes.

iv) Awareness and education roadshows be conducted in all target communities to explain and differentiate between CC and its effects/impacts and natural disasters associated with CC using visual aids mediums to effectively convey CC information.

v) Introduce and share with OCCD a daft Teacher's Guide on Climate Change Education for Lower Primaries developed in 2013 for potential integration into the PNG Education system. This will also directly contribute to enhancing Pilar 5 of PNG National Vision 2050.

Recommendation 2:

FPCD should network closely with organisations and interest groups within PNG in pooling resources together to use in educating families and youths on climate change adaptation and disaster risk reduction activities. Since all target communities have been impacted in one way or the other by climate change-induced flooding, impacting agriculture and food crops, adaptation activities should look at introducing flood-tolerant and drought-resistant cropping to;.

i) Youth groups interested in participating in agriculture; and

ii) Target primary schools, as part of grades 7 and 8 agriculture lessons. Schools have requested for seeds for their agricultural sessions. Past lessons have mainly been classroom-based. With the supply of flood-tolerant and drought-resistant crop seeds school children can be able to put into practice the theory sessions.

In addition to introducing food crops, FPCD, in close consultation with the Madang provincial authority and network partners in Madang Province, and PNG, introduce programmes aimed at reforestation of hillsides, river banks, and other high disaster risk areas. Reforestation can be effectively managed by engaging with schools and school children in target communities.

Recommendation 3:

All villages and Local Level Government Council Wards need to be empowered to handle climate change-related floods and other disasters within their areas of responsibilities. Many lacked the necessary skills and knowledge to handle crises of this nature.

Disaster preparedness planning sessions should start at the community level. These plans then get integrated into the Local Level Government plans, the District plans and then into the Provincial plans.

Recommendation 4:

Engage closely with schools and church mission stations in the establishment of early warning system for floods in most of the main tributaries of Ramu River. Engaging with schools is beneficial to schools as children will learn the use of these instruments and be able to take readings.

Picture 5*: A husband and wife heading home from their garden, wading through Ramu River overflowing onto the main Madang Highway at Waput, Usino-Bundi District. Trees and other vegetation in the background are dying as the area is now waterlogged.*

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Picture 6: *The survey team faced few challenges in certain areas of the two target districts while conducting the KAP survey. Here, the team crossed Sogeram River to meet with Koromasaric community and access Wanang Elementary and Primary Schools.*

7. Appendices

Appendix 1: Details of Schools Involved in KAP Survey, Middle Ramu and Usino-Bundi Districts, October 2014 (incomplete)

Name of School	Summary of Respondents								
	Total Enrolments	By Gender		*Total Teaching Staff*	By Gender		*Disabled Children Enrolled*	By Gender	
		M	F		M	F		M	F
Wanang Elementary & Primary									
Usino Elementary & Primary	*700*	500	200	21	9	12	0	0	0
Waput Adventist Elementary & Primary	*361*	200	165	15	6	9	1	1	0
Sausi Primary									
Yakumbu Elementary									
Ranara Lutheran Elementary & Primary							1	0	1
Totals									

Appendix 2: Detailed Consolidated Responses to Question 7 in KAP Survey, Middle Ramu and Usino-Bundi Districts, October 2014

Examples of Disaster Risks	Climate-related					Non-climate-related					Not sure				
	Teachers	*Youths*	*Children*	*Community Facilitators*	*Community*	*Teachers*	*Youths*	*Children*	*Community Facilitators*	*Community*	*Teachers*	*Youths*	*Children*	*Community Facilitators*	*Community*
Flood	14	35	11	27	48	0	0	28	0	28	1	3	21	6	48
Storm Surge	10	27	28	26	66	1	0	0	0	22	4	17	31	7	46
Coastal Flooding	13	26	28	19	44	0	3	0	7	20	2	13	31	7	54
Tropical Cyclone	11	31	52	18	59	2	0	0	7	6	3	8	5	8	51
Earthquake	10	38	52	16	46	1	0	0	1	13	4	0	5	16	66
Volcanic Eruption	5	32	49	16	23	4	4	10	9	16	6	3	0	8	85
Tsunami	9	34	49	26	56	3	1	0	1	7	3	0	10	6	61
Landslide	15	25	59	19	44	0	2	0	7	24	0	13	0	7	56
Sub-totals	*87*	*248*	*328*	*167*	*386*	*11*	*10*	*38*	*32*	*136*	*23*	*57*	*103*	*65*	*467*
Totals					***1216***					***227***					***715***
													Total Respondents		**2158**

Appendix 3: Sample Questionnaire (School Teachers) used in KAP Survey in Middle Ramu and Usino-Bundi Districts, Madang Province.

SHEET 1: SCHOOL TEACHERS

Instructions: You can conduct focus group discussion or have consultation with individual teachers

A. General level of school

☐Primary ☐ Secondary

Name of school:

_____

B. Method of survey and number of teachers consulted

☐ Individual consultation

☐ Focus group discussion
State total number participated: _____

KNOWLEDGE

1. Have you ever heard of the term “climate change”?

   ☐ YES ☐ NO

If YES, where did you hear about climate change?

☐ Radio ☐ Newspaper ☐ Through a Government Official
☐ Internet ☐ Through a friend/relative/family member
☐ TV
☐ Other, please specify _____

2. What do you think is meant by Climate Change?

_____
_____
_____

3. Give some examples of effects of climate change.

_____
_____
_____

4. Are the following linked to climate change and its impact? (tick where appropriate)

	YES	NO	DON'T KNOW/NOT SURE
Hurricanes			
Increased greenhouse gases			
Sea level rise			
Earthquakes			
Increase in air and sea temperatures			
Global Warming			
Tsunami			
Coral bleaching			
No specific association			

5. What has caused climate change?

	YES	NO	DON'T KNOW/NOT SURE
Industrial emissions in developed countries			
Vehicle emissions (smoke from cars, boats, generators)			
Poor agricultural practices (such as overgrazing, burning)			
Deforestation			
Burning household waste			
Burning firewood for cooking			

6. Give examples of natural disasters that has affected your country?

_____

_____

_____

7. Classify the following as a climate related disaster and non-climatic related disaster.

DISASTER	CLIMATE RELATED	NON-CLIMATE RELATED	DON'T KNOW/NOT SURE
Flood			
Storm surge			
Coastal flooding			
Tropical cyclones			
Droughts			
Earthquakes			
Volcanic eruptions			
Tsunami			
Landslides			

8. Are children and youth more vulnerable to climate change and disasters?

☐ YES ☐ No

Please state your reasons:

_____

_____

_____

9. How does climate change and disasters affect their (children and youths) lives?

_____

_____

_____

ATTITUDE

1. How concerned are you about climate change and disasters?

☐ Very Concerned ☐ Moderately concerned

☐ Not concerned at all ☐ Don't know/Not sure

2. How interested are you in knowing about climate change and disaster risk management?

☐ Very Interested ☐ Moderately interested

☐ Not interested at all ☐ Don't know/Not sure

3. State your level of agreement with the following statements: (put a tick where appropriate)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't know/ Not sure
Children are more vulnerable to the impacts of climate change and disasters, given that they are sensitive to changes and more likely to be injured or killed during a disaster.						
Both, children and youths, have the equal right to participate and be involved in climate change adaptation and disaster risk management.						
It is important to educate children and youths on climate change and disaster risk management in schools to increase their capacity and awareness.						
I want to become a Trainer to train/educate others on child centred approaches to CCA and DRM						
I am willing to use educational materials, such as story books, teachers guide and resource book, comics, etc on CCA and DRM in classroom						

PRACTICE

1. Have you received training on the following:

a. Climate change ☐ YES ☐NO

IF YES, please specify:

_____

_____

b. Disaster Risk Management ☐ YES ☐NO

IF YES, please specify:

_____

_____

2. Have you conducted formal lessons on CCA and DRM in classroom?

☐ YES ☐ NO

IF YES, please state how the lessons were conducted and what educational materials were used:

_____

_____

3. Do you think there has been sufficient work done on climate change adaptation and disaster risk management, specifically with *child-centred approaches* in the formal education system?

☐ YES ☐NO

IF NO, what are the reasons in your opinion?

_____

_____

_____

_____

4. What has been done to build capacity and raise awareness of children on climate change adaptation and disaster risk management? For example, formal classes on CC and DRM, child-led/target activities, educational material development on CCA and DRM, etc.

_____

_____

_____

_____

5. Do you think CCA and DRM should be included into the education system in schools?

☐ YES ☐ NO

IF YES, what are you recommendations?

☐ As an extra-curricular activity ☐ Should be part of the curriculum

☐ NGO's and government's official raising awareness in schools

☐ Others, please state:

_____

_____

Thank you for your time.

8. Acknowledgement

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