

SECRETARIAT OF THE PACIFIC COMMUNITY

**Climate Change and Food Security Vulnerability Assessment
for Sepa and Loimuni**

*SPC/USAID Project on “Enhanced Climate Change Resiliency of Food Production
Systems in Selected Pacific Island Countries”*

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Table of Contents

	Page s
Table of Contents.....	1
List of Tables.....	2
List of Figures.....	3
1.0 Introduction.....	4
1.1 Area Description.....	4
1.2 Project Site.....	5
1.3 Objective.....	5
2.0 Methodology.....	5
2.1 Site Selection Process.....	5
2.2 The process and Assessment Team.....	5
3.0 Results.....	8
3.1 Climate Change Vulnerability Assessment for Sepa Village.....	10
3.2 Climate Change Vulnerability Assessment for Loimuni Village.....	11
3.3 Households Income.....	11
3.4 Housing/Housing Types and Appliances.....	12
3.5 Land Access and Land Use.....	12
3.6 Food Consumption Analysis.....	16
3.7 Transect Walk Findings.....	18
4.0 Discussions.....	19
5.0 Recommendations.....	27
Appendices.....	27

List of Tables

Tables	Pages
Table 1 Sepa Village Exposure to Climatic Change.....	8
Table 2 Sepa Village Sensitivity to Climate Change.....	8
Table 3 Sepa Village Adaptive capacity to Climate Change.....	9
Table 4 Loimuni Village Exposure to Climatic Change.....	10
Table 5 Loimuni Village Sensitivity to Climate Change.....	10
Table 6 Loimuni Adaptive Capacity to Climate Change.....	11
Table 7 Households Income.....	12
Table 8 Housing types, Water Sources and Facilities.....	12
Table 9 Land Access and Land Use.....	13
Table 10 Energy Availability.....	14
Table 11 Protein Availability.....	14
Table 12 Transect Walk Findings.....	15
Table 13 Adaptation Strategies for Sepa and Loimuni Villages.....	20
Table 14 Master Logframe.....	22
Table 15 Detailed Logframe.....	23

List of Figures		
Figures		Pages
Figure 1	Map of Choiseul Island showing the communities selected.....	4
Figure 2	PRA Steps and Tools.....	6

1.0 INTRODUCTION

1.1 Area Description

Choiseul Province (Figure 1), located in the north-west of Solomon Islands archipelago, consists of six islands, Choiseul (main island), Taro (main town centre), Vaghena Island, Rob Roy Island, and several islets, most of them lying off the south and north eastern coasts of Choiseul Island. The population of Choiseul is 26, 372 with 4,712 households and average household number of 5.5 (2009 Census).

Figure 1. Map of Choiseul Island showing the communities selected



In Choiseul, subsistence agriculture remains important for food security and livelihoods. Root crops (taro, sweet potato, yam, pana (*Dioscorea esculenta*), kakake (Giant swamp taro) and cassava and banana are the main crops grown by most households with a few families keeping indigenous pigs and chickens. Most or all livestock are kept in subsistence production systems.

Land access and possession of land in Choiseul is based on tribal landownership that connects tribe (*sinaqi*), sub-tribe (*jojolo*) and clan (*pupu*) as the communal unit that holds the right and authority over a piece of land with more than 300 tribal landowners are recognised in the province. In the indigenous context the land, sea, reefs, forests, rivers and other natural resources within a tribal land boundary are strongly connected to the tribes (Mataki et al., 2013).

1.2 Project Sites

The Solomon Island Government identified Choiseul province as a demonstration province for the ‘Ridge to Reef’ program where donor activity shall be concentrated to deliver “whole of province” support for climate change. In 2012, a team was formed comprised of Choiseul Integrated Climate Change Adaptation Program (CHICCAP) conducted a provincial vulnerability assessment (V&A) in 27 villages. Based on the results of the V&A, five villages (out of the 27 villages) were identified as potential areas for climate change adaptation demonstration projects sites. Two villages (Loimuni and Sepa Villages) out of the five villages were recommended as pilot sites for the SPC/USAID project.

The main goal of the SPC/USAID project is to evaluate and implement innovative techniques and management approaches to increase climate change resilience of terrestrial food production systems for communities in selected PICTS (Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu).

1.3 Objective

Therefore, the main objective of the assessment was to conduct a more detailed climate change vulnerability and risk assessments on land based agricultural production systems and identify adaptation measures to the impacts of climate change. More specifically:

1. Assess the degree of vulnerability to climate change on food productions systems in Sepa and Loimuni villages;
2. Assess food security situation in Sepa and Loimuni villages;
3. Identify adaptation measures to the impacts of climate change on food production systems in Loimuni and Sepa Villages.

2.0 METHODOLOGY

2.1 Site Selection Process

As mentioned above, the two villages were selected based on recommendations from the previous V&A. Villages were selected based on the following criteria (Mataki et al., 2013):

- a. high population (>100 people)
- b. geophysical factors (low-lying, unsheltered coastline or close to a river)
- c. already experiencing environmental degradation and over-exploitation of natural resources
- d. d. (stressed coastal fisheries, degraded forests and coral reefs)
- e. is experiencing reduced crop yields
- f. has experienced destruction of food crops, coastal erosion, severe storm surges and inundation as a result of tropical cyclones
- g. is an organised community (from previous experience and opinion) which will support a climate change programme.

2.2 The Process and Assessment Team

The assessment was conducted from 12th - 21st May 2013 by a team consisting five (5) SPC technical staff, three (3) SPC-GIZ Choiseul based staff, two (2) Choiseul Province Agriculture staff, two (2) UNDP staff and two (2) Ministry of Agriculture and Livestock staff along with two (2) SPC Regional Media Centre. Appendix 3 presents the list of team members.

Prior to the assessment, the assessment team met for two sessions in taro to familiarize team members on the assessment tools including the household survey questionnaires. The team then reviewed data from previous assessments and from synthesis materials to gather preliminary data for the assessment tools. Hence this assessment builds on the results of the previous V&A assessments.

2.2.1 Household income and expenditure surveys (HIES)

The primary objective of the survey is to collect information on household income and household expenditures, household consumptions and housing characteristics including other living conditions of households. Survey covered 50% of the household size in each village. The survey was conducted on the first day in each of the villages. The Survey Questionnaire used in this study is provided in Annex 5. Microsoft Excel was used to analyse data from the survey.

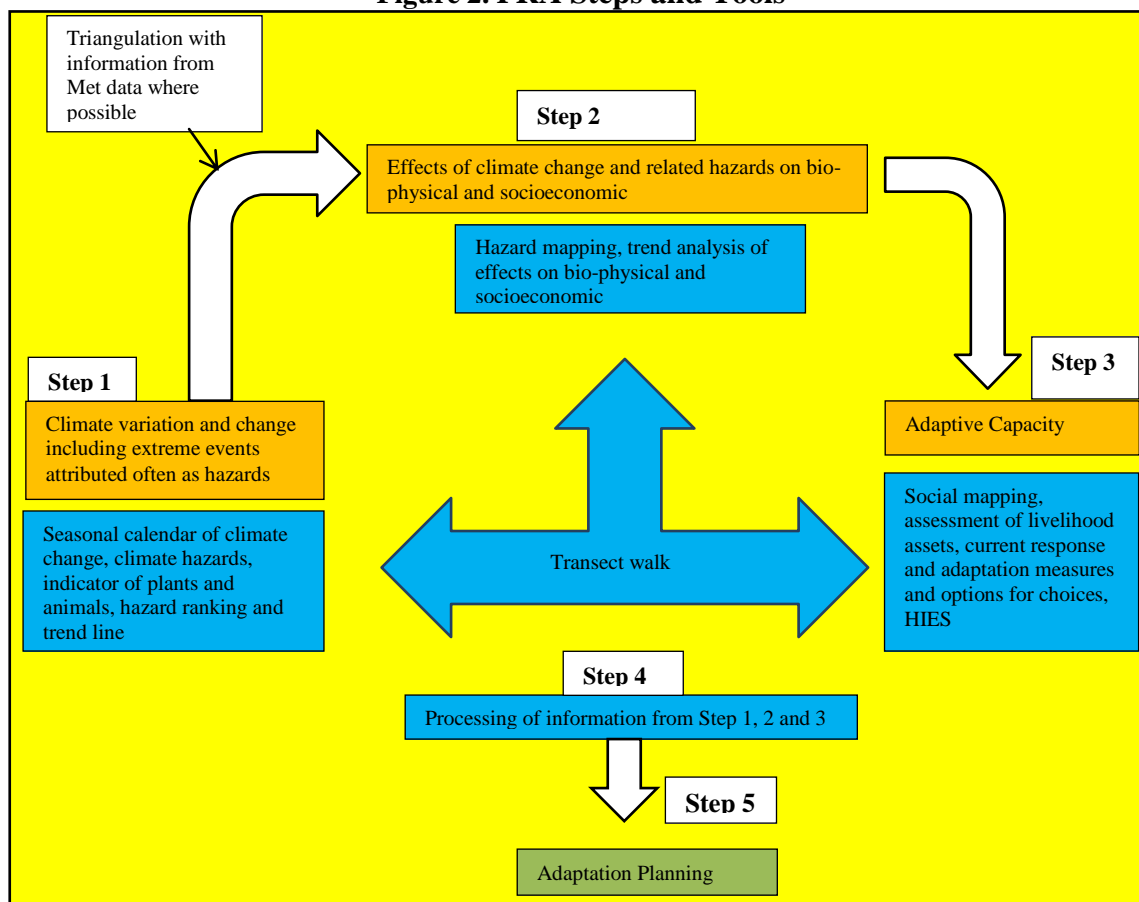
2.2.2 Participatory Rural Appraisals (PRA) Process

In each village, participants were divided into 3 groups (Men's Group, Women's Group and Youth's Group) with team facilitators from SPC and Choiseul based staff and Ministry of Agriculture helped facilitate group work. Facilitators then record the perceptions of the communities which were then collated for the analysis. Figure 2 shows the steps and tools used in the PRA process. The following definition was used to assess the communities' vulnerability to climate:

*“Vulnerability is a function of character, magnitude and rate of **climate variation** to which a system is exposed, its **sensitivity**, and its **adaptive capacity**”* (IPCC, 2001). This definition is articulated in the following equation for simplicity: $V=E \times S/A$. Where:

V = Vulnerability: The degree to which a system is susceptible to, or unable to cope with adverse effects of climate change, including climate variability and extremes.

Figure 2. PRA Steps and Tools



E = Exposure: The nature and degree to which a system is exposed to significant climatic variations (TAR, IPCC). The climate variation includes average climate change and the extreme climate variability. Exposure in this assessment, is the character, magnitude and rate of climate variation at local level. The more the local climate has changed or deviated from its historical condition or trend, the more the value of exposure (E) will be; the more the value of E means the more the system is exposed to new climate leading to high vulnerability. Through community participation, “E” is assessed through assessment of change in elements of climate over time – temperature, precipitation, etc and the hazards induced by such changes.

S = Sensitivity: Degree to which a system is affected, either adversely or beneficially, by climate-related stimuli. The effect may be direct e.g. a change in crop yield in response to a change in the mean, range or variability of temperature or indirect e.g. damages caused by an increase in the frequency of coastal flooding due to sea-level rise (IPCC, TAR) or floods, landslides, etc. Hence, sensitivity in this assessment is the effect of local climate change and related hazards on local system – biophysical and socioeconomic. Highly sensitive (S) systems will be more impacted compared to low sensitive systems even with a same level of climate change or hazards. Therefore the more the system is sensitive to climate change and related hazards, the more the system is vulnerable to climate change. Sensitivity of a system is assessed through assessment of effects or impacts or damages of the system from climate change and related hazards.

A = Adaptive Capacity: The ability of a system (in this case the “community”) to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (TAR, IPCC).

Using each of the PRA tools, E, S and A were assessed at LOW, MEDIUM, HIGH and VERY HIGH scales through assessment of their elements based on community perception. In terms of numerical, LOW was denoted by “1”, MEDIUM by “2”, HIGH by “3” and VERY HIGH by “4”.

2.2.3 Transect Walk.

After completing each of the PRA and household surveys, the team did a transect walk to validate findings of the assessment. The transect walk findings were then combined with assessment results to guide the formulation of the adaptation strategies provided in this report.

3.0 RESULTS

3.1 Climate Change Vulnerability Assessment for Sepa Village

3.1.1 Analysis of Exposure

Table 1 presents the results of the analysis of Sepa village's exposure to climate change. The average Exposure is high (3). Changes in behaviour of plants were ranked Very High.

Table 1. Sepa Village Exposure to Climatic change

Parameters	Indicators	Perceived changes	Score index
Temperature	• Numbers of hot days increased	H (3)	2.67
	• Number of cold days decreased	M (2)	
Precipitation	• Rainfall has become increased	H (3)	3
Plant and animal indicators	• Productivity of sweet potato reduced due to pest and disease	VH (4)	4
	• Change in soil texture and fertility		
	• Taro leaf blight has affected taro production	VH (4)	
	• Pest and disease problem on slippery cabbage and sweet potato	VH (4)	
Climate induced disasters	• Reduced productivity of pigs and chicken (low survival rates)	VH (4)	2.33
	• Landslide	M (2)	
	• Tsunami	M (2)	
	• Flooding	H (3)	
Average Exposure index			3

3.1.2 Analysis of Sensitivity

Table 2. Sepa Village Sensitivity to Climate Change

Parameters	Hazards	Indicators	Perceived changes	Score index
Agriculture and food security	Landslides	• Loss of productive lands	H (3)	3.38
		• Soil fertility reduced	H (3)	
	Flood	• Loss of crop production	VH (4)	
		• Affected soil texture and fertility	H (3)	
	Outbreak of pests and diseases	• Production decline (sweet potato, slippery cabbage and taro)	VH (4)	
		• Taro production reduced (TLB)	VH (4)	
		• Decline in production of slippery cabbage and sweet potato	H (3)	
Forest and biodiversity	Landslides	• Low survival rates and slow growth rate of livestock (pigs and chicken)	H (3)	2.5
		• Loss of forest cover	H (3)	
		• Emergence of new plant species	M (2)	
Infrastructure	Landslides	• Trails damaged/flooded	H (3)	3
		• Damaged farm structures and copra sheds	H (3)	
Water resources and energy	Landslides	• Loss of fresh water (Flooding)	H (3)	3
	Flood	• Reduced water quality	H (3)	
Human health	Landslides and Flood	• Emergence of waterborne diseases on kids (diarrhoea)	H (3)	3
Average Sensitivity Score				2.98

Table 2 shows the degree of sensitivity of Sepa Village to climate change. The results showed that the Sensitivity of Sepa village to adverse impacts of climate and related stimuli is Medium – High (2.98). The highest perceived level of sensitivity to climate change was on agriculture and food security particularly on outbreak of pest and disease on crops.

3.1.3 Analysis of Adaptive Capacity

Table 3 shows the adaptive capacity of Sepa village to climate change impacts on their agriculture production systems and livelihoods. The adaptive capacity is low indicating the limited capacity to adapt to climate change impacts.

Table 3. Sepa Village Adaptive Capacity to Climate Change

Parameters	Indicators	Criteria	Perceived changes	Score index
Human assets	Demography	• Old age and children	M (2)	2
	Education	• Secondary education and awareness of climate change	M (2)	
	Skill labour	• Trained workers	M (2)	
Natural assets	Land	• Land ownership and productivity	M (2)	1.67
	Forest	• Availability of product and services (but threat exist from logging and cultivation)	M (2)	
	Water	• Availability of drinking water and Water Quality	L (1)	
Financial assets	Financial institutions	• Access to Banks, cooperatives	L (1)	1.5
	Household incomes	• Sufficiency for household needs	M (2)	
Social assets	Social institutions	• Community affiliations to formal and non-formal institutions	M (2)	2
	Service providers	• Engagements of NGOs and GOs with community	M (2)	
Physical assets	Infrastructure for services	• Access to school, house, bridge, road, electricity, health posts, vehicle availability, boats	M (2)	1.5
	Information and communication sources	• Access to mobile phones, radio, TVs, papers, and internet	L (1)	
Average Adaptive Capacity Score				1.55

3.1.4 Vulnerability index of Sepa Community

Vulnerability (V) = EXS/A

$$V = 3 \times 2.98/1.98$$

Vulnerability = 5.77 (Vulnerability is VERY HIGH)

3.2 Climate Change Vulnerability Assessment of Loimuni Village

3.2.1 Analysis of Exposure

Table 4 shows the results for the analysis of community exposure to climate change. Their exposure is High (3.21).

Table 4. Loimuni Village Exposure to Climatic Change

Parameters	Indicators	Perceived changes	Score index
Temperature	• Numbers of hot days increased	H (3)	3
	• Number of cold days decreased	M (2)	
Precipitation	• Rainfall has become increased	VH (4)	4
Plant and animal indicators	• Productivity of sweet potato reduced due to pest and disease	VH (4)	3.5
	• Change in soil texture and fertility		
	• Taro leaf blight has affected taro production	VH (4)	
	• Pest and disease problem on slippery cabbage and sweet potato	VH (4)	
Climate induced disasters	• Reduced productivity of pigs and chicken (low survival rates)	M (2)	2.33
	• Landslide	L (1)	
	• Tsunami	H (3)	
	• Flooding	H (3)	
Average Exposure index			3.21

3.2.2 Analysis of Sensitivity

Table 5 shows the sensitivity of Loimuni village to climate change impacts. The average sensitivity score is Medium (2.04).

Table 5. Loimuni Village Sensitivity to Climate Change

Parameters	Hazards	Indicators	Perceived changes	Score index
Agriculture and food security	Landslides	• Loss of productive lands	H (3)	3.25
		• Soil fertility reduced	VH (4)	
	Flood	• Loss of crop production	H (3)	
		• Affected soil texture and fertility	H (3)	
	Outbreak of diseases	• Production decline (sweet potato, slippery cabbage and taro)	VH (4)	
		• Taro production reduced (TLB)	VH (4)	
		• Decline in production of slippery cabbage and sweet potato	H (3)	
	• Low survival rates and slow growth rate of livestock (pigs and chicken)	M (2)		
Forest and biodiversity	Landslides	• Loss of forest cover	M (2)	2
		• Emergence of new plant species	M (2)	
Infrastructure	Landslides	• Trails damaged/flooded	M (2)	2.5
		• Damaged farm structures and copra sheds	H (3)	
Water resources and energy	Landslides	• Loss of fresh water (Flooding)	H (3)	2.5
	Flood	• Reduced water quality	M (2)	
Human health	Landslides and Flood	• Emergence of waterborne diseases on kids (diarrhoea)	M (2)	2
Average Sensitivity Score				2.04

3.2.3 Analysis of Adaptive Capacity

Table 6 shows the average adaptive capacity for Loimuni village to climate change. The adaptive capacity is Low (1.5).

Table 6. Loimuni Village Adaptive Capacity to Climate Change

Parameters	Indicators	Criteria	Perceived changes	Score index
Human assets	Demography	• Old age and children	M (2)	2
	Education	• Secondary education and awareness of climate change	M (2)	
	Skill labour	• Trained workers	M (2)	
Natural assets	Land	• Land ownership and productivity	L (1)	1.33
	Forest	• Availability of product and services (but threat exist from logging and cultivation)	M (2)	
	Water	• Availability of drinking water and Water Quality	L (1)	
Financial assets	Financial institutions	• Lack of Banks, cooperatives	L (1)	1
	Household incomes	• Sufficiency for household needs (Limited income – distance from market)	L (1)	
Social assets	Social institutions	• Community affiliations to formal and non-formal institutions	L (1)	1
	Service providers	• Engagements of NGOs and GOs with community	L (1)	
Physical assets	Infrastructure for services	• Access to school, house, bridge, road, electricity, health posts, vehicle availability, boats	M (2)	2
	Information and communication sources	• Limited access to mobile phones, radio, TVs, papers, and internet	M (2)	
Average Adaptive Capacity Score			Low	1.5

3.2.4 Vulnerability index of Loimuni Community

Vulnerability = ExS/A

$$= 3.21 \times 2.04 / 1.5$$

= 4.37 (Vulnerability is Very High)

3.3 Households Income

Table 7 shows average income for households surveyed. On average, 63% of households surveyed in Sepa and 81% in Loimuni indicated insufficient income for their household needs. The analysis also showed that food security, traditional/church obligations are the biggest impacts on financial situation for households.

3.4 Housing/Housing types and appliances

Table 8 shows the housing and housing types for the households surveyed. The results show that majority of households live independently with most households living in thatch houses. Only 12% of the households live in timber/tin roof housing. In Sepa, more than 80% of households have access to community water supply as their main source of drinking and washing while in Loimuni, household

tanks and protected wells are the common water sources. Majority of the households lack proper toilet facilities. Most households have solar panels as their main source of lighting while 100% of the households use open fire for cooking.

Table 7. Households Income

Village	Income Sources (Week)							Income Insufficiency		Expenses Impacting financial situation most
	<i>Farming</i>	<i>Marine produce</i>	<i>Salary</i>	<i>Remittances</i>	<i>Other</i>	<i>Total</i>	<i>Income/ households</i>	<i>%</i>	<i>Methods for moderating expenses</i>	
Sepa	3735	711	3735	1350	132	9663	357	63	Extended Families	Food Security
Loimuni	3123	845	6985	4963	791	16707	63.52	81	Extended families, Barrowing	Traditional Obligations and Church & food security

Table 8. Housing types, Water Sources and Facilities

Village	Living Quarters	Water sources		Toilet Facilities	Power & Light	Cooking
		Drinking	Washing			
Sepa	<ul style="list-style-type: none"> Independent (85%) Share 15% Timber/Wood /Tin (12%) Thatch (88%) 	<ul style="list-style-type: none"> Community water supply (84.6%) Unprotected well and others (15.4%) 	<ul style="list-style-type: none"> Community water supply (84.6%) Unprotected well, Spring, river lake (15.4%) 	<ul style="list-style-type: none"> Outhouse pit toilet (7.5%) Waterseal & Flush (4%) Outdoor (88.5%) 	<ul style="list-style-type: none"> Kerosene lamp (11.5%) Solar Panels (88.5%) 	<ul style="list-style-type: none"> Open fire (100%)
Loimuni	<ul style="list-style-type: none"> Independent (85%) Share 15% Timber/Wood /Tin (31%) Thatch (69%) 	<ul style="list-style-type: none"> Protected well (74%) Unprotected well and others (26%) 	<ul style="list-style-type: none"> 88% water tank Unprotected well and others (12%) 	<ul style="list-style-type: none"> Outhouse pit toilet (9%) Outdoor (91%) 	<ul style="list-style-type: none"> Kerosene lamp (27) Solar Panels (73%) 	<ul style="list-style-type: none"> Open fire (100%)

3.5 Land Access and Land Use

Table 9 shows land access and land use for households surveyed for each village. The results showed that over 90% have access to land however, majority of the households surveyed indicated the quality of their land is not suitable for agriculture. The average size of land per household is about 2.89 acres for Sepa and 1.24 acres for Loimuni. Majority of the households surveyed (70-89%) indicated they grow their own food.

Table 9 also showed that majority of the household surveyed indicated interest for training in agriculture production techniques. There is also high interest for fruit tree and timber species while a small proportion of the surveyed households interviewed indicated lack of interest for tree species. It must be noted that this lack of interest is due to lack of access to land or quality land.

3.6 Food Consumption Analysis

3.6.1 Energy and Protein Availability

Table 10 shows energy availability while Table 11 shows protein availability for each village. The results indicated that on average, the energy intake per capita per day is higher than the FAO/WHO minimum daily requirement for a person to be food secure. However, there is an established tendency for reliance on imported food (rice, flour and ramen/noodles) for both villages. Similar trend was observed for protein source for both villages, there is a tendency to rely on imported food.

Table 9. Land Access and Land Use

Village	% HH have land	Average size (acre)	Land Quality	% Grow own food	Type of trees grown	Planting Pattern	Interest for tree	Training needs
Sepa	96	2.89	<ul style="list-style-type: none"> • Good (63%) • Average (30%) • Poor (7%) 	89.2	<ul style="list-style-type: none"> • Ngali nut (<i>Canarium harveyi</i>), betel nut, coconut, Cut nut (<i>Barringtonia edalis</i>), Kavika or Malayan apple) • Timber (Teak (<i>Tectona grandis</i>), Eucalyptus, , , • Cocoa • Polynesian Chestnut (ivi) • Carrabolla • Sour sop • Citrus (lemon, Great fruit) • Pawpaw • Guava 	<ul style="list-style-type: none"> • Agroforestry • Separate from crop plots (<u>wood lots</u>) • Natural stands 	<ul style="list-style-type: none"> • Fruit tree & Timber (70.4%) • Firewood and other (25.6%) • No interest (4%) 	<ul style="list-style-type: none"> • 70% Indicated need training on propagation and field planting
Loimuni	92	1.32	<ul style="list-style-type: none"> • Good (33%) • Average (40%) • Poor (17%) 	70.37	<ul style="list-style-type: none"> • Ngali nut(<i>Canarium harveyi</i>) , betel nut, coconut, Cut nut (<i>Barringtonia edalis</i>) Kavika or Malayan apple) • Timber (Teak (<i>Tectona grandis</i>), Eucalyptus, , , • Cocoa • Polynesian Chestnut (ivi) • Carrabolla • Sour sop • Citrus (lemon, Great fruit) • Pawpaw • Guava 	<ul style="list-style-type: none"> • Agroforestry • Separate from crop plots (<u>wood lots</u>) • Natural stands 	<ul style="list-style-type: none"> • Fruit tree & Timber (82%) • Firewood and other (8%) • No interest (9%) 	<ul style="list-style-type: none"> • 73% Indicated need training on propagation and field planting

Table 10. Energy Availability

Village	Quantity/ person/day	Giant Swamp Taro (Kakake)	Sweet potato	Cassava	Banana	Total Local	Rice	Flour	Ramen Noodle	Total Import	Tot./ person/day	% Import
Sepa	g	55.3	286.3	177.4	72.2	591.3	267.0	130.6	131.3	528.9	1120.1	65.81%
	kcal	47.6	263.4	642.2	43.3	996.5	961.1	475.2	482.0	1918.4	2914.9	
Loimuni	kg	30.42	481.26	462.79	212.38	1186.85	229.22	107.82	159.98	497.03	1683.88	44.27%
	kcal	26.16	442.76	1675.31	127.43	2271.66	825.20	392.47	587.13	1804.81	4076.46	

Table 11. Protein Availability

Atoll	Quantity/ person/day	Pig	Chicken	Tuna	Reef fish	Total Local	Can fish	Can meat	Chicken	Tot import	Tot./ person/day	% Import
Sepa	g	20.6	3.2	13.9	31.0	68.8	25.2	11.9	2.9	40.0	108.7	43.04%
	kcal	67.3	3.9	12.0	19.9	103	46.6	27.7	3.6	77.8	180.8	
Loimuni	kg	12.29	1.39	42.08	43.28	99.05	79.85	7.22	0.54	87.62	186.66	60.99%
	kcal	40.08	1.70	36.19	27.70	105.67	147.72	16.83	0.66	165.21	270.88	

Table 12. Transect Walk Findings

Village	Farming Systems	Main Type of Crops	Livestock	Issues
Sepa	<ul style="list-style-type: none"> • Crop lands are situated about half a kilometre from village • Mixed Cropping/Agroforestry • Plots of Root crops within Agroforestry • Flatland is about 1 ½ km from coast to hill slopes. • Plots of Root crops within Agroforestry • Cropping on sloping land 	<ul style="list-style-type: none"> • Coconut • Sweet Potato • Pineapple • Banana • Cassava • Cocoa • Polynesian Chestnut (ivi) • Carrabolla (• Sour sop • Citrus (lemon, Great fruit,) • Pawpaw • Guava • Taro (colacassia, kongkong) • Pana(dioscorea esculenta) • Giant swamp taro • Local yam • Vegetables (bele, ferns, corn, beans, egg plants) 	<ul style="list-style-type: none"> • Confined pigs in pens (subsistence system) • Limited Poultry – free range • No other forms of livestock 	<ul style="list-style-type: none"> • Major farming is concentrated toward river banks, noncompliance on buffer zone (50m) • There is no proper spacing for mixed cropping and agroforestry resulting in understory crops being shaded by upper canopy trees • Pest and disease observed on sweet potatoes and slippery cabbage (Bele) • Nutrient deficiency observed on root crops • Timber trees are planted toward river banks • Erosion on river banks is significant • Unchecked farming practices on sloping land • Need for more animal based protein sources (livestock species diversity) • Farm trails are not well established and quite muddy
Loimuni	<ul style="list-style-type: none"> • Mixed cropping and agroforestry (subsistence farming system) 	<ul style="list-style-type: none"> • Coconut, • Sweet potato • Taro • Banana • Cassava • Yam • Vegetables (Hibiscus spp,, ferns etc) • Pineapple 	<ul style="list-style-type: none"> • Pigs confined in pens • Limited chickens free-range • No other species of livestock 	<ul style="list-style-type: none"> • There is no proper spacing for mixed cropping and agroforestry resulting in understory crops being shaded by upper canopy trees • Pest and disease observed on sweet potatoes and slippery cabbage (Bele) • Nutrient deficiency observed on root crops

3.7 Transect Walk Findings

Table 12 shows the summary of the transect walk findings. In both villages, the farm lands are located about half a kilometre from main village or residential areas. Trails are the main access to these farm lands which are quite muddy and not well built or established. Livestock are mainly kept in subsistence production systems, with a few being confined in wooden stalls while some families are still keeping their pigs in free range systems. There is quite limited poultry (chicken) kept in free range systems (Photo 4-1). There are no other forms of livestock being kept in the villages.

Photo 4-1. Methods of keeping livestock in the two villages



The main feature of the cropping systems observed is mixed cropping within agroforestry systems. Plots of root crops are found to be within the agroforestry systems. The villages are situated along the coastlines while gardens are located above the villages and stretched inland to about 1 ½ kilometres from the coastal areas. Further inland from the villages are mainly slopy (except in Loimuni) areas where farming activities being done. The common staple crops grown are as follow:

- Coconut
- Sweet Potato
- Pineapple
- Banana
- Cassava
- Cocoa
- Polynesian Chestnut (ivi)
- Carrabolla
- Sour soup
- Citrus (lemon, Great fruit)
- Pawpaw
- Guava
- Taro (colacassia, kongkong)
- Pana(dioscorea esculenta)
- Giant swamp taro
- Local yam
- Vegetables (bele, ferns, corn, beans, egg plants)

Photo 4-2. Mixed plots of major crops within agroforestry systems



From Photo 4-2, several problems can be observed. There is lack of proper spacing and limited knowledge on mixed cropping. The community have indicated their interest for training on farming techniques especially on spacing requirements for the different crops within an agroforestry and mixed cropping systems, inter-cropping techniques and soil management. Significant nutrient deficiencies with pest and diseases were observed on crops especially on sweet potatoes, slippery cabbage and taro (TLB). There also significant problems on soil erosion and landslides in farm lands (Photo 4-3). These erosion problems are mainly due to cultivation on slopy areas and near river banks. There needs to be awareness on sustainable farming techniques.

Photo 4-4. Showing river bank heights from the normal river flow



4.0 DISCUSSIONS

4.1 Climate Change Vulnerability of Sepa and Loimuni

The results of the analysis showed that both villages are vulnerable to climate change impacts. The communities' exposure to climate change is high. During the assessment, community members have indicated that they have observed rainy seasons to be prolonged and more intense impacting their agriculture production. Community members indicated that behaviour of crops and livestock are also changing. Growth rate and survival rates of livestock have reduced. Community members also indicated that soil texture and fertility is changing due to frequently flooding in crop lands.

The study found that the sensitivity of both communities were medium to high. There were concerns raised during the exercise that flooding is increasingly frequent and that during flooding, most agriculture lands and crop lands are damaged. Pests and disease incidences are increasing with more frequent rainfall. Community members also indicated that taro production has now been reduced due to taro leaf blight problems. Slippery cabbage (*Hibiscus manihot*) as the main type of leafy vegetables has been affected by insects boring on leaves. It was also noted from the discussions that soil texture change (hardening of soils) during heavy rainfalls and after some periods of sunshine which in turn affects sweet potato tubers (common and preferred root crop). Water quality is also affected by flooding.

The adaptive capacity of both communities is low. During the assessment, it was noted that loss of forest cover is increasing leading to soil erosion which in turn affect water sources and water quality. Soil erosion on river banks is mainly due to poor agriculture practices too close to the banks. Hence it is highly important to establish watershed or water catchment area with management plan to ensure sustenance availability of water sources and water quality for the community. The results also indicated that spread of water borne diseases is often common during heavy rainfall with floods. In terms of village infrastructure, the survey showed that 88% of the households are living in thatched houses vulnerable to natural and climate induce disasters. Lack of infrastructure and transportation for the village is reported to be a major concern in accessing farm lands and as well as markets to sell produce. Taro which is the main market outlet for the village is about 1 to 3 hours away by Outboard motor boats. There is an existing health clinic in the villages however at the moment the facility is not accessible due to lack of qualified person to man the post. Telephone and mobile services is not covered in the villages. The main communication service available to the villages is two-way radio. Access to service providers is low. With these findings, it is important to device adaptation strategies to the impacts of climate change already impacting food production systems in the villages.

4.2 Food Security situation for Sepa and Loimuni Villages

The four determinants of food security (food availability, food access, food utilization and food stability) were assessed to determine the communities' food security situation.

4.2.1 Food Availability

Although the analysis of food balance sheets indicated that both villages is food secure from food availability point of view, reliance on imported food sources (rice, flour and ramen noodles) is quite high (ranging from 40% - 65%). From the exercise, it was found that non climatic factors are also affecting food production such as soil fertility, soil erosion, pest and diseases, limited choice of livestock and low crop diversity and limited market availability. Villagers indicated that sweet potato production has been reduced due to change in soil texture/properties and soil fertility.

Production and productivity of farms are declining. For instance, community members indicated that sweet potato production (size of tubers) is reported to be reducing. Production of taro has been reduced by most households due to taro leaf blight problem. Breadfruit is not a preferred crop for the villagers. The main crops grown by villagers are: Sweet Potatoes; Cassava; Banana; Yam; Pana (*Dioscorea esculenta*); Kakake (Giant swamp taro); Coconut; Fruit Trees (Cut-nut and Ngali nut) Carrabolla, Guava and citrus trees. The study also found that food preservation is not practiced by households. During the transect walk, it was also found that most or if not, all livestock especially pigs are confined in wooden pens and chickens on free-range, all are kept in subsistence production

system. These are mostly inbred local breeds. With the observed reduction in performance of livestock, villagers indicated there is a need to introduce improved and productive breeds of livestock to increase availability of livestock products for food security. With all the production problems, it can be assumed that the established reliance on imported food is due to the many production problems the communities faced.

4.2.2 Food Access

Food access is determined by the household/individuals access to resources to either produce the food or income to purchase a sufficient and safe food. Most households in both villages have access to land. However, with the tribal land ownership tenure systems, land access can become a big issue especially during land dispute among villagers. Although most households have access to land for gardening, quality of land is a concern by the villagers. Soil fertility is becoming a big problem in both villages. With the limited access to transportation along with the distance of both villages to market is resulting in low income for households. There is limited income opportunities for the communities.

4.2.3 Food Utilization

The frequency of consumption measured in the study also revealed that there is already a trend on reliance on food import. The limited choice of crops and vegetables is causing a low diversity in the diet of households. The main leafy green vegetable consumed by villagers is ‘slippery cabbage’ (*Hibiscus manihot*) and fern indicating low diversity of the household diets. There is also limited availability of local livestock products (meat and eggs) for families. It has been well reported in the Pacific that nutritional related diseases are mainly due to consumption of unhealthy foods. With the trend in reliance on imported unhealthy food, the community is vulnerable to nutritional related diseases or non-communicable diseases. In addition, the survey revealed that most households lack skills on food preparation and preservation. Hence there is a strong need to promote local production and consumption of local food. Villagers indicated during the assessment that they need capacity building and awareness on nutrition, food preparation and preservation.

4.2.4 Food Stability

In terms of stability of food supply, it is clear from the exercise that food production is affected by natural disasters, pest and diseases and other climate related stimuli. Given the reliance on imported food with distance of the village from markets, transportation is a big problem for food stability of the villagers. The results of the analyses on food security indicated that both villages are vulnerable to climate change impacts on food production systems. Taro production has been reduced significantly by most households due to taro leaf blight disease. There is an urgent need to provide training on good agriculture practices, availability of resistant crops, crops diversity, pests and disease control.

5.0 RECOMMENDATIONS AND ADAPTATION STRATEGIES

From the previous V&A, the following sectoral adaptation strategies were identified for Choiseul (Mataki et al., 2013):

1. Minimising damage to village infrastructure. Adaptation options include:
 - a. Community and infrastructure planning to include sea-level and flooding projections and
 - b. Relocating buildings and infrastructure.
2. Management and protection of inter tidal and coastal areas. Adaptation options include:
 - a. planting coastal trees/shrubs for protection
 - b. mangrove reforestation
 - c. creating vegetation buffers on river banks and
 - d. maintaining existing ecosystem functions.
3. Increasing food security and livelihoods. Adaptation options include:
 - a. technical agricultural assistance (crop rotation, crop diversity, agricultural techniques),
 - b. agroforestry of cash crops and fruit trees,
 - c. reforestation of previously logged areas with valuable timber species,

- d. contour planting and terracing and
 - e. improved pest and disease control.
 - f. increased livestock production
4. Protection of water resources. Adaptation options include:
 - a. protection and/or restoration of water catchment areas,
 - b. riparian and freshwater ecosystem management,
 - c. increasing water storage capacity,
 - d. sediment control of freshwater streams and
 - e. water quality testing.
 5. Marine and fisheries management. Adaptation options include:
 - a. coral reef and mangrove ecosystem management,
 - b. minimising fishing pressure on key species,
 - c. trials of fish aggregating devices,
 - d. locally managed marine management areas and monitoring.
 - e. Increase disaster preparedness. Adaptation options include:
 - f. emergency management procedures for landslides, tropical cyclones, flooding or tsunamis and planning for food shortages caused by disaster events.
 - g. Introduce aquaculture interventions options for villagers to increase fish availability

From the results of this study and in line with the SPC/USAID project purpose (*Enhanced Climate Change Resilience of Food Production Systems*), Table 15 shows the adaptation strategies for Sepa and Loimuni communities.

Table 15. Adaptation Strategies for Sepa and Loimuni Villages

Villages	Interventions	
	Crops/Agroforestry	Livestock
Sepa	<ul style="list-style-type: none"> • Women's group of Sepa is interested to establish a seedling nursery for home gardening and to sell to neighboring villages (Sasamunga) • Development of Community Watershed management plan and formalization of committee to enforce • A demonstration farm to be established (site to be confirmed by Village members) to demonstrate contour farming on sloping land, proper spacing of multi species, and appropriate buffer zone from river banks. • Vegetable and root crop diversification including appropriate training on farming practices • Introduction of taro leaf blight tolerant varieties • Capacity Building in all areas of intervention • Awareness/training on proper nutrition on young mothers/villagers & food safety. 	<ul style="list-style-type: none"> • Introduction of improved pig breed and demonstration of appropriate piggery housing designs • Introduction of poultry (chicken) breed and demonstration of poultry farm using simple and affordable model • Introduce honey bees as an alternative livestock intervention. Model farm to be selected by community members
Loimuni	<ul style="list-style-type: none"> • Participants indicated interest to establish a community nursery for seedling distribution (tree and fruit tree species, vegetables). • Vegetables/root crops to be established 	<ul style="list-style-type: none"> • Introduction of improved pig breed and demonstration of appropriate piggery housing designs. • Introduction of poultry (chicken) breed and demonstration of poultry farm using simple and affordable model

		<ul style="list-style-type: none"> • Introduce honey bees as an alternative livestock intervention • Model farm site to be selected by community members
Farmer Field school	<ul style="list-style-type: none"> • Visited two sites: • Lauru Rural Training Centre, Kolombangara River • Choiseul Bay Provincial Farm, Tarakure 	<ul style="list-style-type: none"> • <u>Recommendation:</u> Choiseul Bay Provincial Farm, Tarakure as the potential site for a Farmer Field School given its ease of accessibility by farmers and existing facilities as well as appropriate activities and programs

Table 14. Master Logframe

Objectives & activities	Objectives Verifiable Indicators (OVIs)	Baseline	End of the Project	Means of Verification (MOVS)	Assumption
GOAL : Household food secured					
PURPOSE: Agriculture production and productivity increased	<ul style="list-style-type: none"> • Crop area increased • Livestock production increased • Crop diversity increased 	<ul style="list-style-type: none"> • Low crop productivity • Pest and disease problems • Limited crop diversity • Poor soil texture/fertility 	<ul style="list-style-type: none"> • Adaptive capacity improved • % Increased productivity • # Tolerant varieties introduced and adopted • Health and nutrition improved • Reduced reliance on imports • Contribution of local food to diet of households 	<ul style="list-style-type: none"> • Project reports • Project survey • Health reports & data • Provincial reports 	<ul style="list-style-type: none"> • Limited capacity in agriculture farming techniques • Accessibility of the village
OUTPUTS: 1. Diversity and productivity of crops and livestock increased	<ul style="list-style-type: none"> • Increased crop diversity • # of crops varieties introduced and utilised • Increased yield • # of new livestock breeds introduced and distributed • Capacity building provided 	<ul style="list-style-type: none"> • Limited crop diversity • Poor agriculture farming practices • Limited livestock production/diversity • Lack of improved breeds (pigs and chickens) • Lack of capacity in livestock production 	<ul style="list-style-type: none"> • % increased in crop area & agroforestry • % increase livestock numbers 	<ul style="list-style-type: none"> • project reports • Project survey 	<ul style="list-style-type: none"> • Limited farming techniques • Strong support from Govt and donors • Strong support from partner agencies/stakeholders • Strong participation of community members
2. Watershed management plan developed and adopted by village leadership	<ul style="list-style-type: none"> • Increased forest cover • Reduced deforestation • Increase acreage of tree planting 	<ul style="list-style-type: none"> • Deforestation in water catchment is an issue • Poor water quality 	<ul style="list-style-type: none"> • Watershed management plan adopted • % increased in area of tree planted 	<ul style="list-style-type: none"> • Project reports 	<ul style="list-style-type: none"> • Strong support from Govt and donors • Strong support from partner

	<ul style="list-style-type: none"> Watershed management plan in place Capacity building provided 	<ul style="list-style-type: none"> Lack of knowledge and capacity in watershed management 			<ul style="list-style-type: none"> agencies/stakeholders Strong participation of community members
3. Adaptation Capacity strengthened	<ul style="list-style-type: none"> Income from agriculture sales increased Number of climate tolerant varieties introduced and planted Appropriate farming systems adopted Number of awareness/training programs provided Establishment of farmer field school Capacity building provided 	<ul style="list-style-type: none"> Limited adaptation capacity Limited income opportunity Limited market Poor nutrition Poor agriculture farming practices Limited capacity in adaptation measures 	<ul style="list-style-type: none"> % increased in agriculture sales Income from agricultural sales Capacity building provided to farmers from each village Farmer field school curriculum developed 	<ul style="list-style-type: none"> Project reports Project survey 	<ul style="list-style-type: none"> Strong support from Govt and donors Strong support from partner agencies/stakeholders Strong participation of community members

Table 15. Detailed Logframe

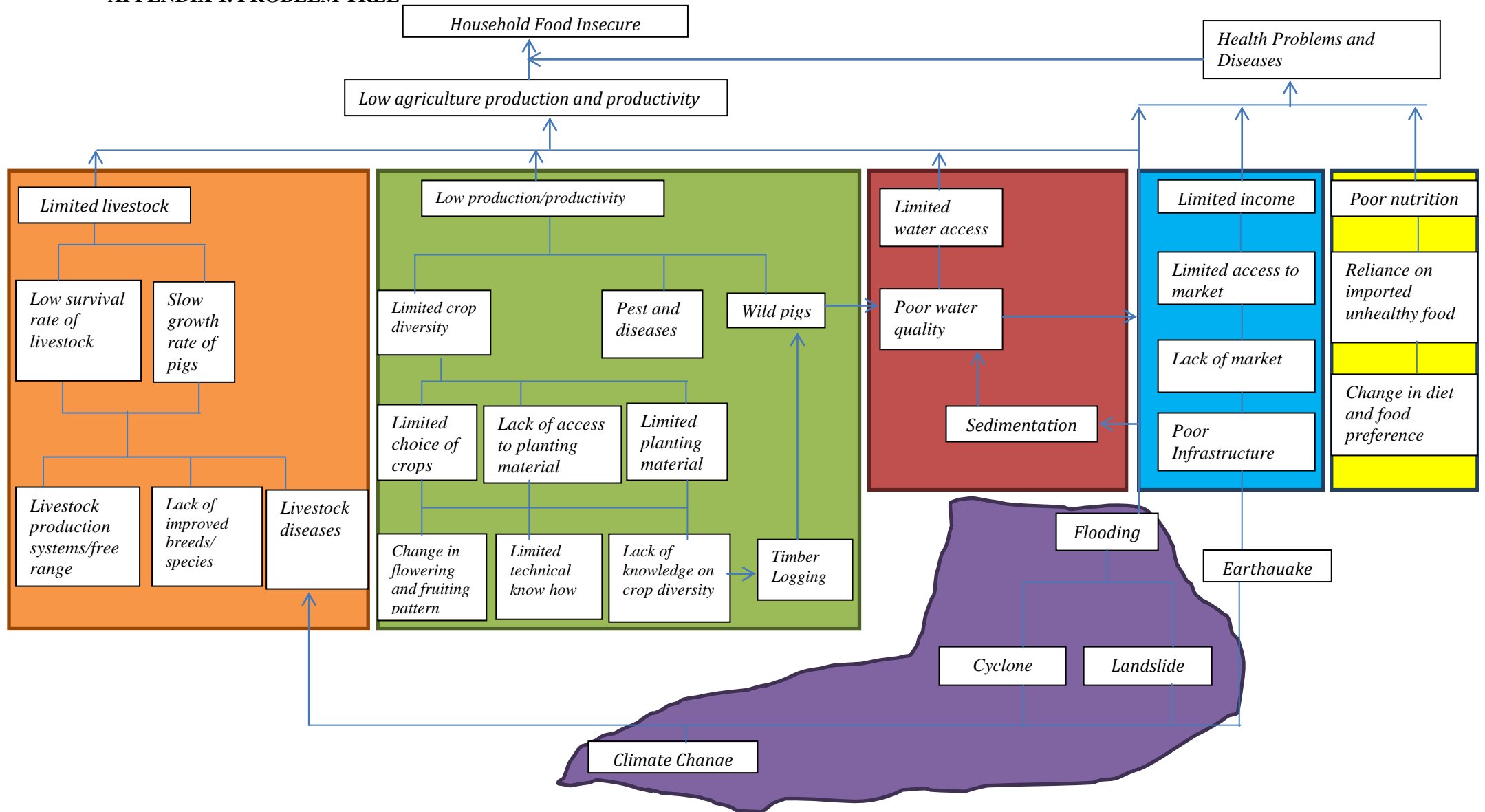
<i>Output 1</i> Diversity and productivity of crops and livestock increased						
<i>Output 1.1</i> Diversity and productivity of crops increased						
Activities	Indicator	Budget Description	Budget Amount	Responsible / Partners	Year	
					1	2
1.1.1 Increase crop varieties by introducing multiple crops in a bulking gardens in both Sepa and Loimuni	Increased crop varieties for farmers by 10%	Seeds etc..		Lead: Nic SPC/USAID, GIZ, MAL and communities	X	
1.1.2 Build vegetable nurseries for Sepa, Loimuni and Choiseul Bay Provincial Farm	Increase varieties of vegetables for farmers to grow by 50% Increased resilient varieties to pests and diseases.			Lead: Nic SPC/USAID, GIZ, MAL and communities	X	
1.1.3 Introduce a demo farm on sloping land contour farming in Sepa	Improve farming practices for sloping land adopted			Lead: Nic SPC/USAID, GIZ, MAL and communities		X

Output Sub-Total						
Output 1.2 Diversity and productivity of livestock increased						
Activities	Indicator	Budget Description	Budget Amount	Responsible / Partners	Year	
					1	2
1.2.1 Establish two (2) 3pen units piggery of local / improved breeds, one per each village	Increased availability of pigs for distribution and for meat and nutrition by 20% by 2014			Lead: Nic SPC/USAID, GIZ, MAL and communities	X	
1.2.2 Establish two (2) indigenous chicken multiplication pens to increase meat and eggs, one chicken pen per each village	Chicken stock for farmers are available and meat and eggs are accessible for nutrition by 15%			Lead: Nic SPC/USAID, GIZ, MAL and communities	X	
1.2.3 Establish two (2) 5 hive- honey bees apiaries to increase honey products for food security 1 apiary for Sepa 1 apiary for Loimuni	Honey for food and nutrition and livelihood is increased			Lead: Nic SPC/USAID, GIZ, MAL and communities	X	
1.2.4 Introduce improved chicken breeds for cross-breeding with local chickens (Rhode Island Red, Australorp etc)	Increased breeds of potential cc resilient breeds to increase production			Lead: Nic SPC/USAID, GIZ, MAL and communities		X
1.2.5 Establish Biogas digester operation at the Choiseul Bay Provincial piggery farm.	Safe handling and utilisation of animal waste for renewable energy.			Lead: Nic SPC/USAID, GIZ, MAL and communities		X
1.2.6 Establish honey bees multiplication and distribution centre for the province	Increased production of honey and products for food security			Lead: Nic SPC/USAID, GIZ, MAL and communities		X
1.2.7 Establish a goat project under coconut seed garden	At least I goat farm established in each village			Lead: Nic SPC/USAID, GIZ, MAL and communities		X
Output Sub-Total 1.2						
Output 2. Watershed management plan developed and adopted by village leadership						
Activities	Indicator	Budget Description	Budget Amount	Responsible / Partners	Year	
					1	2
2.1 Consultations held with community members	At least one meeting held in each village			Lead : Jalesi Meteboto Partners: GIZ, Communities, MAL	X	
2.2 Formalisation of village resource management committee	Committee established and functional			Lead : Jalesi Meteboto Partners: GIZ, Communities, MAL	X	
2.3 Rapid watershed appraisal conducted in both villages	Watershed appraisal report completed			Lead : Jalesi Meteboto Partners: GIZ,	X	X

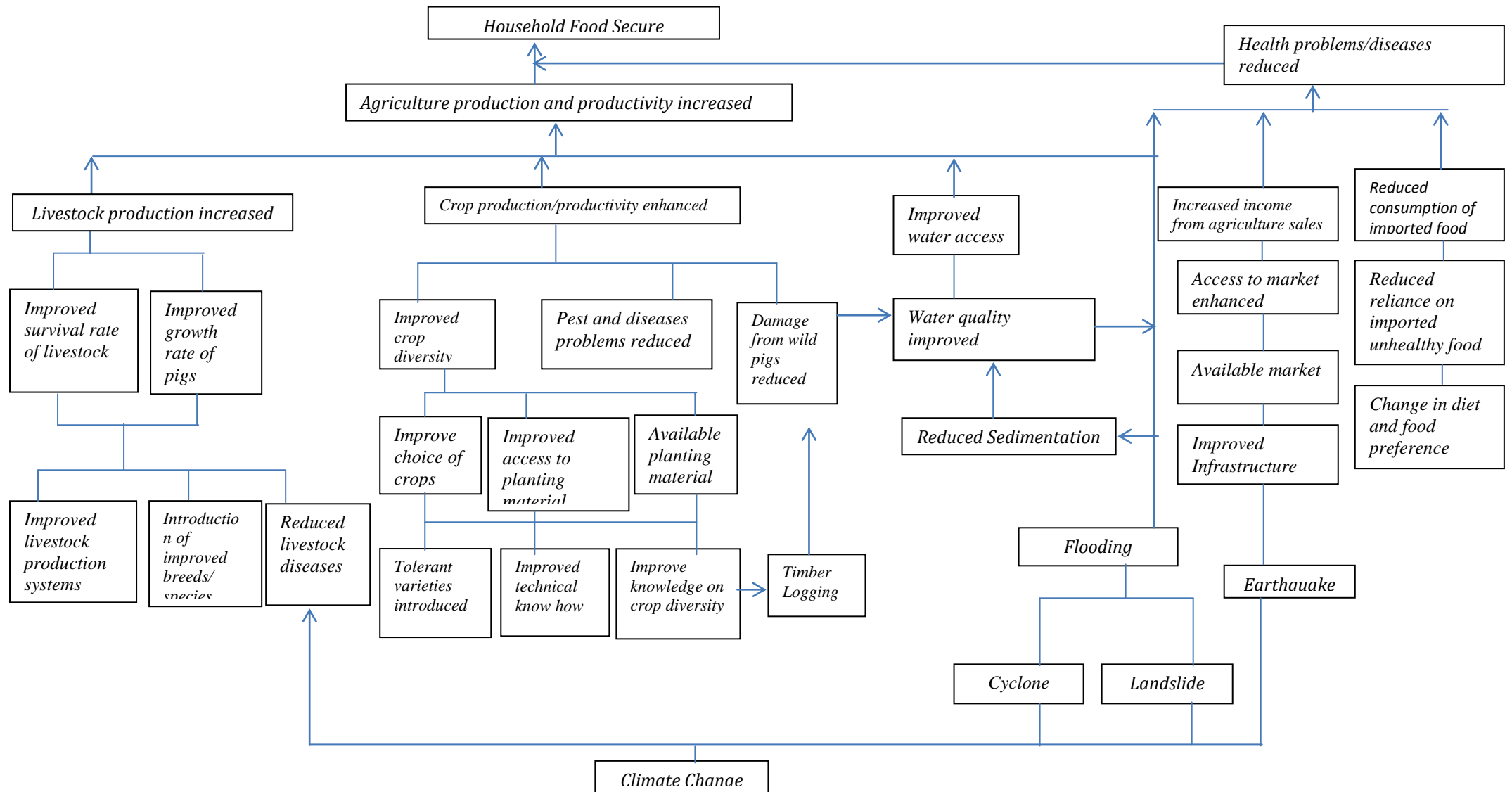
				Communities, MAL		
2.4 Development of Draft watershed management plan clearly identifying recommended watershed area and endorsed by the Committee	Watershed management plan endorsed by villages			Lead : Jalesi Meteboto Partners: GIZ, Communities, MAL		X
2.5 Demarcation of watershed boundaries	On the ground boundaries established			Lead : Jalesi Meteboto Partners: GIZ, Communities, MAL		X
2.6 Rehabilitation of watershed	On the ground rehabilitation measures established			Lead : Jalesi Meteboto Partners: GIZ, Communities, MAL		X
2.7 TOR for the Committee developed and adopted	TOR signed by committee members			Lead : Jalesi Meteboto Partners: GIZ, Communities, MAL	X	X
Output Subtotal						
Output 3. Adaptation Capacity strengthened						
Output 3.1 Farmer Field School Established in Choiseul Bay Agriculture Training Centre						
Activities	Indicator	Budget Description	Budget Amount	Responsible / Partners	Year	
3.1.1 Establish CePACT bulking site for cc ready crops (resistant taro, s/potato, cassava, yams etc.) at C/Bay Provincial farm	Availability of climate ready crops enhanced	1 x GPS for area mapping 1 x soil ph and moisture tester 1 x internet facility at Taro office for communication 1x Power tiller Soil testing kit for NPK	13,000??	Lead: Nic SPC/USAID, GIZ, MAL and communities	X	X
3.1.2 Establish Nursery for vegetables and other plants	Increased availability and distribution of seedlings Utilisation of waste for renewable energy			Lead: Nic SPC/USAID, GIZ, MAL and communities	X	X
3.1.3 Set up a food crop bulking of local /indigenous crops	Increased planting stock of vegetables for farmers Increased diversification of local crops			Lead: Nic SPC/USAID, GIZ, MAL and communities	X	X
3.1.4 Agro-forestry demo plots/ orchards	Demo plots available for farmers to see and learn			Lead: Nic SPC/USAID, GIZ, MAL and communities	X	X
3.1.5 Development of farmer field school curriculum	Farmer field school curriculum developed					
Output Subtotal						

Output 3.2 Income from agriculture sales increased						
Activities	Indicator	Budget Description	Budget Amount	Responsible / Partners	Year	
3.2.1 Conduct feasibility study for income opportunities for the two villages	Study identifying income opportunity for the communities			Lead: Nic Partners: IACT, MAL	X	
3.2.2 Identification of potential income generating agricultural products	At least 2 commodities for each village identified			Lead: Nic Partners: IACT, MAL	X	X
3.2.3 Training on food processing and marketing provided	Enhanced capacity			Lead: Nic Partners: IACT, MAL	X	X
<i>Output Subtotal</i>						

APPENDIX 1. PROBLEM TREE



APPENDIX 2. OBJECTIVE TREE



APPENDIX 3. PRA Team Members

No.	Name	Title	Agency/Program	Email address
1.	Nichol Nonga	Animal Health and Production officer	SPC Land Resource Division	nicholn@spc.int
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13.	Andrew Melanolu	Chief Field Officer, Agriculture	Choiseul Province	Andrewloli39@gmail.com
14.	Joe Dino	Choiseul Agriculture Officer	Choiseul Province	
15.	Simon Iro Sefu	Land Use Planning Officer	Ministry of Agriculture and Livestock	
16.	Thompson Poloso	Agriculture Ext. Officer	Solomon Ministry of Agriculture and Livestock	

APPENDIX 4. Village Participants for PRA

No.	Name	Sex	Village
1.	Martha Gilataru	F	Sepa
2.	Florence Sikana	M	Sepa
3.	Dokas Sikini Elizabeth Lumuleke	M	Sepa
4.	Telmah Salumata	F	Sepa
5.	Ruth Pitakumuki	F	Sepa
6.	Anna Baritama	F	Sepa
7.	Nelly Gilakoqu	F	Sepa
8.	Sylvia Tanito	F	Sepa
9.	Veronica Morris	F	Sepa
10.	Venas Bari	M	Sepa
11.	Marly Ngadoro	F	Sepa
12.	Virginia Poloso	F	Sepa
13.	Isaiah Pitavato	M	Sepa
14.	Brown Soqa	M	Sepa
15.	Joana Bari	M	Sepa
16.	Wilson Kodokovoe	M	Sepa
17.	Livingston Siana	M	Sepa
18.	Eve Qae	F	Sepa
19.	Samson Koveke	M	Sepa
20.	Kennedy Qolon	M	Sepa
21.	Ethel Madada	F	Sepa
22.	Abraham Mathias	M	Sepa
23.	Mathias Tapidaka	M	Sepa
24.	Lawrence Leoro	M	Sepa
25.	Venas	M	Sepa
26.	James Lokapio	M	Sepa
27.	Joe Ngadoro	M	Sepa
28.	William Kutini	M	Loimuni

29.	Leah Kutini	F	Loimuni
30.	Ledley Boselalu	M	Loimuni
31.	Jerolyn Mabe	F	Loimuni
32.	Hilder	M	Loimuni
33.	Violet Qila	F	Loimuni
34.	Sundry Kari	F	Loimuni
35.	John Pitakesa	M	Loimuni
36.	Cornelius Joe	M	Loimuni
37.	Linda Nodoro	F	Loimuni
38.	Enda Pondoboe	F	Loimuni
39.	Miriam Tekula	F	Loimuni
40.	Reagan Puninaza	M	Loimuni
41.	Rehab Lava	F	Loimuni
42.	Cornelius Paqara	M	Loimuni
43.	Mabel Katagag Ave	F	Loimuni
44.	Jiporah Kolokana	F	Loimuni
45.	Unice Qilavuvune	F	Loimuni
46.	Salote Qora	F	Loimuni
47.	Sepi Polosa	M	Loimuni
48.	Ngondoro R.	M	Loimuni
49.	Neiden Pitavainini	M	Loimuni
50.	Merrilyn Valomo	F	Loimuni
51.	Lihian Gorogu	F	Loimuni
52.	Benicy Likakale	M	Loimuni
53.	Alice Tuku	F	Loimuni
54.	Menalyn Leven	F	Loimuni
55.	Nancy Kondokuna	F	Loimuni
56.	Joe Domboboe	M	Loimuni

USAID CC Project

Vulnerability and Adaptation Survey



Section1: Background Information

1.1 Household No.:

1.2 Village:

.....
.....

1.3 Respondent name:

.....

1.4 Interviewer name:

.....

1.5 Date: / /

1.6 Time:

Section 2: Demographics

2.1 Household composition

<i>Household Member No.</i>	<i>Ethnicity</i>	<i>Relationship to H/ H</i>	<i>Sex</i>	<i>Age(Years)</i>	<i>Marital Status</i>	<i>Highest level of Education completed</i>

CODES

Ethnicity

- 1.Fijian
2. Indian
3. Chinese
4. Others

R'ship to HH

1. Hhold head
2. Spouse
3. Child
4. Parent
5. Grandchild
6. Other relation
7. Not related

Sex

1. Male
2. Female

Marital Status

1. Never Married
2. Married
3. Widowed
4. Separated
5. Divorced
6. Other

Education

0. None
1. Kindergarton
2. Elementary
3. High School
4. College
- 5.University
6. Vocational

Section 2: Household and Housing

2.1 – .9 Dwelling Structure and Amenities

2.1 MAIN type of living quarters

- 1-Independent
- 2-Shared building
- 3-Other

2.2 MAIN type of material for walls of the house

- 1-Concrete
- 2-Corrugated Iron/Tin
- 3-Timber/Wood
- 4- Thatch
- 5-Other

6-None

2.3 MAIN source of drinking water

- 1Public utility water supply
- 2-Community water supply
- 3-Household tank
- 4-Protected well
- 5-Unprotected well
- 6-Other

2.4 MAIN source of washing water

- 1-Public utility water supply
- 2-Community water supply

- 3-Household tank
- 4-Protected well
- 5-Unprotected well
- 7-Spring, river, lake
- 8-Other

2.5 MAIN toilet facility

- 1-Flush toilet
- 2-Water seal
- 3-Outhouse, pit toilet
- 6-Other

2.6 MAIN form of sewage disposal

- 1-Connected to sewer line
- 2-Connected to septic tank
- 3-Use other means

2.7 MAIN source of power you have access to;

- 1-Public utility
- 2. Generator
- 2-Solar Panels
- 3-Other
- 4-None

2.8 MAIN source of lighting

- 1-Public utility
- 2-Generator
- 3-Solar panel
- 4-Kerosene lamp
- 5-Battery lamp
- 6-Other
- 7-None

2.9 MAIN cooking facility

- 1-Electric range
- 2-Gas stove
- 3-Portable electric stove
- 4-Kerosene stove
- 5-Microwave oven
- 6-Wood stove
- 7-Open fire
- 8-Other

Section 3: Income

3.1 Income Sources

In the table below, please provide the average annual income of the household as a whole, for each of the categories provided below (Please leave the total as blank)

Sources of incomes	Av. income/week (\$)
Selling farm produce	
Selling cooked foods	
Salary/wages	
Selling handicrafts	
Remittances	
Others (small business etc.)	
Total weekly income	

3.2 Income Sufficiency

Is the total weekly income sufficient for the household?

Yes (Go to q3.3)

No (Provide the MAIN method the household meets their basic needs)

1-Assisted by extended family members

2-Borrow from neighbors

3-Barter exchange

4-Other

5-None

3.3 Financial Impact

Please rank from 1 to 6 (1 being “most impact”) the impact of the following obligations on the household’s financial situation?

	Rank from 1 to 6 (1 most impact)
Traditional obligations	
Church obligations	
Food security (meals, preserved food, etc.)	
School fees	
Health care	
Shelter, clothing, etc.	

Section 4: Land Access/Use

4.1 Land Access

Do you have access to land?

Yes – my own land (Go to q7.3)

Yes – leasing from someone else

No

4.2 – 4.5 Land Use

4.2 How much do you pay a year for the land? \$ _____

4.3 How much land do you have access to? _____m (length) x _____m (width)

4.4 Do you grow your own food on this land? Yes / No

4.5 How would you describe the quality of land?

1-Good

2-Average

3-Poor

4.6 Trees in Agroforestry systems

1. What does a forest or a tree mean to you?
2. Do you know what benefits you can derived from forests and trees
3. Do you have trees in your farm? Are they planted or part of the natural stand? If the trees are planted, how were they selected?
4. What are the trees currently planted at your farm (species\local names and nos. of trees)
 - Fruit\nuts trees
 - Timber trees
 - Ornamental trees
 - Fuelwood trees
 - Medicinal trees
 - Others (fodder, soil conditioner\protection, etc.)
5. How the trees were planted (positioning) within the farm lot? Are they integrated with food crops?
6. What benefits have you derived so far from the existing trees?
7. Are you interested to plant more trees in your farm? What kind of trees would you prefer to grow?
 - Fruit\nuts trees
 - Timber trees
 - Ornamental trees
 - Fuelwood trees
 - Medicinal trees
 - Others (fodder, soil conditioner\protection, etc.)
8. Do you already have the skill on how to propagate trees?
 - From seeds (including seed collection seedling production and maintenance

- Vegetative propagation (cuttings, grafting, marcotting, etc.)
- Field planting and maintenance

9. Do you have existing facilities (including labor) to raise your planting materials?

Section 5: Food Availability

5.1 Crops

In a typical **WEEK** how much crops does your household consume, give away, sell, receive as gifts and purchase?

CROP	Total produced by the household Weight (lbs)						Received as gift (lbs)	Purchased from another household/ store	
	Total =a+b+c +d	Household consumption (a)	Preserved (b)	Given Away (c)	Sold (d)	Sold (\$ Value)		Amount (lbs)	\$ Value
Taro (Colocasia)									
Cassava									
Banana									
Yams									
Taro (Xanthosoma)									
Coconut									
Sweet potato									
Breadfruit									
Other									
Total									

5.2 Livestock harvest

In a typical **WEEK** how much livestock does your household consume, give away, sell, receive as gifts and purchase?

LIVESTOCK	Total produced by the household Weight (lbs)					Received as gift (lbs)	Purchased from another household/ store	
	Total =a+b+c	Household consumption (a)	Given Away (b)	Sold (c)	Sold (\$ Value)		Amount (lbs)	\$ Value
Pigs								

Beef								
Mutton								
Chicken								
Ducks								
Other								
Total								

5.3 Seafood harvest

In a typical **WEEK** how much sea food produce does your household consume, give away, sell, receive as gifts and purchase

SEAFOOD	Total produced by the household Weight (lbs)						Received as gift (lbs)	Purchased from another household/ store	
	Total =a+b+c+d	Household consumption (a)	Preserved (b)	Given Away (c)	Sold (d)	Sold (\$ Value)		Amount	\$ Value
Tuna and other deep sea fish									
Reef fish									
Shellfish									
Crab									
Lobsters									
Coconut crab									
Other									
Total									

5.4 Frequency of Consumption (Staple Foods)

How many days in a typical week does your household consume the following produce? Check (√)

Food Items	Mostly (5+)	Sometimes (2-4)	Rare (once or less)	None
taro				
cassava				
Banana				
yams				
Coconut				
Sweet potato				
Breadfruit				
Other				

Section 6: Imported Foods

6.1 Amount and Value of Imported Foods

In the following table, please provide details of the amount of each imported food item the household purchases in a typical MONTH. Also provide an estimate of the value of this food

Imported Food	Quantity imported (quantity in numbers e.g. cases)	Total Costs (\$ Value)
Rice		
Flour		
Ramen Noodles		
Canned fish		
Canned meat		
Soft drinks		
Chicken		
Mutton		

6.2 Frequency of Consumption (Imported Foods)

How many days in a typical week does your household consume the following produce? Check (√)

Food Items	Mostly (>5)	Sometimes (2-4)	Rarely (once)	None
Rice				
Flour				
Ramen Noodles				
Canned fish				
Canned meat				
Chicken				
Mutton				

Section 7: Information, Communications and Extension

7.1 Rank the following media formats in their usefulness to receive information:

Format	Most Useful	Useful	Not Useful
Posters/leaflets			
Radio programme			
Newspaper			
Video programme			
Mobile phone			
Internet			

7.2 Do you own a mobile phone _____ yes _____ no

7.3 If you own a mobile phone, which service provider _____ Digicel _____ TCC _____

7.4 Do you own a smartphone? Yes/No.

7.5 Do you know someone who owns a smartphone? Yes/No

7.6 Do you want to receive useful farming tips using text messages? Yes/No

If Yes, are you willing to pay for the text messages at 20cenets a message? Yes/No

7.7 Does your household have a computer? Yes/No

7.8 Do you have access to the Internet? Yes/No

7.9 Do you know your extension officer? Yes/No.

When did you last meet your extension officer? In the last six months? Yes/No.

7.10 Do you belong to a farmer network group? Yes/No. Name: _____

7.11 Do you belong to village group? Yes/No Name: _____