Navigating false seasons

A Research of Aspirations and Perceptions toward climate change adaptation for food security in Western Pacific Island communities

LIVE&LEARN
Environmental Education

Acknowledgements

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A big thank you to the 70 women and men, young and old, who participated in the research from eight communities, across three provinces; Santo, Vanuatu and Choiseul and Malaita in the Solomon Islands. Appreciation is extended for your generous sharing of time, in-depth reflection on your lives, active participation and story-telling.

This report documents many women's and men's personal stories, openly shared with each other and the wider research team. Accordingly, much of the information presented belongs to the communities and individuals; it is a reflection of their achievements, challenges, current experiences and visions for the future and we thank them for their willingness to share their stories in this format.

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The title 'Navigating false seasons' reflects the many stories shared by participants whose food production systems are challenged by conditions that they describe as 'false seasons', linked to climatic changes. Navigation is central to the cultural life of seafaring Pacific Islanders. The feats of early Pacific navigation were imbued with a psychology of affinity and survival with the ocean, its fauna and flora, the birds, stars, clouds, moon and other nautral elements, all believed to be sacred. The stars, wave reading, and conversations with nature were central to traditional knowledge systems and the relationship between the navigator and nature was harmonious. Adapting food production systems to a changing climate will draw on these navigation skills in a new context. The challenges of navigating climate variability will require a sturdy boat, an anchor, sailing skills and lots of knowledge of the environment.

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Navigating false seasons

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Sanma Province (Vanuatu)
Malaita and Choiseul Provinces (Solomon Islands)
October 2010

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Environmental Education

Abbreviations

APHEDA: Union Aid Abroad

AusAID: Australian Agency for International Development

CSP: Community Sector Program (Solomon Islands)

FAO: Food and Agriculture Organisation

FSP: Food Secure Pacific Working Group

GDP: Gross Domestic Product

ICT: Information Communication Technology

KGA: Kastom Gaden Association

LDC: Least Developed Country

Live & Learn: Live & Learn Environmental Education

MECM: Ministry of Environment, Conservation and Meteorology (Solomon Islands)

MDGs: Millennium Development Goals

MSC: Most Significant Change

NAPA: National Adaptation Programme of Action

NGO: Non Governmental Organization

NRM: Natural resource management

OBM: Outboard motor

PICs: Pacific Island Countries

RAMSI: Regional Assistance Mission to the Solomon Islands

RAP: Research of Aspirations and Perceptions

SI: Solomon Islands

SIG: Solomon Islands Government

SPREP: Secretariat of the Pacific Regional Environment Programme

UNDP: United Nations Development Programme

UNFCCC: United Nations Framework Convention on Climate Change

WHO: World Health Organisation

WWF: World Wildlife Fund for Nature

Terminology

Kaikai/kakae: Subsistence garden food used for home consumption (Solomons/Vanuatu)

Kastom: Kastom, the Pidgin term for custom, refers to traditional beliefs and land ownership

Kwaso: Local home brewed beer in the Solomon Islands

Marketing/selling: Broad term used to describe selling garden crops and fish at small 'waterside' or 'roadside' markets, selling in a neighbouring village or at larger central markets.

Mere/Mama: Woman (Solomons/Vanuatu)

Shell/mat money: String of beads, shells or mats exchanged traditionally for goods and services

Sup Sup Garden: Backyard garden

Tambu (Tabu): Something that is against kastom or forbidden

Pikinini: Children

Wantok: Communal, clan and family ties remain strongly focussed on the wantok system. A key part of the Melanesian culture, wantok means people from the same language or family group who are part of the extended family who communally support and assist one another.

Young man: An unmarried male

Young woman: An unmarried female

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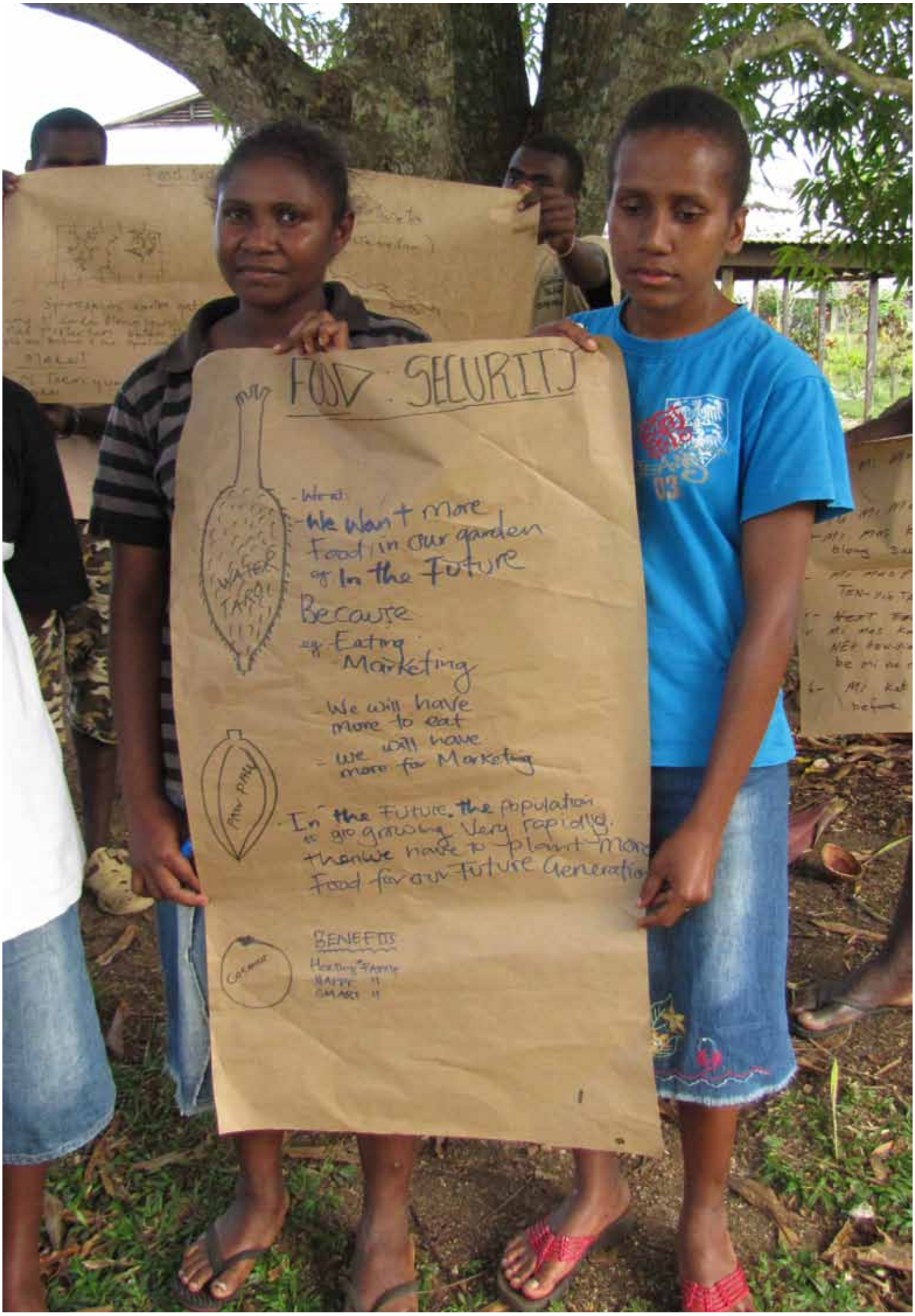
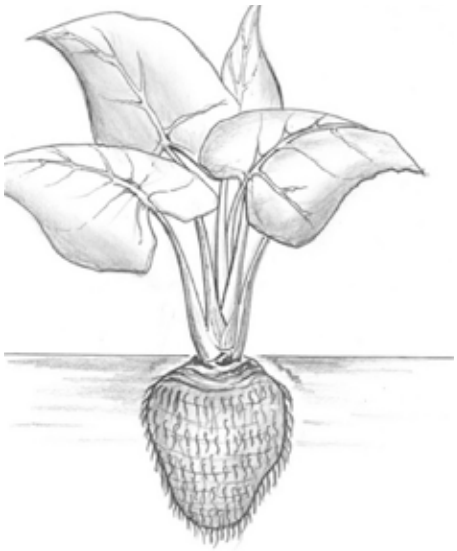

FOOD SECURITY
WATER TARO
We want more Food in our garden of In the Future
Because
of Eating
Marketing
We will have more to eat
We will have more for Marketing
In the Future, the population is gro growing very rapidly, thenwe have to plant more Food for our future Generation
BENEFITS



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Executive Summary

Food Security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active healthy life.

World Food Summit, 2009

This Research of Aspirations and Perceptions (RAP) provides an analysis of the main factors and variables in perceptions by communities in Vanuatu and the Solomon Islands of their capacity to safeguard their local food resources through the uptake of new, resilient, adaptive and appropriate food producing techniques in a changing climate.

The research is intended to inform leadership capacity building activities, and contextualise and guide the identification of appropriate and effective design approaches for Live & Learn's forthcoming Climate Change Adaptation for Food Security pilot project. The project will be implemented through the AusAID International Climate Change Adaptation Initiative, which aims to support community-based adaptation activities. The pilot project is part of Live & Learn's ongoing programme on climate change adaptation in the Pacific seeking to deliver low cost, community-based adaptation activities that are easy to scale up in remote island locations. The project supports objectives of the Pacific Plan, leaders' comments at the 39th Pacific Islands Forum Niue 2008, the 1995 Yanuca Island Declaration, National Adaptation Programmes of Action (NAPAs), Theme 2 and 3 of the 2010 Framework for Action on Food Security in the Pacific and food security and climate adaptation initiatives of other Pacific national and regional organisations.

The pilot project is part of Live & Learn's ongoing programme on climate change adaptation in the Pacific seeking to deliver low cost, community-based adaptation activities that are easy to scale up in remote island locations.

Sex disaggregated findings from the RAP are relevant for the identification of community-led food security initiatives around locally identified agendas for women, men, young women and young men (and their sub groups). Through the RAP the impending project is intended to 'start from where communities are at' while seeking to take a strengths-based approach to support existing groups and networks in safeguarding food sources through climate adaptation. This report also contributes baseline data for future project evaluation of the pilot project.

The RAP was undertaken across seven rural communities in two research sites in the Solomon Island provinces of Malaita and Choiseul and at one site in the Vanuatu province of Sanma. Further research will be conducted in the Vanuatu province of Shefa. The sites were identified in partnership with national Agricultural Ministries as having food sources that are particularly vulnerable or at risk to changing climatic conditions.

Participants shared a wealth of information on their perceptions toward changes in food quality, stability, nutrition and access, signs and attitudes toward a changing climate, their visions for the future and capacity for climate adaptation toward securing food sources. A range of research findings emerged relating to the complexity of climate related challenges currently facing communities. The RAP revealed that there is a wide variety of issues concerning women and men that are community specific; however it also showed some issues are shared across sexes, communities and provinces.

Macro challenges

The macro food security related issues consistently perceived to be urgent and found to be common across communities in Vanuatu and the Solomon Islands include: increasing variability in climate, decreasing amount of land and sea food resources; decreasing quality of garden kaikai; decreasing local island food diversity; unsustainable exploitation of natural resources resulting in lack of land for community-based production; related social and economic issues including rapid population growth; land disputes; exacerbated by an increase in 'false seasons'; compounded by lack of literacy, formal education skills and an absence of systematic information on community-level practical climate change adaptation measures.

Circumstances perceived to be contributing to the macro challenges include: deep seated socio-cultural inequities; lack of cooperation in communities; lack of access to markets (for some communities); lack of reliable communication systems causing information isolation; high population growth; challenging topography, soil type and moisture, deterioration of ecosystems, low levels of transport and energy security; lack of education and current skills to carry out community-based activities on climate adaptation to safeguard food sources, underpinned by a shortage of meaningful community-led programs addressing the macro challenges cited above.

Where are the gaps?

The RAP found gaps and strategic locations for strength and capacity building. Many of these support findings of other assessments by Kastom Gaden Association (KGA) and the United Nations Development Programme (UNDP) of adaptation to the adverse effects of climate variability on agriculture and fisheries. The predominant gaps highlighted by the community-based research are documented below:

Limited knowledge, awareness (and action) on climate variability, future climatic changes and its likely impact on agriculture, fisheries and food security systems at large

All RAP communities lack strong plans and communication for climate change and food security, highlighting the need for stronger links between the NAPAs and community level planning. The project could play a strong role in bridging this gap in pilot communities. Ministries of Agriculture and their provincial extension officers have limited access to appropriate climate change information for use in community level awareness activities. The project and its allies could play a key role in the creation and dispersion of such resources directly to pilot communities.

Inability to forecast trends in weather and schedule management of food production systems accordingly

Forecast limitations make planning agriculture production for reduced risks extremely challenging. Resulting from the limited capacity of meteorological services and communication, communities are unprepared for changing weather patterns and extreme rain periods resulting in crop losses and reduced subsistence food security, increasing reliance

on store bought food, government and donors.

Limited ability to undertake land use planning to support sustainable agricultural practices

There is limited capacity of both Solomon Island and Vanuatu Governments to assist communities with land use planning including conservation planning. This situation is made more complex by shortages of land for food production, land tenure systems and disputes that prevent land use planning and lack of mechanisms to support integrated land use planning. As a result, much non-productive land is being used by pilot communities for food production.

Limited ability to undertake soil management for optimum fertility and productivity

The RAP results supported the existing literature by UNDP and KGA and other studies concluding that subsistence capacity, including good soil health is key to food security in the islands. Coupled with lack of land use planning, there has been a noticeable decline in traditional knowledge on farming and food producing practices, including knowledge on how to conserve and manage soil fertility and productivity. The RAP found there is great need and desire for community-based demonstration activities to show pilot communities how to improve soil fertility and management to improve crop production.

Food garden, livestock and fishing systems are not currently designed to cope with climate variability

Decline in diversity of food sources coupled with limited knowledge about sustainable food production practices that are adapted to variations in climate have resulted in low production during heavy periods of rain and strong sun. This is made worse by the notable cross generational loss of traditional ecological knowledge in the current youth to adult generation.

Weak coordination to plan and implement vulnerability and adaptation assessment and implement adaptation plans

The pilot project has a key role to play by involving a coordination mechanism between regional bodies, Government departments, civil society, pilot communities and other partners, to support the creation of practical resources for farmers, and sharing and documentation of information including the creation and implementation of food security and adaptation risk assessments and plans.

What are the strategic priorities?

According to participants, the following are considered strategic priorities for climate change adaptation toward food security:

1. **Gender inclusive food security planning and management** as part of broader climate change adaptation activities with inclusive decision making systems.
2. **Increased access to appropriate solutions to adapt gardening and fishing techniques** to a changing climate through community-led demonstrations and planning processes.
3. **Land and sea conservation sites** with education where conservation sites exist, and the management and set-up where they do not exist, supported by inclusive decision making for conservation.
4. **Sustainable agriculture sup sup gardening skills particularly for youth** to increase soil fertility and decrease reliance on food from shops.
5. **Financial management and literacy** to support sustainable livelihoods from food production systems.
6. **Improved access to markets/identification of new markets.**

Further design recommendations can be found at the end of this section and detailed design considerations are at the end of this report.

Summary of community-based findings

All findings are based on perceptions gathered during the research and articulated by RAP participants. The following findings were common across all communities in Vanuatu and the Solomon Islands. Location specific findings are located in the extended findings section of this report.

1. Climate change is already affecting all RAP communities and climate variations and extremes have disrupted their food production systems, and in many cases, their water supply and their economies. Changes in rainfall patterns, as well as changes in the frequency of extreme weather events (such as tropical cyclones) were cited as particular concerns.
2. RAP results reflect reduced food security especially at a household level as a direct and indirect result of a changing climate. A decline in food production and supply of nutritional food is affecting family health, particularly women.
3. All RAP participants, particularly older men and women, noted the many changes in yields and fruiting, flowering and catch seasons of a number of traditional plants, crops and marine food sources resulting in a decline in food security.
4. While RAP participants, young and old, were cognisant of the connection between changing weather patterns and changes in food production, they knew very little, and wanted to understand more, about the causes and adaptive solutions to climate variability.
5. Complex interactions between the social, environmental, economic, cultural and political realms in which women, men and natural resources operate. Women best understand the complex relationship of natural resource and ecosystem health to human wellbeing. As such, women and young women are most concerned about how food security impacts social and family structures, as these areas are closest to their day to day roles and responsibilities. Men and young men are most concerned about how food security issues link to

community planning, controlling pest populations, the cash economy and community politics.

6. Men identify women and young women to be good garden food managers and intimately linked to the environment and natural resources, because of their concern for their communities and for future generations. Women and young women report working longer hours in the garden and were seen to have better knowledge of garden planting and harvesting timing than men. Traditionally women have shown how they protect natural resources, and as such stand at the core of the sustainability paradigm to move forward (this finding is also supported by Asker, 2009).

7. The research found that women are more likely to forgo quality of food for the 'benefit' of their family. In this way for family consumption the focus (especially in Sanma and Malaita) was seen to sway toward adequate quantity over adequate quality. Conversely the focus in Choiseul was on quality and may be reflective of their food security 'status' when compared to communities in the other provinces like Malaita.

8. In all communities women held far fewer opportunities than men to participate in agricultural decisions. Compounding this was the inequitable gender division of formal natural resource leadership roles, restricting women's ability to control resources beyond deciding what to grow in small food gardens.

9. Participants are highly aware that food security is impacted by a range of variables (including, but not limited to) changes in climate.

10. Women and men participants at all research sites identified that changes to food security have been increased with the arrival of a cash economy, heavily influenced by the onset of resource extractive activities in the Provinces. With cash economies the desire for a narrow selection of processed and sugary foods perceived as easy and accessible has increased.

11. At present both women and men, young and old, know that the main imported foods they rely on from stores are detrimental to household and community financial stability, and their ability to sustain their growing families into the future. Most people consider current reliance on shop foods to impact negatively upon health and nutrition.

12. Most young women and men are knowledgeable on the basic concepts of climate change science at a rudimentary/word recognition level. Younger peoples' awareness of the term 'the greenhouse effect' and knowledge of climate causes and impacts was found to be generally greater than that of the majority of older community members. Conversely older men and women had far deeper knowledge and understanding of agricultural techniques than youth and were more readily able to relate stories about signs of climate stress in garden crops and sea resources than their younger counterparts. The emerging difference arose that youth are aware of climate change science but not the signs, whereas older members understand the signs (physical impacts and changes in food sources) however they do not understand the cause (the climate change science).

13. The length of time communities believe their food security will be severely threatened, if current practices continue, is dependent on the amount of land available for subsistence, the rate of population growth and the current weather patterns and the rate at which resources are depleting. The quality of people's lives depends on the quality of their ground and access to ground (land and soil). As such there is a strong relationship between population pressure on the land and the urgency women and young women felt to address food security issues. For example, in Lilisiana, high urgency was expressed, where as in Choiseul perceptions of food security for the population was a longer-term consideration and urgency was less.

14. Communities feel that they lack the knowledge, physical tools, planning skills and financial basis to engage in alternative methods to adapt their farming/gardening techniques for changing climatic conditions. Further, many stated that they lack the ability to identify innovative alternatives to current methods given that they learn new ideas from their family unit and have been exposed to minimal education from outside the family structure.

15. Men in particular struggle to strike a balance between immediate needs of cash income and long-term needs. This is reflected in the amount of marketing of quality garden crops in order to obtain cash for wants (including store-based processed foods) over basic needs.

16. With the exception of Sasamunga villages, who have received on-going support from Kastom

Gaden programs and tsunami relief initiatives, prior experience with medium to long-term development projects has been minimal and lacking strategy. However women and men considered that some of the existing organisations in their communities are equipped, ready and willing to commit to projects for social and environmental outcomes.

17. Desire for change presents an important driver and entry point for the project to engender buy-in and ownership from the outset. Those who do not benefit from natural resource cash economies were found to be those who have the strongest desire to engage in sustainable practices. The majority of RAP participants expressed a strong desire to learn more about climate change and practical measures to adapt food production systems to changes in nature.

Findings: Vanuatu

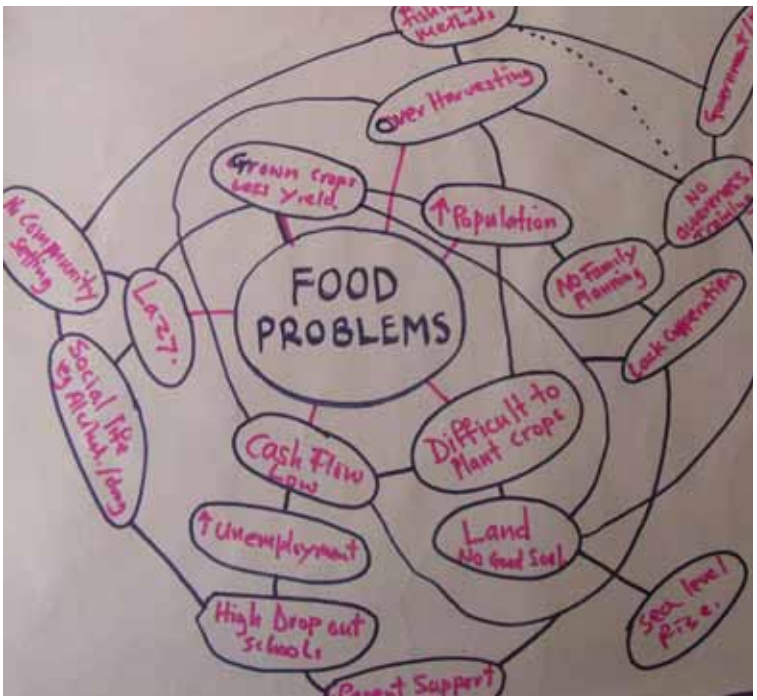
According to male and female Sanma participants (from Kole 1, Kole 2 and Manioc communities), locally produced foods that are most stressed (from climate and other stresses) include: banana, kumala (sweet potato), coconut, Fiji taro, pawpaw and cucumber. These stresses were attributed to a combination of changes in weather patterns and pests/diseases. In Sanma RAP participants stressed the importance and the need for fisheries management, integrated pest management, crop rotation, seed banks and soil improvement methods. Sanma participants perceived their current food sources to be more secure than their Solomon Island counterparts.

RAP participants in Sanma, Vanuatu discussing household consumption patterns.

Findings: Solomon Islands

According to female and male RAP participants from Choiseul (including Sasmungga, Boe and Panarui communities), locally produced foods that are most stressed (from climate and other stresses) include: kassava, kumara, banana, taro and beans. Participants attribute these stresses to infertile soil, changes in weather patterns and an increase in pest and rodent populations. In Choiseul, RAP participants stressed the importance of the need for improved soil nutrition, crop rotation, access to and management of seed banks, sup sup gardens, integrated pest management, and improved access to expanded regional markets.

According to female and male RAP participants from Malaita (Lilisiana village), locally produced foods that are most stressed (from climate and other stresses) include: coconut, bonito (tuna fish), potato, kakake, koa and tomato. Participants attribute these stresses to a combination of changes in weather patterns, saltwater inundation, lack of land, overharvest/exploitation and pests/diseases. In Malaita RAP participants stressed the importance of the need for fisheries management, replanting and conserving mangroves, dealing with saltwater inundation and learning new techniques to produce climate resistant crops suitable for extremely limited land space in sup sup gardens. The food security situation in the Malaita RAP community is the most urgent.



A 'cause and effect' diagram by male RAP participants from Malaita, Solomon Islands.

Participant reality check

The balance between using land and sea resources sustainably for subsistence food and cash livelihoods as well as for building resources is not easy to achieve. The complex balancing act challenged RAP participants in this and previous RAPs. Participants saw food security as desirable but grappled with some questions of what it would look like in reality. Key questions participants described as their challenges in the face of climate adaptation for food security during the RAP included:

- How can we sustain the functioning of ecosystems and simultaneously support growing populations with a nutritious diet and cash incomes?
- How can we engage in food production business activities while maintaining a good quality of life with sufficient food for our own families?
- Practically, how can we grow consistent market quality food given the 'fake seasons' we experience?
- How can we rest soil or reduce marketing when we are in immediate need of food and cash for our families?
- How can we make space for youth to get a good formal education as well as a good 'cultural community-based education' to both participate and influence plans for food production techniques that are adapted to a changing climate?

Community plans for change toward food security

During the RAP, participants began discussions regarding plans for food security. Community plans were centred around the themes of natural resource and community planning, management of individual families gardens, fishing, conservation and (cash and non-cash) livelihoods. Under these themes community-based food security plans commonly highlighted the need for:

- Inclusive natural resource decision making and planning
- Sustainable agricultural knowledge, skills and livelihoods
- Establishment of land and marine conservation sites
- Improved sustainable livelihood options
- Establishment of seed banks
- Improved market access
- Improved crop quality
- Improved skills for knowing different methods of planting and harvesting that will be effective in high rains and hot sun

Sex disaggregated perceptions of how a community-based project can contribute to change are provided within the Findings section of this report.

Capacity for change

On an individual and group basis, women and men were asked to reflect upon their capacity to engage with initiatives and activities that bring about change associated with food security and uptake of new food producing techniques. Their responses show that they consider themselves to have the capacity to lead pilot initiatives through existing organised groups. However some key challenges act as barriers to change including lack of motivation reflected by the disorganisation in some groups and across some communities. In such cases capacity for reconciliation and working together needs to be addressed prior to capacity building for sustainable livelihoods or longer term development approaches.

As commonly found in Live & Learn RAPs in the Pacific Islands, women see themselves, or other women in their constituent groups, to have the capacity to play powerful roles in leadership positions in general, and specifically in voices for sustaining peace, promoting sustainability and financial management for sustainable livelihoods.

All participants involved in the RAP perceive youth to be critical stakeholders in the future and expressed a desire for youth climate leaders in the pilot project. Youth across all research sites were found to be most concerned about food security and climate change.

In a RAP survey, participants identified the following ways that they could contribute to change toward food security:

- Learn new skills and methods in food production techniques that are resilient to a changing climate.
- Act as leaders to promote best practices to others in the community.
- Educate people about the benefits of consuming good quality local island food.
- Encourage values among youth that support social, environmental and economic sustainability, keeping in mind that one cannot be separated from the others.
- Promote and strengthen greater participation of local/community organisations in conservation and sustainable management of food production sources.

Design recommendations

The RAP identified some core principles and mutually strengthening processes that will need to occur in the forthcoming project design. Design workshops held with supporting organisations identified the following principles to minimise risk and ensure the project is appropriate and effective. These principles include:

- Build on existing local strengths, leadership and ownership
- Utilise and support existing organised groups, systems and structures
- Promote an inclusive society through inclusive equitable implementation
- Build up the relationship, accountability and engagement between governments and smallholder farmers families
- Deliver visible results, in rural areas in the short term (as well as the longer term)
- Avoid over engineering, use realistic timeframes

and ensure predictability

- Develop and promote programmatic approaches and ensure activities are fully embedded in NAPAs
- Promote mutual accountability, disciplines and responsible partners
- Obtain the support of existing community leaders and other respected people in the community, and
- Promote coordination and harmonisation with other funded programs in the Pacific region

The RAP findings call for an integrated approach to project design. Based on gathered evidence the ensuing project should practically and strategically focus on the following key areas:

1. **Strengthening existing rural networks**, and seeking to build on and replicate successful models of sustainable agriculture, livelihoods products and market access in other areas.
2. **Provision of sustainable agriculture technical training** and support especially for women, young women and young men.
3. **Development of Food Security and Ecosystem (land and coastal) risk assessments** to inform the creation of adaptation plans.
4. **Identification of policy and networks** that promote equity in reaching markets.
5. **Institutionalising long-term natural resource (land and sea) governance, risk assessment and planning skills** for women and men, young and old: Community-led natural resource plan development will ensure communities, tribes or clans, can set their own strategies for sustainable development, improve their inclusive management and tackle obstacles.
6. **Fostering young women's and young men's leadership in agriculture** and focusing on building community relationships through the transfer of traditional ecological knowledge together with new approaches to agriculture that is appropriate for a changing climate.
7. **Supporting and promoting evidence-based cross-sector policy development** ensuring policies are inclusive, gender responsive and sustainable while addressing practical and strategic needs.
8. **Supporting the regional food security plan for the Pacific and National Climate Adaption Plans.**
9. **Respecting and utilizing traditional mechanisms, values and practices to enhance food security** such as customary management of fisheries and traditional ecological knowledge and stewardship techniques.

These areas should be supported through:

- Piloting projects before going to scale (the foundation of the forthcoming pilot project).
- Building on positive patterns of change as an entry point for staging integrated approaches.
- Focusing on facilitation processes that stimulate and support community-led social change that enables leadership space for women and men young and old, in developing and sustaining livelihoods and land and sea natural resources.
- Building on existing community and gendered strengths, and giving upward importance to working with and strengthening established and organised women's and men's and youth bodies, groups and networks.
- Facilitating dialogue opportunities between women's, men's and youth community organisations and the department of agriculture's extension officers, and provincial and national governments.
- Acknowledging that tackling natural resource management in a gender sensitive manner is more about strengthening awareness and education of alternative approaches to agriculture than increasing financial resources to climate adaptation.
- Establishing supportive policies and structures which are responsive to working with women and men working together for food security.

Mainstreaming a gender focus into the pilot project

The RAP identified that deliberate efforts should be made to up-skill women and young women (together with young men) on gardening techniques as females spend the most time and have intimate knowledge of the small garden systems. It is with the young women that it would be most important to embed new approaches and involve them in decision making

in organisational and community processes and practices.

Putting gender equity into practice will be challenging though an important focus through the design and implementation of the coming project. What is known is that a multitude of social and economic benefits will follow efforts toward safeguarding food resources. To help this process it is imperative that civil society together with the National Governments of Vanuatu and the Solomon Islands and communities are in a position to support this focus.

Coordination and collaboration for climate adaptation toward food security

To strengthen the pilot project, it is recommended that the project work in close coordination and collaboration with other interested stakeholders throughout Vanuatu and the Solomon Islands including government ministries, donors, non-governmental organisations and other organisations – in the following ways:

- Collaborate with relevant partners, national and international (regional) actors and other organizations involved with agriculture and fisheries and health departments to design practical locally relevant community–based materials which mainstream gender equity at the rural level as well as the national level and showcase best practice in men and women's advancement in rural agriculture and climate adaptive techniques for food security (particularly young women).
- Coordinate and piggyback on existing strong rural or community-based networks (of any kind), to facilitate the expansion of their focus to include messages about food security in a changing climate awareness, skills and associated action.
- Work with rural farming networks, and facilitate the expansion of their focus to include natural resource governance, food security planning and sustainability knowledge.
- Establish a community-based advisory group across the pilot communities of interested staff, community members and others outside the project to support, including its gender consideration, sharing of challenges and celebrate success over the life (and beyond) of the project.

Leaders and youth from Lisiana community, Malaita with a fish and crop calendar.

Lessons learnt during the RAP process

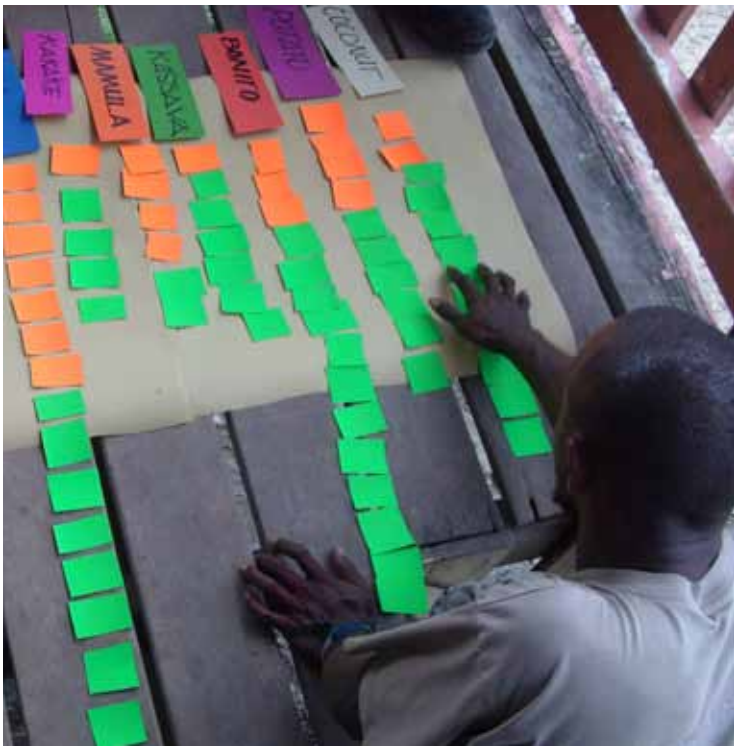
The RAP proved to be a highly useful and desirable approach to project design and development. The approach engendered levels of trust, and led to participation and engagement in the form of critical reflection particularly for young women and young men.

The RAP approach proved to be important for:

- Designing an evidence-based project grounded in community reality.
- Building a foundation of inclusion with pilot communities to remove the 'them and us or give and take' mentality commonly associated with community-based aid provision.
- Managing project expectations in a partnership approach with the community.
- Avoiding tokenistic consultation 'after the fact' on a finished design 'from Vila, Canberra or Honiara'.
- Ensuring the integrity of engendering community ownership of the pilot project from the outset.

Additional lessons applied from previous and emerging from this RAP include:

- Sound research into natural resources must examine the biophysical as well as the social dimensions of communities and need to focus on the relationship between the two.
- Gender is relevant in the design phase of any project: to understand gender roles, to provide a gender analysis of the situation in communities and to develop strategies that will ensure both women and men will have the opportunity to participate in and benefit from a given project.
- Preceding the RAP visit, the original engagement and travel to communities to set-up the RAP is a crucial process to ensure expectations are set that the RAP is about inclusive project design, research and participation as opposed to a passive workshop or training session. Additionally it is of paramount importance that communities understand that literacy is not required for inclusion or participation.
- Where possible RAPs should be held in the participants' village to ensure woman are able to attend and feel comfortable doing so alongside their family responsibilities.



RAP participants individually ranked the severity of changes in their local food sources into low, medium and high categories before sharing stories about the changes they had witnessed.

The meaning and value of RAP involvement to participants is illustrated through unprompted statements concerning their involvement in the design phase. Such statements were commonly shared during the second day of the RAP in communities:

We are excited and ready to learn how to have food security, I now understand my community's role. We have never been part of a project like this or been involved in designing a project that will help my village. (Chief, Sanma)

I realise from this research the importance of my role in planning for food security for my community. I do not want to miss this opportunity. (Man, Malaita)

Thank you for working with us, I thought I was going to have to read and write lots, but it [the RAP] was much more, we have shared many stories. I am happy to be involved and I want to help others in my village. As you can see there are a lot of food problems in our village and I want to be part of our solution. (Woman, Malaita)

It is important to note that while many participants in Choiseul had built existing relationships with Live & Learn and/or KGA, in Malaita participants related that others in the community did not attend due to a past experience where they felt an organisation had made promises for future projects that did not materialise. For these non-participants they apparently wanted to 'wait and see results' before participating. It is hoped that the pilot project can restore this hope and obtain their involvement in the early stages.


400
50 VT
50 VT
For ONE ring.
200 VT

2 Introduction

Live & Learn's Climate Change Adaptation toward Food Security Project

The RAP was undertaken during August/September 2010 to inform a pilot project design process by Live & Learn through the AusAID International Climate Change Adaptation Initiative – Community-based Adaptation Activity Grants. The pilot project is part of Live & Learn's ongoing Pacific climate change adaptation programme seeking to deliver low cost, community-based adaptation activities that are easy to scale up in remote island locations.

The pilot project aims to benefit 12-15 communities in the Solomon Islands and Vanuatu.

This project seeks change across two areas:

1. Protecting local food supplies, assets and livelihoods against the effects of increasing weather variability and increased frequency and intensity of extreme weather events including natural disasters and sea level rise; and

2. Protecting ecosystems and strengthen the provision of environmental services (food).

These changes seek to support the project goal to strengthen the resilience of communities and ecosystems toward climate change.

The pilot project aims to benefit 12-15 communities in the Solomon Islands and Vanuatu. Target groups are smallholder farmer families (women and men) and ultimate beneficiaries will be communities and provinces at large. The project links closely with Solomon Islands and Vanuatu Government National Adaptation Programme for Action (NAPA) and supports Theme 3 in the Framework for Action on Food Security in the Pacific, 2010. Live & Learn is the lead agency for implementation of the pilot project and has support from relevant national government departments and input from regional organisations including the Secretariat of the Pacific Regional Environment Programme (SPREP) and other peak bodies including the Food and Agriculture Organisation (FAO) and local organisations including Kastom Gaden Association (KGA).

Research of Aspirations and Perceptions (RAP)

The RAP is an investigative social research method developed by Live & Learn Environmental Education to gauge community perceptions toward sustainable development issues. At its core the RAP methodology acknowledges the intimate relationship that exists between people and the environment.

A successful project design is dependent on the community's involvement to identify how and where support can best be provided. The findings of the RAP are intended to inform viable and effective project design. A design document and draft educative tools and resources will be developed using the RAP findings, focussing on a one year food security through climate change adaptation pilot project designed on the emergent findings from this research.

A RAP is explained by Live & Learn as:

A semi-structured process of learning with and from communities about their aspirations and perceptions toward access and power structures, existing human capital strengths and weaknesses, local capabilities, and other relevant social, cultural, political, environmental and economic information on the subject being explored.

Accordingly, this RAP captures gendered community perceptions toward issues linked to food security and climate adaptation to safeguard food resources. It strives to gauge where strengths and opportunities exist to support socially and culturally appropriate environmental education and community development projects. The research also introduced many participants to the concept and objectives of food security and how climate adaptation for food security can be beneficial for all community members now and in the future. During the RAP participants explored different aspects of the resilience of food production systems in their personal past, present and future contexts.

Ideally, social research should entail a long-term comprehensive exploration and analysis of all stakeholder perceptions, issues and options. Practically, as a result of resource constraints, this level of sustained research is not feasible for this or any other Live & Learn RAP. Accordingly, it should be noted that the findings in this report are not based on statistically sound data sets however they are of high value as they do present the perceptions and stories shared with the research team by over 70 participants, female and male, young and old, across seven communities in three provinces. This report presents the results of research conducted over two days in three sites with each community. Participants engaged in the RAP were from gendered vertical and horizontal 'slices' of each of the seven communities, however there was a higher than usual number of youth (unmarried men and women) which was found to be a positive yet unplanned outcome.

The need for a research of aspirations and perceptions

For any community development project to be appropriate and effective it needs to be informed by an assessment of stakeholder aspirations and perceptions on related issues. There are innumerable examples of well meaning development projects that fail due to a disconnect between what is believed to be important by outsiders, and what is perceived through values and experiences, to be important by the community. The RAP technique acknowledges that people coming from outside a community have different perceptions and visions of what is required for sustainable development compared to those within the community. It also acknowledges that there is often a raft of different ideas within the community between and amongst men and women and their sub groups. Accordingly, the RAP seeks to start from where the community is at, and to understand what gendered community visions for a sustainable future entail. While the RAP seeks to unveil perceptions, it also has an exploratory nature as participants investigate, learn and question their own realities and desires for the future.

RAP objective

The objective of the RAP is to provide an understanding and assessment of village based capacity, gender relations and local perceptions to climate adaptation toward food security. The RAP will inform leadership capacity building activities, evaluation and provide an understanding of how communities (in each village) perceive how climate change will impact on their lives in relation to food security. The RAP aims to assess the strengths and ability of communities to adapt through the uptake of appropriate tools, techniques and approaches to safeguard food sources.

Key research questions

The RAP endeavours to provide insights into these overarching questions:

1. What are the gendered perceived issues (or problems) of a changing climate on food production?
2. What are the gendered perceived issues (and their root causes) related to food security? What challenges and opportunities lie ahead to address these issues?
3. What are the major foods consumed by each pilot community and have they witnessed any signs of stress or changes in the management of the food sources?
4. What are the gendered perceptions of how food sources and nutrition have changed over time?
5. What are the gendered perceptions of roles, responsibilities and decision-making access for food sources for subsistence and marketing purposes?
6. Where are the knowledge gaps in community-based climate change adaption toward food security?
7. What are the gendered perceptions relating to how a community-based program can contribute to changing knowledge, attitudes and practices in respect to climate adaptation for food security and uptake of appropriate farming approaches, technologies and awareness activities via a pilot project?
8. What changes do communities consider desirable in the future in relation to climate adaptation and safeguarding local food sources?

Data collection methodology

The RAP uses a mix of qualitative and quantitative research methods to facilitate the exploration of relationships and interactions between the social, environmental and physical sphere, and gendered perceptions of these. The RAP data collection approach is highly participatory (Refer to Annex III) and was undertaken over two days in three community hubs across three provinces. The RAP utilises a combination of: men's and women's group storytelling, visual stimuli, ranking cards, 'food stress' indicator cards, cause and effect diagrams, drawings, crop and fishing calendars, individual semi structured interviews, and community profile surveys for community representatives.

RAP approach

Different approaches were taken for each day in the community. On day one, women and young women were separated from men and young men to provide females with a space for participation and story sharing with other females. The facilitator's sex was matched to the sex of the group. Interviews, focus groups and observations were the primary means by which perceptions, reflections and aspirations were generally shared by the communities and documented in the RAP. On day two women and men shared stories and 'walked in each others' shoes'. In most locations they presented their key findings from day one to each other, and discussed, contrasted and compared the different perceptions and commonalities between women and men's perceptions and worked together to look at the 'bigger picture'. Day one was quite rigorous and intense, while day two provided time for open discussion around a changing climate and to discuss community-led project design and input in greater depth. In some locations day two also involved garden visits and to talk about issues *in situ*.

The RAP approach emphasises participatory research or partnerships between researchers and community members. It stresses the importance of participatory

research and the role of community members in initiating, collecting and using their own data, as well as the collaboration of community members with others (in this case Live & Learn community facilitators and researchers) so that the participants lead the transfer of knowledge and shape the design of the project.

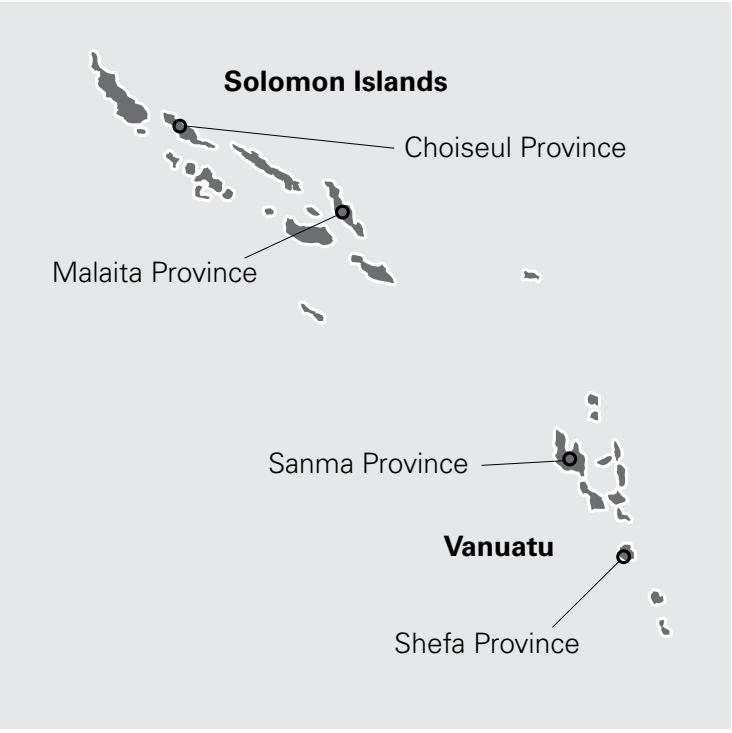
Research sites and geographic coverage

Communities invited to take part in this RAP were communities identified as being vulnerable or 'at risk' with respect to food security. Some communities were earmarked to be more 'at risk' than others. The identification was made through extensive consultation with the Ministry of Agriculture in Vanuatu and the Solomon Islands. All RAP communities are impacted by some common and some different issues in respect to food security.

The RAP was carried out in three sites across three provinces; Sanma Province (Vanuatu), Choiseul Province and Malaita Province (Solomon Islands), involving seven communities and 70 community participants (45% women and young women and 55% men and young men). Communities involved in the RAP are listed below in Table 1.

Table 1: RAP communities

Province/country	RAP location	RAP communities
Choiseul Province Solomon Islands	Sasamunga community	RAP communities: Sasamunga, Boe, Panarui
Malaita Province Solomon Islands	Lilisiana Village	RAP community: Lilisiana
Sanma Province Vanuatu	Matevulu Secondary School Santo Island	RAP communities: Kole 1, Kole 2, Manioc
Shefa Province Vanuatu	Lelepa Island and Mataso Island	RAP communities: Lelepa and materials will be shared with Mataso (not included in this report as research is underway)



The map shows the location of RAP research sites.

RAP locations

Full community profiles can be found in Annex I. Descriptions of these communities are based on the information gathered from participants during the RAP.

3

Methodology: The RAP Approach

This research will employ the Research of Aspirations and Perceptions (RAP) tool, a highly participatory approach to facilitate community involvement in a project's design. Developed by Live & Learn Environmental Education, the RAP in this case will explore community members' aspirations and perceptions in relation to social, economic and environmental issues related to safeguarding food sources in a changing climate. The findings of this research will inform the design and development of forthcoming climate change adaptation engagement methods and tools that will seek to lead communities further toward self-resilience and sustainable development. The RAP will provide baseline data for evaluation purposes.

The RAP will examine community perceptions of food production issues and communities' knowledge levels in relation to a changing climate. It also seeks to provide an understanding of the perceptions held by community members regarding strategic needs, issues, opportunities, and capacity requirements to undertake projects to safeguard food sources.

The RAP involved a participatory gendered approach, encouraging communities to explore their strengths, share experiences, stories, ideas and opinions, and question and clarify issues related to safeguarding food sources.

RAP activities are centred on six main research axes:

1. Current and past food production management practices
2. Food security related issues and root causes
3. Access and power over decisions about different food sources
4. Understanding and capacity for involvement in climate awareness and adaptation techniques within the ensuing pilot project
5. Current and future food economies, entry points and future approaches/ options
6. Community visioning, planning and most desired change

Each of the axes were gendered. A RAP facilitators' research guide and standardised note takers' guide were used in all locations.

RAP participation

The research sought to involve a cross representation of community members. During the research, Live & Learn staff met with community representatives and explained the nature of the RAP and the importance of balancing the gender, socio-economic status and age of participants. Participation of women and men were generally balanced in most provinces. However participation of women was limited in some locations due to family responsibilities, miscommunication and misunderstanding. In Choiseul, participation in day two activities was impacted by overlapping local festivities. Participants were organised into four key groups: 'older men', 'young men', 'older women' and 'young women'. At times throughout the research, the term 'youth' is used to describe 'young men' and 'young women'.

Data collection tools

The RAP involved a participatory gendered approach, encouraging communities to explore their strengths, share experiences, stories, ideas and opinions, and question and clarify issues related to safeguarding food sources. The RAP also sought to measure the capacity and knowledge, attitudes and practices toward climate adaptive tools and methods in food production (land and sea).

The RAP was designed to facilitate a reflective, educative and solution-orientated process. It is through this process that participants were able to critique their relationships, systems and structures and build their capacity to engage with the ensuing project. It was important that the RAP developed a relationship between Live & Learn and the communities. Live & Learn had previously worked in each province, however not in the target communities, providing a good opportunity for expanding existing networks.

Data collection focused heavily on qualitative research with a high emphasis on story-telling. Some activities involved diagrams and drawing, and only a few activities involved a community scribe with a group. None of the activities relied on literacy levels of participants. Unfortunately in two locations, women did not attend as they assumed participation in the RAP would require literacy skills. Future RAPs will need to firmly communicate that literacy is not a requirement for participation and actively encourage illiterate women and men to attend. All activities were conducted in Pidgin or Bislama.

The RAP used several different approaches to data collection; referred to in social research as the mixed methods approach. The approach involved the following tools:

1. Photo stimulus (to discuss climate change and the greenhouse effect)
2. 'Chain of effects' diagram for story sharing
3. Participatory ranking and crop stress ranking cards
4. Semi-structured focus group discussions and story sharing
5. Face to face individual semi-structured interviews
6. Community profile templates

Data collection logistics

The location of the focus groups at each community were areas where there was shelter and space, free of noise and distractions from other community members. School classrooms, outdoor spaces (gardens), community halls and shady trees were used as research venues. In these setting participants felt comfortable and relaxed. Participants were generally positioned in a circular or semi-circular configuration encouraging participation and interaction.

The RAP took two days at each community. On day one, male and female participants were separated to allow space for open story sharing, particularly to facilitate the women's participaion. On day two, women and men came together to share stories and findings from the first day, and to conduct community visioning.

One facilitator and one note taker worked with the women's group and another facilitator and note taker worked with the men's group. The sex of the facilitators and note takers matched the sex of the group undertaking the RAP to encourage open participation. In each province a local community member, identified through pre-RAP arrangement visits, helped to take notes and/or to facilitate community involvement and make participants feel comfortable.

The RAP focus groups involved 8-22 participants and involved direct and very active participation between the facilitator and the participants.

The RAP focused on providing the opportunity for all participants to share their attitudes and experiences with their group. The exchanges highlight common

Participants in Sanma, Vanuatu with their visions and food security plans.

experiences and views, identified the differences within the group, and acted as a stimulus to further thought among participants. Consequently, the research found that focus groups was a useful tool to explore the RAP topics broadly whilst maintaining some structure to the discussions.

The data collection techniques focused strongly on oral and visual communication; and did not depend on the participants' literacy skills.

RAP analysis techniques

Analysis of qualitative data indicated the structural, cultural, environmental, economic, mental, social, political and/or institutional barriers that limited action.

Data analysis integrated collection and analysis methods to validate the research findings through a dialectic process. There are several key strategies that were used for the RAP:

- **Coding** was a process used for both categorising qualitative data and for describing the implications and details of these categories. Coding was an important method in finding patterns in the data. It involved dividing the data into concepts, categorising the concepts, and assigning properties to categories, and linking properties along a continuum.
- **Memoing** was a process for recording the thoughts and ideas of the researcher as they evolved throughout the study. Two of the six community facilitators conducted memoing and found it useful to note the differences that occurred between communities and provinces.
- **Integrative diagrams** were used to organise details into common themes.

Limitations

Most facilitators involved in this research had considerable prior experience in facilitation of community activities and knowledge of the diversity of the communities visited. Facilitators were fluent in Bislama or Solomon Island's Pidgin and notetaking was both in Pidgin and English. Notetaking was not necessarily an exact transcription and translation to English in an effort to preserve the integrity of the comments.

While gender balance was desirable, the exact composition of participants was determined by the community itself. In most communities gender balance was achieved except where married women were not represented in Sanma.

The findings from this research should be seen as a starting point to stimulate further, more specific discussions.

4 Context

This section outlines the economic, social, development and environmental context in which the pilot project will operate.

Food security in the Pacific

Food security is a fundamental development issue in the Pacific. Traditionally Islanders achieved food security through agricultural and fishing methods that were in balance with their natural surroundings. Sustainable natural resource management was a matter of survival and communities relied on local staple foods including roots, tuners, bananas and breadfruit. More recently reliance on imported foods has emerged along with large changes in the supply and demand for food. While this transition to imported foods has helped contribute to food security by meeting growing demand for diversified foods, it has affected the health of Pacific Islanders and formed other uneven and fragile dependencies some of which are mentioned below.

Food security is a fundamental development issue in the Pacific. Traditionally, Islanders achieved food security through agricultural and fishing methods that were in balance with their natural surroundings.

As set out by the Food Secure Pacific Working Group (FSP) 2010, food security is impacted by a range of variables (including, but not limited to, changes in climate). Imports have contributed to food security by making more foods available however they also pose a threat by exposing populations to poor quality foods (many are high in calories and low in vitamins and minerals e.g. turkey flaps). Adding pressure to families, imported foods rely on availability of household cash for their purchase. Low cash income levels in rural areas strongly effect how families can respond to situations of low food production. In some cases cheap imported foods (e.g. rice and wheat) compete with domestic market produce, increasing dependence on unstable import markets and contributing to high rates of diabetes, heart disease, stroke and cancer.

Economic shocks, such as recent increases in food and fuel prices mean that stretched household cash benefits have to be further stretched to buy food. This is particularly prevalent in vulnerable communities where access to land

for gardening is limited or non-existent. To exacerbate these challenges, transport costs to outer provinces further increase the price of food and hinder regional trade of locally grown produce. While a return to an entirely subsistence way of life to feed the whole population is unrealistic, in some communities local production strategically needs to remain at the core of the food system (FSG, 2010).

Climate change and food security

The United Nations Framework Convention on Climate Change (UNFCCC) reports that climate change is already affecting communities in small island states and climate variations and extremes have disrupted Pacific Island food production and economies. Climate projections for the future, although uncertain for islands, are bleak at best and indicate reduced food security especially at a household level. Cyclone intensity, rainfall variation, fresh water salinization and the incidence of disease are all expected to intensify with climate change. In the Pacific Islands, adaption to these changes is constrained by a currently low local capacity due to lack of access to information, lack of market or cash, lack of access to quality domestic and international imports, and lack of shared awareness of appropriate local food production methods and technologies that are suitable for a changing climate.

Chief Thomas Taloga Lilisiana, shows where the sand used to be under their homes. King tides have washed away many houses in the community.

The current and imminent threat of climate change as well as natural disasters to Pacific Island Countries (PICs) highlights the need for greater focus on building local economies; agricultural resilience; innovation; food security and strengthening ecosystems based natural resource management.

Recent tsunamis and earthquakes in the Pacific region demonstrate the vulnerability of remote islands to climatic variability and disasters. Many low lying villages rely on a thin and ever changing fresh water lens for survival and live in very challenging environmental conditions including:

- High ground water levels with regular tidal incursions
- Erosion and unstable and saline soils
- Water shortages
- Sea level rise and periodic flooding

Adding to this vulnerability, populations in the Western Pacific are extremely dispersed with up to 80% of people living in resource-constrained areas due to regional disparities in living conditions, remoteness of islands, lack of infrastructure and social services (including education and training), variable access to markets and inequity in the distribution of cash benefits.

In some of the RAP communities (e.g. Lilisiana in Malaita) the limited soils are saline and sandy and challenging even for the most basic forms of agricultural production. The vulnerability of such low lying communities makes

the success of new agricultural developments and methods a matter of survival. Economic opportunities for families are limited due to lack of land for production, the varying amount and inconsistent quality of crops and/or lack of market access.

For small holder farming families, about 70% of the gross cropped area benefits from the summer rains (November to April). Production relies heavily on seasonal rainfall consequently prolonged variation from the historical or 'normal' rainfall has been devastating to local-scale agriculture. In addition to economic risk to cash livelihoods, subsistence (non-cash) livelihoods and household food security is further threatened by coastal inundation, increased salinity and erosion as ever present consequences of sea level rise.

Front beach at Lologae village, Choiseul. Saltwater has washed away the white sand.

The level of climate change understanding at a national policy level is found to be high however the access to solutions to counteract the challenges posed by a changing and variable climate are currently few. Most Pacific Island governments are seeking to address challenges relating to food security and climate variability through their NAPAs:

- Seeking to build capacity at the community and institutional level
- Developing practical community-based responses
- Adopting systematic approaches to food security and partnership development; between government and civil society groups
- Placing greater focus on education, learning and awareness
- Realigning agricultural practices with realities of a changing climate

It is recognised in country NAPAs that climate change is an additional stress that needs to be navigated by farming families.

Long-term food security requires the establishment of food supply systems that can adapt to climate risks and cope with climate related stress. Food supply systems traverse land tenure and use systems, transportation systems, energy and technology systems that link food to markets and consumers. As set out by FSP (2010), food security systems in the Pacific must build on subsistence systems, globally competitive agricultural and fisheries' products and demand driven importation. Above all, local capacity at the community level must be strengthened to monitor and maintain food security in the long-term.

Progress has been made in recent years to understand and appropriately address climate change issues in the Pacific. The Live & Learn project will form part of the national response to climate change adaptation in the target countries at the rural community and household level. Access, management, and proper utilisation of land and sea resources underpins food security. Addressing climate adaptation, energy security, transport security, market access and linkages, Information and Communications Technology (ICT) and resilient farming systems that underpin food security, is now crucial and highlighted as a priority in the Pacific Plan and NAPAs. Support needs to be provided to village based farmers and fisher-people's capacity to adapt their methods and techniques to a changing climate alongside other initiatives to ensure a holistic approach to development.

Country overviews

Solomon Islands

The people of the Solomon Islands live on a scattered archipelago of mountainous islands and coral atolls covering approximately 28,000 square kilometres. The country is organised into nine provinces and one capital territory; Central, Choiseul, Guadalcanal, Isabel, Makira, Malaita, Renbel, Temotu, Western and Honiara. As populations are dispersed over multiple islands, travel times are long, costs expensive and services can be infrequent. These factors impact upon the efficient delivery of social services to communities and community access to markets.

More than 80% of Solomon Islanders rely on rural livelihoods of small-scale subsistence cash based agriculture and small scale forestry and fishing (AusAID, 2006). The agricultural sector absorbs 75% of the labour force. Despite recent strong economic growth, the Solomon Islands' economy continues to face a number of challenges at the community level. The majority of working age people in the Solomon Islands are engaged in the non-monetary economy (ADB, 2007).

While the Solomon Islands have areas with abundant natural resources, natural systems are under great pressure from commercial logging, mining and fishing. Commercial logging is one of the Solomon Islands' most important sources of economic growth however this source of growth is unsustainable. The country is therefore broadening the base of growth of the economy, with mining, agriculture exports, fisheries, and tourism all being targeted.

Major agricultural produce includes cocoa beans, coconuts, rice, potatoes, vegetable, fruit, cattle, pigs and fish. The agricultural sector accounts for 42% of Gross Domestic Product (GDP) with industry and services accounting for 11% and 42%.

For decades sustainable forest management has been absent from community life and this has impacted food security. It is recognised by communities that they lack the skills, planning ability and knowledge to assess natural resource development (resource extractive activities) against other options. Communities need support to more appropriately manage the resources upon which their livelihood depends.

Many islands in the region are vulnerable to natural disasters like floods, typhoons and volcanic eruptions. An earthquake and tsunami hit Western Solomon Islands on 2 April 2007 affecting 36,500 people. About 6,300 houses were damaged or destroyed across 304 communities. These types of events and resultant damage to development and agriculture are becoming increasingly common.

Agricultural practices that rural populations rely on have been placed under increasing pressure from climate change risks. The Solomon Islands' NAPA outlines the effects of change on a number of sectors, most notably agriculture.

High population growth rates of around 2.8% continue to place pressure on infrastructure and increase the demand for food, water, sanitation, housing, education, and health services.

A Participatory Poverty Assessment conducted by the Asian Development Bank in 2007 indicated that the major causes of hardship in rural communities in the Solomon Islands include: lack of livelihood opportunities and market outlets, poor access to water and sanitation, unsustainable harvesting of natural resources, inequitable gender relations, and lack of access to health care and education in rural areas. These challenges are compounded by a range of risks for young men and young women including unemployment, substance abuse, teenage pregnancy and low educational participation beyond primary years in part due to limited vocational opportunities for young people who wish to seek employment.

The Solomon Islands is ranked as one of the Least Developed Countries (LDCs) in the world by the United Nations Development Program (UNDP) as 129 out of 177 countries in the Human Development Index (UNDP, 2007). Of the many who live in poverty, women and children are the most powerless and the most affected, reflected in the high and increasing maternal mortality rate (130 per 100,000), pervasive gender-based violence, and the low status of women and their absence from political leadership positions (SPC 2008). In the context of this assessment, and given the Solomon Islands has among the lowest GDP per capita in the Pacific (AusAID, 2008), it will be a challenge for the Solomon Islands to reach many of the Millennium Development Goals (MDGs) by 2015.

Vanuatu

Vanuatu comprises 83 islands across six provinces configuring a 'Y' shaped archipelago. Fiji lies to the east, New Caledonia to the south, and the Solomon Islands to the northwest, all within the Melanesia sub-region of the Pacific.

The two largest islands, Espiritu Santo (or Santo) and Malakula, account for nearly 50% of the total land area (the Vanuatu RAP was undertaken in Santo). They are volcanic, with sharp mountain peaks, plateaus, and lowlands. The other larger islands are also volcanic but are overlaid with limestone formations; the smaller islands are coral and limestone. Rainfall averages about 2,360 mm per year but can be as high as 4,000 mm in the northern islands.

Vanuatu shares common features of vulnerability with other small island developing states, namely; a narrow resource base, distance from markets, lack of economies of scale, low factor productivity, small domestic markets and vulnerability to adverse environmental disasters. Vanuatu has a thin economic base which depends primarily on proceeds of tourism and agriculture, both very volatile sectors. As such the country is very vulnerable to external shocks which can also affect its integration into the regional and global economies. The Vanuatu National Assessment Report 2009, outlines Vanuatu's need to respond to the 'triple development threat' (food, fuel and finance).

Vanuatu is particularly vulnerable to natural disasters. Geographically located along the 'ring of fire', geologic and climatic hazards are common. The volcanic origins of the islands infer a constant risk of volcanic eruptions, earthquakes, tsunami and landslides. There is an annual cyclone season lasting six months. El Nino and la Nina weather patterns increase risk of droughts and floods. Impacts of sea level rise and climate change are visible in the islands. Villages have been re-located in low lying islands of Vanuatu in the recent past and the risks of cyclones, coastal flooding, coastal erosion, heavy rainfall events and droughts are predicted to increase.

Vanuatu's economy is primarily agricultural; 80% of the population is engaged in agricultural activities that range from subsistence farming to smallholder farming of coconuts and other cash crops. Copra is by far the most important cash crop (making up more than 35% of the country's exports), followed by timber, beef, and cocoa. Kava root extract exports

also have become important. Coconut oil, copra, kava and beef account for more than 75% of Vanuatu's total agricultural exports and agriculture accounts for approximately 20% of GDP. Tourism is a key driver of the economy and contributed 20% of GDP in 2006. Vanuatu claims an exclusive economic zone of 735,893 square kilometres and possesses substantial marine resources. Currently, only a limited number of ni-Vanuatu are involved in fishing, while foreign fleets exploit marine resources. Because populations are dispersed over multiple islands in the Pacific, efficient delivery of health care, education and other social services is difficult. Air travel is expensive and not always available to the most remote corners of the region; boat services can be infrequent.

Vanuatu is ranked the world's most vulnerable country out of 111 developing countries assessed using the Commonwealth Vulnerability Index. Vanuatu continues to be listed by the UN as an LDC (despite its high GDP) due to its status as the world's most vulnerable country.

Vanuatu faces a growing problem of urban drift, with large numbers of the unskilled poor being concentrated in informal and squatter settlements of urban and peri-urban areas. According to the Government of Vanuatu Annual Development Report, 2009, 16% of the total population was living below the basic needs poverty line and 7% were experiencing food poverty (Government of Vanuatu, 2009).

5

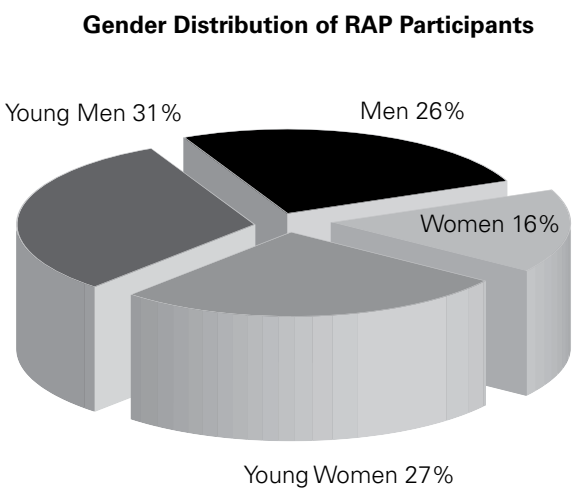
Findings

Summary of findings

The RAP was carried out in three locations across three provinces in two countries; Sanma Province (Vanuatu), Choiseul Province and Malaita Province (Solomon Islands). The research involved seven communities spanning 70 community participants (45% women and young women and 55% men and young men). The gender distribution is shown below in Figure 1.

The research involved seven communities spanning 70 community participants (45% women and young women and 55% men and young men).

Figure 1: Gender distribution of RAP participants



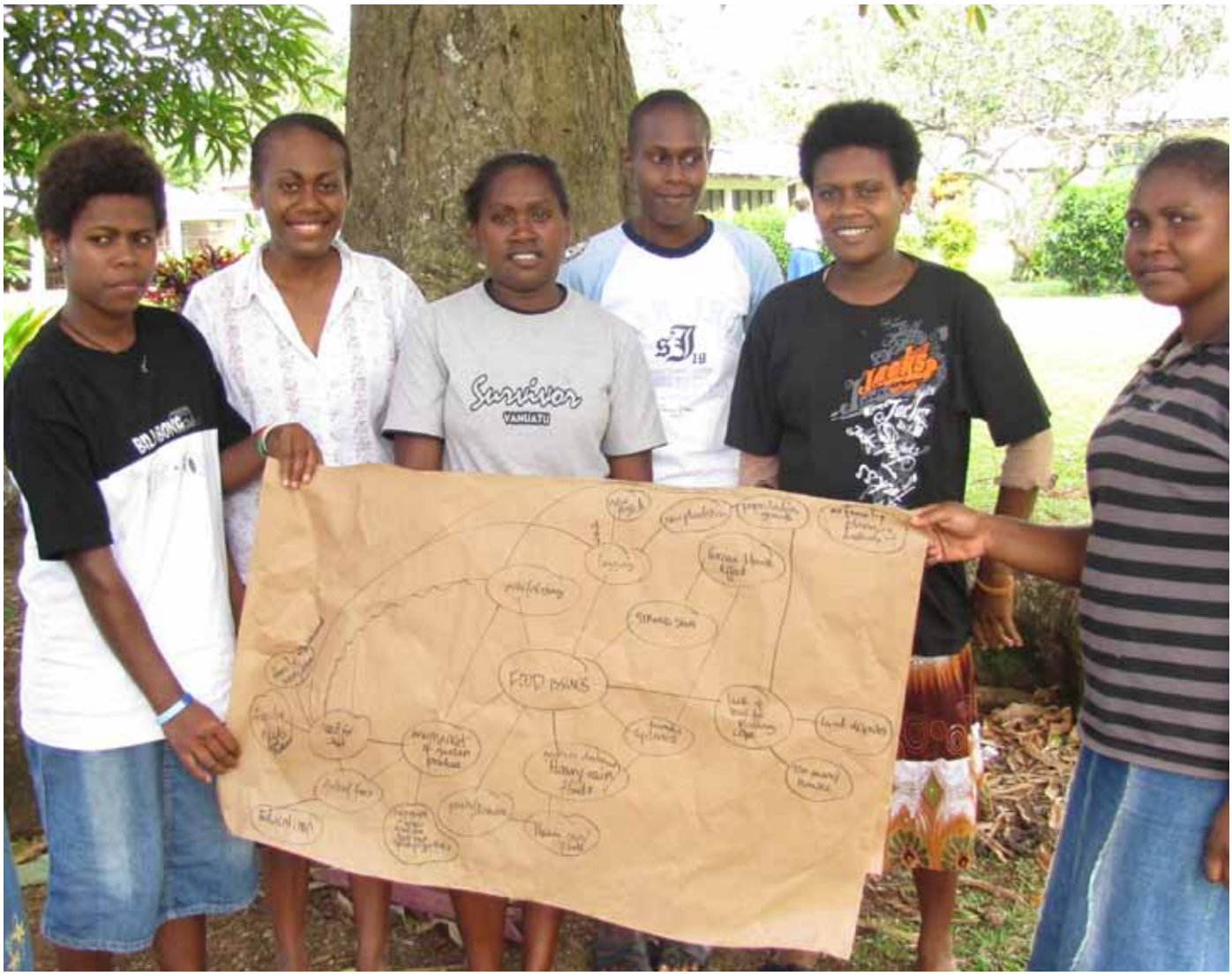
Live & Learn staff undertook scoping and engagement visits to all communities inviting communities to take part in the research and to assist in the design of a food security and climate adaptation project with a view to involvement in the pilot project. Key contacts in each community were asked to ensure participant gender balance along with diversity in age and socio-economic status. Despite

these efforts, participation rates of married women were lower than married men. Unfortunately in Sanma married women were not represented due to issues related to travel to the research site and proximity from children and family responsibilities. Positively, a high portion of both male youth and female youth attended the RAP, illustrating both their interest and sound organisational capacity of community leaders.

The findings are sex disaggregated based on the premise that strategies for moving forward are best informed by better understanding the relationship between women and men and their interaction with food production systems in a changing climate. Stories (via direct quotes) are used in the findings.

Some similarities in sex disaggregated findings were identified across provinces and countries however significant differences existed between locations, and occasionally within communities. Such differences are not surprising given the great distance between provinces and differences in land availability and land tenure. Where common findings emerged, similar answers were coded and grouped together; where they did not converge, they have been highlighted in this section through the sharing of stories and experiences to focus on specific communities within the provinces. .

Females from three villages in Sanma, Vanuatu with their illustration of linkages between social and environmental impacts on their families' food security.



Findings:

1. Current garden, bush and livestock food production systems found across RAP communities are not designed to cope with climate variability. Participants spoke of looking at the interactions between nature, animal life, the moon and weather systems in an attempt to work out a pattern to how changing seasons are affecting their food production systems. Traditionally planting, fishing and harvest times are determined by these interactions, however participants related that an increase in 'false seasons' caused by climate variability was outside their ability to predict and traditional ecological knowledge systems of reading nature.

2. Participants reported that food availability and quality has noticeably decreased across all RAP communities, most notably in Malaita, over the past decade.

3. The research highlights the changing climate as only one of a range of causes relating to food security, and is intimately linked with other challenges. As such, food security requires solutions which are cognisant of the broader picture of causes and of livelihoods concerns at the community level.

4. It is evident that a number of RAP communities are severely 'at risk' due to the high pressures of rising populations coupled with the effect of 'false seasons' on the security of their local food sources. These same communities were also characterized by lack of education, and poor access to clean water and sanitation, health access, energy access and transport access.

5. A direct and intimate link exists between access to food production decisions and the different spheres of responsibilities women and men hold in food production and the community more broadly. Women had the most influence over crops grown in small gardens, while men generally influenced decisions involving heavy labour and finances.

6. Women are more likely to forgo quality of food for the 'benefit' of their family. Food for family consumption (especially in Sanma and Malaita) was seen to focus on adequate quantity over adequate quality. Conversely the focus in Choiseul was on quality for family consumption and may be reflective of their level of food security when compared to communities in the other provinces like Malaita.

7. Stories (from Sanma and Malaita) revealed that women tend to harvest first for subsistence (feeding the family with low value crops) with the leftover produce going to market, whereas men prefer to harvest first for marketing gains (high value crops/ fish), with family consumption being a secondary focus. However in situations where women and men are in desperate need for cash, irrespective of gender or socio-economic status, they will sell produce destined for home consumption.

8. It became apparent that a high portion of each community had become accustomed to reliance on store bought sugary and processed foods. Some stories related that participants had made a conscious choice to not put a lot of effort into farming as the gamble on the health of crops was not found to be proportionate to their effort invested in gardening. Others were deemed by their counterparts to be 'too lazy to garden'.

9. All RAP participants recognised the transition of their diet to an increased amount of sugary and processed foods. They commented that they now desire these foods over traditional island foods (which are not of the same quality as they once were).

10. Men and women held a similar understanding of changes in food access, quality, and effects on nutrition and livelihoods of increasing reliance on store purchased imported foods. Women were more aware of the affect of store bought food on the family's finances.

11. Young and old women and men's perceptions toward food security were found to reflect their roles and responsibilities in food production. Men were more likely to focus on pests, politics of food security whereas women and young women were more likely to focus on livelihoods through the production of garden food for marketing purposes as a means to be able to purchase family needs (e.g. school fees, soap, kerosene, transport, clothing) as well as family wants (e.g. TV, videos).

12. Women's and men's descriptors for main food sources were found to be similar. However women's knowledge of seeds, planting and root crop life cycle was considered to be higher in some communities than that of men and attributed to the amount of time women spend gardening. Men were more likely to be responsible for mono-cropping systems (kassava and timber) and

women for managing more diversified systems (in subsistence gardens).

13. Women and men in all RAP locations perceive women to be most in tune with the environment and natural resources generally used in food production, because of their concern for their communities and future generations. Further, women and men perceived women to be the most dedicated to the nutrition of children.

14. Men were found to hold deeper knowledge than women on the climate related changes occurring in sea and marine resources, reflecting their role and responsibilities.

15. Communities have a strong sense of the severity and complex range of effects that a changing climate has on their food production practices and on their overall livelihoods. While participants desire knowledge and skills on new approaches to resilient food production methods, they are unsure of what types of remedies are required to improve the current situation.

16. As a climate risk strategy some communities are planting crop varieties that they know are most tolerant of climatic changes, as such the diversity of species grown is decreasing.

17. Heavy rainfall is resulting in sweet potato (kumara, which is a staple) becoming a marginal crop. Continuous rain and hot sun across the RAP locations is responsible for poor crop quality and many stories of rotting and small potatoes were shared. When kumara is not available, participants related that they harvest kakake (sometimes before it is ready). Kakake was referred to as 'the powerhouse crop'.

18. Different types of disease are affecting species of taro across research locations. Traditional practices such as planting strong smelling species near the taro to deter pests are still practised with varying degrees of effectiveness.

19. A number of RAP communities have limited access to land, and as such will require more effort directed toward assisting with methods and planning to strengthen the security of sea resources. Further, RAP locations have different types of productive environments and limitations that will require a mixture of approaches.

20. All RAP participants were very interested in gaining more information on the greenhouse effect and the international context of climate negotiations as well as practical information on how to grow crops in an appropriate way for a changing climate.

21. Participants across research sites were found to have limited knowledge and awareness about future climate change and increasing impacts on agriculture, fisheries and food security. Participants expressed extreme frustration in their inability to forecast short and medium term weather trends.

22. Due to land ownership and access issues many participants lacked the ability to undertake land use planning that can take into account climate variability and change exacerbating their ability to maintain and improve soil fertility and productivity.

23. Young men and young women who had completed secondary studies were found to hold far greater knowledge and understanding regarding the science of climate change when compared to their older community members, however older community members were able to share stories on

crops and other food source stresses better than youth. While people used the word climate change and most acknowledged that they blame many things on it, they related they did not understand what it was or what was causing it.

24. Participants are interested in the formation of farmer networks where they do not exist. They are supportive of demonstration gardens and the trialing of new techniques and approaches that will bring climate resilience and sustainable agriculture to a changing climate.

25. With the exception of Sasamunga, prior experience with long-term development projects was minimal however women and men considered that some of the existing organisations in their communities are equipped, ready and willing to commit to projects in partnership with Government, civil society and other organizations for social and environmental outcomes.

26. According to male and female Sanma participants (from Kole 1, Kole 2 and Manioc communities), locally produced foods that are most stressed (from climate and other stresses) include: banana, kumala (sweet potato), coconut, Fiji taro, pawpaw and cucumber. These stresses were attributed to a combination of changes in weather patterns and pests/diseases. In Sanma RAP participants stressed the importance and the need for fisheries management, integrated pest management, crop rotation, seed banks and soil improvement methods. Sanma participants perceived their current food sources to be more secure than their Solomon Island counterparts.

27. According to female and male RAP participants from Choiseul (including Sasmungga, Boe and Panarui communities), locally produced foods that are most stressed (from climate and other stresses) include: kassava, kumara, banana, taro and beans. Participants attribute these stresses to infertile soil, changes in weather patterns and an increase in pest and rodent populations. In Choiseul RAP participants stressed the importance of the need for improved soil nutrition, crop rotation, access to and management of seed banks, sup sup gardens, integrated pest management, and improved access to expanded regional markets.

Youth highlight the foods they consume compared to the diets of their grandparents. They then discussed the positive and negative impacts of the changes to them personally, their families and communities.

28. According to female and male RAP participants from Malaita (Lilisiana village), locally produced foods that are most stressed (from climate and other stresses) include: coconut, bonito (tuna fish), potato, kakake, koa and tomato. Participants attribute these stresses to a combination of changes in weather patterns, saltwater inundation, lack of land, overharvest/ exploitation and pests / diseases. In Malaita RAP participants stressed the importance of the need for fisheries management, replanting and conserving mangroves, dealing with saltwater inundation and learning new techniques to produce climate resistant crops suitable for extremely limited land space in sup sup gardens. The food security situation in the Malaita RAP community presents the most urgent of all RAP communities.

Assessment of food sources, decision-making structures and division of cash and subsistence food production

Reflecting on changing food types and sources

During an introductory activity, separate men's and women's groups were asked to identify and reflect on the main foods they consume today and the main foods consumed in the past. All participants quickly identified extensive food lists and then discussed the trends, similarities and differences between them. Men's and women's responses and comments on this activity were similar and are grouped together below.

Table 2: Main foods consumed in the past compared with main foods currently consumed

Vanuatu (Sanma RAP communities)	
Main foods consumed in the past	**Main foods currently consumed**
Taro (Fiji, island, water, and dry land varieties), banana (vietnam, molele, and apple varieties), yam (african, wailu, strong, bovile and wild varieties), kumala (baby, white and purple varieties), manioc (yellow and white varieties), coconut, pawpaw, orange, pineapple, mango, tuna, island and bush cabbage, fern, pumpkin, watercress, saltwater crab, other fish and shells, chicken, pig and beef.	Participants noted today's foods are the same as in the past with the addition of rice, bread, cato, corn, peanut butter, butter, jam, biscuits, crackers, turkey flaps, and tinned store food.

Solomon Islands (Malaita and Choiseul RAP communities)	
Main foods consumed in the past	**Main foods currently consumed**
Yam (various types), taro (various types particularly kakake - swamp taro), fish, kumara, cassava, pana, banana, mangrove shells, breadfruit, coconut (dry/green), fern, wild nuts, crab, birds, slippery cabbage, pawpaw, sago palm and flying fox. Lilisiana specific: koa	Kakake, fish, potatoes, rice, flour, noodles, biscuits, canned meats and other foods, sugar, cake, tea, (and many other imported processed foods), seaweed, potato, kassava, shellfish, tomatoes and pawpaw. Lilisiana specifc: koa

Reflections on changing patterns of local food availability

Participants were asked for their thoughts on why food sources and the foods they consume have changed. Their responses highlight the different issues impacting local food security:

Due to our populations there is less food and less variety of food to eat now compared to the past. (Woman, Malaita)

Due to intermarriage new types of food is brought in along with the marriage but at the same time some foods are disappearing due to climate change. (Woman, Choiseul)

In Lilisiana village located in Malaita, and severely challenged by the problem of land scarcity, a women remarked, "*We have no more soil now so our foods have had to change*."

This response was reflective of the urgency Lilisiana feels toward subsistence food security. Due to lack of land their main subsistence food is fish.

Participants commonly reflected on the changes in health, size and availability of local foods caused by changing seasons:

In the past food tasted sweet, juicy and looked fresh. Now most garden kaikai looks stressed, its colour is no good, the skin is bad or it's rotten inside from the rains. (Woman, Malaita)

In 1974 when I was small, the market used to be filled with colorful foods, with lots of variety at very cheap prices compared to now. I remember in 1974 I saw a big heap of taro for twenty cents, there was a lot of slippery cabbage and fern in the past, and we could harvest a lot of taro in each mound compared to now. Now prices are high and for many reasons it's harder to grow crops. (Woman, Choiseul)

Our food changes every year. Now some boys go fishing and there are none. The seasons for fish are changing and it makes them always a surprise. Many times they go and come back with nothing. (Young woman, Malaita)

It takes one year to grow taro and Boe village is well known in South Choiseul for taro but the problem we face is to do with the variety of taro which are losing out [declining]. This is because people are not preserving them, and they are not growing well,

traditional knowledge is dying when old people die, and some people chose to take a shortcut in growing other types and using new fast ways to harvest. (Older Man, Choiseul)

Before, access to quality food was easier. Also if you got sick you went to the garden. In the past, yield and quality and size of crops were bigger but now because of ground, soil, population and too much sun and too much rain, things are different. (Man, Sanma)

Kumara (interchangeably used with descriptor 'potato') used to be our common food however today there are no vines for replanting. (Woman, Malaita)

In Choiseul, a woman commented on the changes in social systems affecting food availability:

Our social system of gardening has changed, only the parents attend to gardening because today the children are more socially orientated and this affects food availability. (Woman, Choiseul)

Similar comments regarding children (and youth) lacking interest in gardening also arose from participants in Malaita.

In conversation with participants, the positive and negative aspects of changes in diet were discussed. Table 3 records a summary of the answers given across research sites, the comments were also repeated across all sites.

Table 3: Reflections on changes in foods consumed

Information in this table is recorded as close as possible to the language used in discussion by RAP participants

Positive aspects of changes in foods consumed	Negative aspects of changes in foods consumed
Store food is accessible *Store foods are easy to find, prepare and fast to cook e.g. rice, noodles, turkey flaps (Sanma)* **Preference in taste for store bought foods** *Improved taste with European imported foods (Women, Choiseul)* *Introduced foods have better flavours than garden food (Malaita)* *One RAP participant group could not cite any positive attributes of the changes (Men's group in Choiseul)	**Changes to store foods are unhealthy** *Island food is more healthy, with store food people eat too much and get fat, children are becoming fat too, and our life span is reduced (Sanma)* **Increased sickness** *People get sick from too much sugar, high blood pressure from oil, and new diseases introduced (Malaita)* **Expense** *Food from stores is expensive (Malaita)* *We spend too much Vatu (money) on unnecessary food resulting in lack of money for other needs (Sanma)* *You must save up for a long time and sell local food (which is cheaper) to save up to buy store food (Choiseul)*

During the discussion about the foods consumed, women were more likely to comment on the positive changes regarding reduced cooking and preparation time associated with store bought food, reflecting their gender roles and responsibility in childcare and domestic duties including cooking.

Women and men, young and old, were easily able to weigh up and identify the positive and negative attributes of a changing diet from garden foods to store bought foods. While they have this knowledge, they commented that they still make the conscious choice to consume a large amount of store foods.

Across all RAP communities, many of the adult participants told stories of witnessing a transition from only eating local foods to more dependence on store bought foods as described below:

Before older people would roast old root crops like banana, taro, kumala, manioc for breakfast. Back then they did not take tea like they do today. (Young Woman, Sanma)

Most of the foods used before are still used today, but now we have a mixture with modern food, especially rice and flour. Before we used pudding and betel nut to welcome visitors but now we use tea. (Man, Choiseul)

Today we eat a lot of tinned food from the store, we have moved from traditional to modern food, in the past we ate local island kakae (food), today we all want white men's food. (Young Woman, Sanma)

Before our daily food came from the coconut, we made pudding and ate fish, now people like rice, and they use oil and curry for their kaikai. (Woman, Malaita)

Because people have developed a taste for imported foods, people are not willing to grow many local foods, this is also made necessary by changing weather patterns and people in the village copy other people in the village. (Young Man, Choiseul)

The effect of the changes on children arose across all locations:

Today we have rice, flour, noodles and other foods from the store. These modern foods are overtaking our local food, even our pikininis are now interested in rice more than local food. (Man, Choiseul)

Now school children take processed foods to school. Making island kakae like laplap takes a long time so rice or biscuits are much quicker for work and school. (Young Woman, Sanma)

Many participants noted that 'modern foods' fill them up however lack nutrition.

Rice makes you fat, but not strong. Sometimes now when I garden too much I get very tired. Education changes the way we eat, white people bring new ideas and changed the way we eat. The white men brought a new lifestyle. (Man, Sanma)

Before people were strong and healthy and lived a long time, sometimes people didn't have enough but now people are fat.(Woman)

Sickness was commonly cited, some remarks showed people understood nutrition, particularly educated youth other comments highlighted a need for health education to link knowledge with healthy food choices:

As you can see most people who eat processed food from the store, they are obese, they look shiny on the outside but inside their system there are many hidden sicknesses. (Young Woman, Malaita)

Before our people ate healthy food and they didn't get too many sicknesses. (Man, Choiseul)

A man got sick with sugar (diabetes) and he lost his leg. (Young Man, Sanma)

Some of the foods from the store can cause sickness, there are foods that are dead (killed and stored meats) a long time ago and some young children and babies lose weight as a result of eating processed foods. (Woman, Malaita)

Overall there was a good level of knowledge about the health related benefits of eating local foods as explained by men in Choiseul:

Garden food is fresh, they have more nutrients and are cheaper than store food. Garden foods are healthy and they are our natural medicine. (Man, Choiseul)

Changes in foods have both a negative and a positive effect, but individuals need to understand and (be) aware of the type of food that is nutritious and helpful for their body. (Man, Choiseul)

The following comment by a man in Malaita highlights the transition to a cash based economy and the effect of rising populations on food sources:

All these changes in food sources are negative for the community, in the past people had enough food and did not sell them but used a barter system to exchange for all items including food. Also in the past we did not need to struggle for food like today as there were not as many family members to feed. (Man, Malaita)

Some participants commented on a willingness to eat more local food, however access to enough local crops, especially in Lilisiana, Malaita, is limited and for some families, non-existent, as reflected below:

We would like to eat more garden food but you have to go and plant and harvest them far away, and we have no land nearby. (Young Man, Malaita)

We have no land area to make a garden because people are now living on that land because there are too many teenage marriages and they do not know how to plan the number of children to raise in a family. Our whole population is children and there is not enough space for everyone here. We cannot grow or buy enough food for everyone. (Woman, Malaita)

Heavy betel nut consumption was evident in Lilisiana, when asked about the current prevalence of betel nut, one young woman commented:

Some people just chew betel nut all day so we don't have to eat a proper meal. (Young woman, Malaita)

Of note, women and young girls in Malaita commented that they chew frequently and drink tea to reduce the amount of food they need to consume.

As a positive reflection on the changes in food sources, one man in Choiseul noted that having store access has increased his options and food security:

There are three kinds of food now so our diet has improved! In the past it was mainly just taro, but now we have cabbage together with protein from the store. (Man, Choiseul)

This last sentiment was not shared across locations as while food sourcing options have increased from stores, options from local gardens are decreasing. Some participants were able (unaided) to recognise the importance of this in the wider food security context at the start of the research, while others became more aware as conversations with other participants continued.

Reflections on causes for the decline in quality and quantity of local island foods

Farming families commented throughout the research on the relatively recent decline in quality and quantity of subsistence locally grown food. Participants discussed why the quality of subsistence food has changed, the most frequently cited reasons were:

1. False weather seasons caused by climate variability (too much sun and too much rain causing 'false seasons') resulting in heavily reduced or inedible harvest. Compounded by lack of maintenance (of food producing resources), lack of seed banks, increase in pests and infertile ground (soil).
2. Taking the best quality food to market as there is an increasing need for cash (to pay school fees, health and travel expenses and other items regarded as 'basic needs' such as soap, kerosene, food from stores and clothes).
3. Increasing population (starting to encroach on the availability and carrying capacity of land and sea units especially in Malaita).
4. Increased prevalence of pests, particularly rodents, and some crop diseases especially for taro and kumara.
5. Sea level rise and coastal inundation (cited only in Malaita).
6. Flow-on effects decreasing land availability such as external pressures on natural resources (communities have sold land to the Provincial Government who then lease it to companies, for example, logging companies (in Choiseul) with very small, inequitably dispersed cash returns realised after the sale).

At this point in the research the effect of climate change on food security became most prevalent in discussions and in Vanuatu the importance of understanding seasons to securing food sources was first noted:

Understanding planting seasons is critical as it can drastically impact on quality and quantity of the food available. You must plant bananas when there is a full moon. You must plant kumula when Nafasfas is flowering for the harvest to be successful. With changes in seasons it is becoming harder to tell the right timings to do things. (Man, Sanma)

Comments like this were common, as signs for harvest and planting are determined by interactions and flowering of other crops in the system. Many stories followed of how 'false seasons' are changing the signs for fishing, planting and harvest and lead to the failure of crops and changes in the location of marine resources. Some of these stories are shared further in this section. When asked if they notice the changes in weather affecting food production, men in Malaita replied:

We plant when it rains but now it's raining at the wrong time and our crops are ruined, it changes our planting seasons and we are planting at the wrong time. (Man, Sanma)

We witness the effect of weather changes every day, for example, through changing harvesting patt erns, our coconuts are affected, and there are big changes to seasonal harvesting of fish. (Man, Malaita)

The combination of land shortage and climate variability was also highlighted:

People who sell land are noticing bad soil and reduced harvest together with a decline in food quality because they have to continually use the remaining ground to grow food. It is now even harder with the strange seasons. (Man, Sanma)

The nature of complex interactions impacting food production systems was shared by an elder from Lilisiana village, Malaita:

In the past our village of Lilisiana was small, and we had enough land to make a small garden around the village and our garden grew well and produced good food. In that time life was easy compared to today. Today we do not have good garden food and the small amount we grow is just enough to eat for some families and not others. The production is small and does not look healthy. Why these changes have happen to our food maybe because of the bad weather conditions and sea level rise. Today the sea level comes and covers places where it did not cover in the past. Today it's too hot, and we see too much rain in the rainy season. These types of changes happen because of climate change and every time we hear the word 'climate change' we think of sea level rise but we don't know what it is and what causes it. (Elder, Malaita)

In all RAP locations, declining yields are having an effect on peoples' willingness to invest effort in planting some crops. The comment below is representative of many others:

In the past we had many food varieties and the yield was good as the soil was fertile and there were not many pests. Kumara (sweet potatoes) used to have a good harvest but now there fruits are small, people are now reluctant to plant kumara. We plant the crops that we know will give a good harvest. (Man, Choiseul)

Division of cash and subsistence food production and labour

During day one of the RAP, participants mapped out the main local foods that they produce for subsistence and for marketing/selling. Following the activity participants gave their perceptions on food production roles and division of labour. The feedback is shown in Tables 4 and 5. Table content is reflective of the level of detail and language used by participants.

Table 4: Malaita, Solomon Islands, division of cash and subsistence food production

	Main foods for subsistence (for household/domestic consumption)	Main foods for marketing/ selling
Garden	Only 1 in 20 houses have a small sup sup garden due to lack of land and sandy soils. Most families buy rice from shops and root crops, fruit and vegetable from the Auki market. The main subsistence diet is fish.	None (lack of land), small sup sup garden crops are for home consumption only.
Livestock	Chicken, pig (for celebrations)	Pigs (a commercial piggery has recently commenced for the prime purpose of marketing)
Bush	Koa pods and swamp taro (kakake)	Koa and swamp taro (taro is value added and made into pudding)
Sea and rivers	Fish and shells	All species of fish are sold by women at the Auki market

Table 5: Division of cash and subsistence food production (Choiseul, Solomon Islands)

	Main foods for subsistence (for household/ domestic consumption)	Main foods for marketing/ selling
Garden	banana, kakake, kassava, kumara (sweet potato), cabbage, yam, pana, taro	betel nut, slippery cabbage, potato, kassava
Livestock	chicken, pig (for celebrations)	chicken, pig (occasionally)
Bush	yam, pana, kakake, breadfruit and occasionally iguana, lizards, birds and possums	yam, pana, fern (two types), bush bird, naliut, mushroom, sago palm (seasonal), slippery and wild cabbage, tulip
Sea and rivers	fish, crayfish, seaweed, eel and turtle (for celebrations)	fish, shark fin, lobster, bêche de mer, shells and trochus for church and school fundraising

In Choiseul some participants commented that they don't sell kassava and potato as they keep it only for home consumption. Generally communities in Choiseul did not garden heavily for marketing purposes, marketing was mainly at times when basic items were needed to be bought, noted to include kerosene and soap.

Table 6: Division of cash and subsistence food production (Sanma, Vanuatu)

	Main foods for subsistence (for household/ domestic consumption)	Main foods for marketing/ selling
Garden	island cabbage, yam, banana, kamala, pineapple, banana, pawpaw, tomatoes, capsicum, water and Fiji taro	potato, kassava, taro, manioc, coconut (brown and green), pineapple, banana, pawpaw, kumala, cabbage, tomatoes, nous, nakatambil, capsicum, leaf lap lap
Livestock	local chicken, pigs (only for ceremonies/celebrations)	local chicken, pigs and bullock (occasionally)
Bush	nangai, navel, natapoa, nandau, nakatambil, nakaviti, wild yam, fern, breadfruit, nakarika, mango, pawpaw, orange, wild mango, sweet nous, coconut, wild raspberry, breadfruit, bush cabbage, watercress	Identical to the list adjacent for subsistence with the omission of watercress
Sea and Rivers	octopus, fish, crayfish, water taro, shellfish, crab, turtle (only for ceremonies)	fish, beche de mer, prawn (salt and freshwater)

Affect of marketing on household nutrition

The affect of marketing on household food consumption reflected that many women and men focus on whether they receive an adequate quantity as opposed to quality of food, as illustrated below:

Sometimes [marketing] affects my family in Boe (Choiseul), because when it comes to selling they always want to sell the good ones (crops) and the bad ones are then eaten by the family. We sell the good ones so we have money to buy things from the store, then our families become used to food from the store. (Man, Choiseul)

A young woman from Sanma added:

When the time of harvest comes men and women decide on what to sell, they usually select the best quality food for market. (Young Woman, Sanma)

Of note, in all locations food production is undertaken within family units. As such the affect to marketing on household nutrition was found to vary from family to family. The woman below noted that she does not regularly participate in marketing:

Women in my village make the decision as to whether we need to market crops, but generally our gardens are not for marketing so food is only rationed if the family decide to market it occasionally for buying basic needs. There must always be food left over from marketing for the family. (Woman, Panarui, Choiseul)

Conversely, in Sanma, Vanuatu, all RAP communities related that they regularly participate in marketing (or selling) and the management of food can have detrimental effects on household nutrition:

Sometimes we have a garden just for selling, then we work one garden for feeding the family and one for the market. All the good ones are for the markets and any leftovers are for home use. Sometimes we starve, because there is very little leftover. (Young Woman, Sanma)

The weight of children goes down when families don't have enough food for selling, some people with lots of children don't have enough kaikai for them. (Woman, Malaita)

In the future we will go hungry, even today there is not enough. One evening we didn't have food because there was no harvest. (Woman, Choiseul)

Now people think about how much money you can make and that changes people's focus to money, if not enough food is grown it all goes to market and then we buy food like rice. (Man, Sanma)

Access to markets

The extent of the research community's participation in the cash economy or otherwise can be attributed to the distance between communities and markets. Communities who struggle to access markets cite that they either lack the transport or economic demand for their products to ensure that travel costs are outweighed by the economic gain from selling produce. Most communities sell garden crops and/or fish, many sell milled timber, and some sell copra, cocoa and gravel at markets of varying size.

Some communities were found to be in closer proximity to marketing opportunities than others. RAP communities in Malaita (near Auki) including Lilisiana had excellent market access, though poor access to resources to take to market. Communities in Sanma, cite unreliable market access due to transport being expensive and inconsistent. For communities in Choiseul market access varies, with one main market in the RAP community of Sasamunga. Communities in Choiseul desire better access to markets in Gizo, the capital of the Western Province, but this is yet to be realised. Distance to markets of scale and lack of energy and transport security is a big concern to some communities. The frustration of accessing markets was voiced by a woman in Boe, Choiseul:

There is no close market house to sell food. Sasamunga is the only community with close market access. (Woman, Choiseul)

People in all communities cited the primary driver for money was to pay 'basic needs' including secondary school fees, kerosene, outboard motor fuel and basic health needs (e.g. soap).

Table 7 describes the RAP communities and their proximity to different markets.

Table 7: Community proximity to markets and main products sold

Communities	Nearest community market	Distance to market	Mode of transport/ frequency utilised
Sanma, Vanuatu			
Kole 1	Luganville	25km	25mins in pickup truck (fortnightly)
Kole 2	Luganville	55km	1hr in pickup truck (not known)
Manioc	Luganville	40km	45mins in pickup truck (weekly)
Choiseul, Solomon Islands			
Sasamunga	Sasamunga central market	0.3km	10mins walking
Boe	Sasamunga central market	1km	30mins walking (weekly)
Panaruhi	Roadside market Sasamunga central market	1.5km 10km	10mins walking (monthly) 1.5hr walking (monthly)
Malaita, Solomon Islands			
Lilisiana	Auki market (provincial capital)	500m	5mins walking (Monday-Saturday)

Participation in the formal economy via marketing was found to be largely dependent on the type of food production conditions in each community. Table 8 provides a short description of the food production constraints and characteristics of each RAP location.

Table 8: Research communities' short descriptions

Location	Food production and situational synopsis
Sanma, Vanuatu	RAP communities in Sanma comprise of three coastal communities located 30 minutes to one hour by truck from the Provincial capital of Luganville. Limited energy and transport access affects access to markets. Communities grow food for subsistence and marketing purposes and balancing both fa ctors proves challenging. Crop rotation is not frequently practised and soils are not rested. Access to land varies as many people have sold land. Access to secondary education is good for the communities however access to health services is low, reflected in an increase in diseases such as diabetes. An expansion of the Digicel mobile phone network has increased communications to the communities, reducing the affect of their remoteness and improving communication within and outside the province.
Malaita, Solomon Islands	The RAP community in Malaita is a coastal fringe dwelling community literally 'on the edge'. Lilisiana was created out of relocated peoples from a natural disaster. The rapidly expanding population are housed over the water, in reclaimed mangrove swamps, lagoons or perched on the beachfront sand. Land is virtually nonexistent. Their main subsistence food source is seafood. There are limited sup sup gardens and garden crops are generally purchased from Auki market which is within very close proximity to the village. Health, education and water and sanitation issues are extreme in Lilisiana. The majority of the population are children. Ecosystems are very stressed and have all been heavily desecrated.
Choiseul, Solomon Islands	RAP communities in Choiseul generally have better access to land than communities in Malaita and Sanma. Many families grow their own garden for home consumption and market occasionally. Access to markets vary between the RAP communities. The centre of Sasamunga is the central marketing location for all communities, however some communities find it challenging to gain frequent access to the market. Communities would like access to the Western Province centre of Gizo for improved trade and services. In 2010, challenging weather conditions have impacted many communities and food production systems in Choiseul.

For communities in challenging conditions value-adding to produce is a common means to obtain a cash income.

From my experience I can make cake, I buy bananas from the markets and make them into cake and sell the cake, it's my benefit for my family for my children's school fees. (Woman, Malaita)

Division of food production labour and decision-making

In separate groups of men and young men, and women and young women, participants discussed division of food production labour and decision making. The main themes discussed are: gardens, livestock, bush, and sea and rivers.

Gardens

Decision-making for gardens:

Both women and men perceived themselves to make decisions about gardens, however the decisions they made reflected their different roles and responsibilities. Women remarked that they choose the land to garden, while men make big decisions. Both men and women noted that gender relations in decision making relating to gardens were largely dependent on the sex of the land owner with major decisions residing with the land owner.

In Choiseul men explained how they plan gardening in partnership with women:

Women are the main ones who spend the most time in the garden, so men plan with the wife to make the garden and look at ways to negotiate for land. Women are involved in planning the variety of plants for the garden and sometimes both the wife and husband make a decision and agree on it. (Man, Choiseul)

Division of garden labour:

Women and girls were likely to be responsible for choosing land, planning gardens, planting, weeding and the ongoing maintenance while men were commonly responsible for assisting with heavy labour, and in some locations, planting 'heavy' crops.

In Choiseul most young women were found to have gardens, and participants commented that this was linked to land availability and women's roles in social activities requiring food preparation. Women noted their intimate knowledge of the gardening systems:

Women are responsible for planting decisions, women spend their time in the gardens so they know best how to rotate what is planted. (Young Women, Sanma)

Women across all provinces commente don the 'laziness' of men:

Men sleep a lot so women attend to the gardens (Woman, Choiseul)

Men perceived their responsibility to include clearing and 'brushing' the gardens, hoeing, weeding and harvesting only in the event that women were unavailable.

Generally men were responsible for undertaking heavy garden labour as illustrated below:

If a young girl decides to make a garden, the cutting of trees will be done by the father or boys, however if the trees are not too big, the girl can do it for herself. (Man, Choiseul)

In Sanma, stories and perceptions between men and young women differed. Young women perceived men to take a greater role in planting and digging holes for planting crops such as taro while women undertook weeding, clearing small areas for planting vegetables or something 'light' like yam. Sanma men perceived themselves to spend more time in the gardens than the women so women can work at home, as such in Sanma men planned planting either alone or in partnership with women.

Importantly, communities in Malaita have very limited access to gardening activities due to lack of land and housing on sand or over water lacking soils. As such most people in the community do not have a garden and source their crops from the nearby Auki market. About one in twenty families have a small sup sup garden. For those who do have a garden, both women and men perceived that men do not participate in gardening at all, leaving the work to the women and girls. The men noted that their exclusion is not due to laziness but rather that there is no space for large gardens requiring heavy labour, as the space is occupied by houses.

Livestock

Decision making for livestock:

Women in all RAP locations regarded men as making the big decisions related to livestock. A woman, in Choiseul noted the decision making power and position of men in relation to kastom:

Men have the power over the family and over the pigs. Women agree whatever the man says, if he wants to sell the pig or give it away, in our kastom the man is boss. (Woman, Choiseul)

In Sanma, men said they make decisions regarding when and whether to kill or sell an animal while in Malaita men commented that both women and men work together in decision-making and caring for livestock. In all locations, ultimate decision making about livestock rested with the owner, who was predominantly male.

Division of livestock labour:

Men's responsibility for livestock was perceived to commonly include fencing, building shelter for livestock and feeding animals. Family units and youth are responsible for all other tasks.

Men in Choiseul commented that they undertake the heavy labour and women's responsibilities include feeding and cleaning of livestock facilities. Men in Choiseul also commented that women spend more time not only in the gardens, but also looking after their livestock. Women agreed with this sentiment, citing the men were 'lazy'.

Women in Sanma commented that while the men are responsible for livestock 'outside', their role is to look after the family and use the livestock 'inside' (through food preparation roles and responsibilities). It was noted in Sanma that men have total responsibility for fowl however tasks for pigs are shared between males and females.

Bush

Decision making around bush foods:

In Sanma men commented that they make most of the decisions regarding 'selling and leasing the ground' (land) while some women felt they could influence men by talking about their ideas, however the final decision lies with the men.

In Malaita the men commented that they make all the decisions regarding bush and women collect things from the bush only if advised by men.

Division of labour undertaken in the bush:

Women and young women's responsibility in the bush includes collecting 'light' bush foods, firewood, and gathering kastom medicines, (in Choiseul the women's role also includes planting coconut and cocoa). Men and young men perceived themselves to be responsible for hunting wild animals, birds, pigs, bats, cutting trees for housing and logging in some places.

In Choiseul, women perceived that they spend the most time in the bush while men perceived that they spent more time than women. Conversely women in Sanma felt that they didn't use the bush very much aside from collecting medicine. When asked why men spent the most time in the bush a young woman offered the following answer:

It's all men because they are strong enough, women don't do as much because we have to go a long way to the bush and it can be unsafe for us, so the men go. (Young Woman, Sanma)

A man in Choiseul offered a supporting response:

Women don't spend too much time in the bush because they are too afraid, but they do spend a lot of time near the bush gardening. The men use the bush because they are the ones in our village who collect firewood, make heavy things for the garden, canoes and chainsaw bush materials for houses. Men also survey the ground for land boundaries. (Young Man, Choiseul)

In Malaita, both men and women perceived that they work together in the bush however, due to scarcity of resources, there is both a lack of control and a general lack of bush materials.

Sea and rivers

Division of food production labour from water resources (sea and rivers):

Participants perceived that women are responsible for collecting shells and occasionally fishing in shallow waters while men take responsibility for fishing offshore and diving. As with livestock, men are responsible for the main sourcing of the food, in this case fish, while women are responsible for marketing and home preparation for consumption, as described by the comment below:

Men and women work together but do different things, the men catch the fish and the women sell the fish at Auki market or cook it for our family. (Man, Malaita)

Men usually gather fish from the deep sea while women gather food from the shallow areas, small children collect shells and crayfish from areas within their reach. (Woman, Choiseul)

Men in Sanma perceived women to take on a role only after their primary garden role is complete:

Men and youth undertake most of the sea food production and collection, however women can make decisions to come to the sea only if the garden work is done.

The garden is the women's most important job first. (Man, Sanma).

Decision making for food from water resources:

Across all locations men were found to be the main decision makers for water resources.

Interestingly, a man commented on the positive gain that could be experienced if women play a larger role in decision making regarding sea resources:

Women have a lesser role [than men] but maybe it should be joint with the man so that we protect it more than destroy it. (Man, Choiseul)

A woman, mentioned her role in teaching younger generations about sustainable harvest, reflecting women's roles as both environmental guardians and caregivers:

Mothers warn children not to harvest the small fish or shells on our reef because of the importance of the river and sea for future use. (Woman, Choiseul)

Natural systems and the social interface

As with previous Live & Learn RAPs, without prompting, women and men, young and old were able to explain the complexity of natural resource and weather related issues and how those issues link to their livelihoods. In most communities (excluding some individuals within the communities who had extensive gardens), participants agreed from the outset of the RAP, that major issues exist relating to local food security. All participants linked the changes in harvest, to causes, including changes in weather patterns. Many people, especially youth used the word 'climate change', however their ability to describe what it is and the causes were very basic to nonexistent (this is discussed in more depth later in this section).

Women, young and old, could clearly see the link between challenges in food production and the effect on the social realm (the human/environment interface). In this way, women were more likely to focus heavily on the social ramifications of diminishing local food security, while men were more likely to focus on the political context in which food purchasing takes place and their technological limitations on their ability to 'fix' the 'problem'.

In some particularly vulnerable communities, like Lilisiana, the impact of sea level rise and saltwater inundation was felt much more strongly than compared to other RAP locations. A woman described some of the changes she had been witness to:

In the past the grave yard was away from the sea and now it's close and some of the graves are under water. There are no more mangrove trees near the church because the sea came and they all fell down. In places where the Koa (mangrove) was once strong, they have fallen down and now it's a zigzag. (Woman, Malaita)

During RAP activities participants told stories relating to a loss of not only food diversity but ecosystem biodoversity, commonly due to over harvest. This was evident through the following stories:

Coconut crab and scrub duck used to be eaten but numbers have now gone down. Coconut crab now have a high Vatu (value) which has created demand to sell more to pay for school fees. (Young Man, Sanma)

Around the 1990s mangroves were everywhere in the village. Back then there were many shells and katu kakal. Most mangroves were cut for firewood and for building house where the mangroves once grew. Before the houses there were lots of fish in the mangroves, today the mangroves have all been cut and there is less fish. People have also harvested all of the mangrove stones to build a sea wall. Now people fish heavily to sell and make money. The result is a small amount of fish available, and it's becoming more and more difficult to catch the fish. (Man, Malaita)

The effect of human activities on the mangrove ecosystem in Lilisiana was also commonly mentioned by young women in the village who have been witness to the devastation of fish breeding habitat within their lifetime:

We have destroyed all the mangroves and now we have nothing, there has been no effort to replace those that have been removed and destroyed. (Young Women, Malaita)

Food security issues, causes and effects

Separate men's and women's groups examined the causes and effects of major 'food issues or problems'. The activity involved developing a 'cause and effect' diagram that reflected the participants' views on food security issues. Climate change was not the only focus for the activity as it was important to capture the true interrelationships between climate change and food security.

However, both men's and women's cause and effect diagrams indicated their ability to draw a direct relationship between changing weather patterns, population increase, land shortage and the decline of soil fertility. This was particularly present in those communities with the least amount of remaining customary land and the highest populations.

The activity and ensuing discussion highlighted that increased climate variability is only one of a multitude of variables impacting food security, and that food security is intimately linked with other development challenges that require solutions that are cognisant of the broader picture of livelihood concerns at the community level.

The activity uncovered the breadth of impacts that food issues have on communities while highlighting differences in gender perspectives. The issues men and women identified reflected their gender roles.

Women's perceptions of the impact of declining food security reflected their gendered roles of home makers and child carers. The women's cause and effect diagrams reflected their interest in how food issues effect the social cohesion of the community. Women made clear links between soil productivity, increased population and low education, as well as the effect of inequitable cash benefits from natural resources on disputes, youth alcohol and drug abuse, men's laziness, theft, general disharmony in the community and the collapse of ecosystems.

Men's cause and effect diagrams focussed primarily on the environmental degradation caused by the unpredictability of too much sun and too much rainfall, and the effect of reduced crops on ability to source cash incomes. Men also tended to highlight the impacts on sea resources and rodent and pest populations more readily than women.

The group's diagrams were visually presented as a complex network of causes and effects during the RAP activity. Accordingly, while Table 9 presents all the words, it is not able to represent the complexity of causal relationships and the links identified by participants.

The following table is documented a closely as possible to the expression of participants.

Table 9: Food security cause and effect diagram outputs

Issue	Effect	Root cause
Difficulty in producing food	Low cash flow Less food Reliance on store foods Health and nutrition issues	Lack of land and no or infertile ground Increasing population pressure on land Lack of cooperation and poor community structures Changing climate or changing seasons Rodents and diseases Poor soil quality Lack of crop rotation Lack of seed banks
Low access to cash	High school drop outs Lack of funds to pay for school fees Lack of funds for agricultural inputs	Laziness Lack of cooperation Lack of access to energy, transport and markets All linked to a climate variability or climate change
Shortage of land	Lowers ability to support growing population Less kaikai/kakae (subsistence food) Less income (from lack of ability to sell or market garden crops) Inability to practise land rotation Increase in agricultural pests and diseases Decreased food availability Land disputes and divided families Lack of re-planting and sustainable cutting (silviculture) practices.	Cash pressured lifestyles Population increase due to lack of family planning (awareness and education) and houses have taken over the available land Over-planting gardens with same crops No fallow time or intercropping Unsustainable cutting of bush Greed and ignorance Uneducated people Disorganised community with no plans Unsustainable harvesting and effect of technology (e.g. chainsaws have enabled entire cutting of mangrove
Not enough quality food for families	Poor health (related to lack of strength, diabetes, and weight problems)	Population increase Lack of space for gardens Increased reliance on making cash for store bought goods Sell too much quality produce in the markets (in some RAP communities only)
Changes in marine resources	Poor health Reduction in availability and quality of marine species (fish, clams, other shell fish etc) Fish moving to deeper waters and changing in fishing seasons and locations	Cash pressured lifestyles Changing climate or seasons Pollution of inshore habitats Unsustainable harvest (e.g. dynamite means undersized fish are killed)
Increase in diseases, and pests	Devastated crops (e.g. worms, frogs, wild pigs) Decreases income Decreases ability to market Rodents spread in rubbish	Changes in weather Plant migration has bought new pests and diseases Poor storage methods Rodents most common around livestock Frogs to kill other animals and spread by tsunami (Choiseul)

Issue	Effect	Root cause
Changes in weather	Poor soil quality 'False seasons' related to uncertain and changing planting and harvest times Soil that is too hot/dry or too wet Problems with crop size, quality, quantity and taste, often rotten crops Increase rodent and pest populations Less crop production	Increase climate variability/climate changes Greenhouse effect (term only used in this activity by women's group in Sanma)
Inequality in financial 'haves and have-nots'	Health problems go untreated Many children do not attend secondary school Minimal food security (not much variation in crops) Theft of food from those with gardens by those without gardens Disputes Increased teenage pregnancy	Lack of financial management skills Greed and self-promotion Uneducated people Bored youths Lack of alternative livelihood options Lack of motivation

Unpacking food security concerns

After the diagrams were complete, participants shared stories to substantiate the changes they had witnessed. Some of their stories are shared below:

Before taro, pana, potato and kassava used to bear good fruits, however today the size of these foods has decreased. Due to rain pana is not planted as often as before. The change in soil and the weather has affected pana, here in Sasamunga we don't have good soil compared to Boe, we know this from their better and good marketing supply. (Woman, Choiseul)

When I look at food today it looks only half and it's losing its taste. It's not like in the past, we do not enjoy our food now. (Woman, Choiseul)

Even when a big net is used, people cannot catch enough Bonito for local sale. (Man, Malaita)

A participant in Malaita voiced his frustration and the need for taking action to improve the situation:

Our Government should find ways to improve this situation. There is no proper community structure in our community, chiefs should be the ones who organize the setup but it's very difficult for them. To make things more difficult, no girls in this community have married out of the community, they all married in the community. An NGO would be helpful if they organize workshops and hope for the women and youths to learn new skills. I suggest lavalava (sarong) dying, screen printing, and how to grow and manage sup sup gardens. And because our people are coastal people, we should look at shell farming for marketing. (Elderly Man, Lilisiana).

Men across all location were more likely than women to focus on pest problems:

Flying foxes eat all the fruit on the trees, rats eat our kumala and manioc, and their numbers are increasing, this is made harder as our planting seasons are changing because the weather is changing. (Man, Sanma)

Pigs are coming into our gardens because of the logging which destroyed the pigs' habitat. They are destroying our gardens and causing people to go hungry. (Woman, Choiseul)

The men of Lilisiana focused mainly on foods from the sea:

The availability of Bonita depends a lot on the weather changes, it also depends on if we use net boats, nets have changed the way we catch fish. We used to catch fish anywhere at any time, now we have to go out very far and we waste a lot of fuel and come back with only two or three fish. (Man, Malaita)

Women in Lilisiana were more likely to focus on the difficulty with, or absence of, sup sup gardens:

We plant just a few taro around our houses, because people now build houses everywhere and there is no land left for gardens. We lack fertile soils and space so we buy our taro from the market. (Woman, Malaita)

Linking food security to a changing climate

As illustrated by the preceding sections, all RAP participants are acutely aware of the link between climate variation and changes in food production and availability. This awareness is heightened because signs of a changing climate are evident and presents livelihood challenges on a daily basis as indicated by the comments below:

The weather is changing too much and planting techniques are determined by the type of ground (soil), 'if it is hard or soft'. If the ground is hot in June and July, the food security is affected as food crops are usually small. If the ground is too dry the mangroves flowering can be late or not at all. (Woman, Sanma)

Because of climate change there is an increase in rain and sun spoiling the garden, crops don't grow properly and there is little to harvest. I've noticed lots of changes in the last five years. (Woman, Choiseul)

Sea level rise was commonly mentioned in Lilisiana:

Coconut trees are not growing well due to sea level rise as most of our coconuts are near the sea. They now have fruits without any meat in them, we blame the seasons. (Man, Malaita)

Sea (level) rise is something that effects the garden as it's high with the Ara [SE winds]. At that time the waves come into my house, and the waves give my sup sup garden salty water which spoils crops. (Woman, Malaita)

Sea level rise led to our resettlement and its even lead to difficulty to maintain the quality of foods such as kakake. (Man, Malaita)

By the conclusion of day one, once participants grasped the concept of food security, participants then cited a changing climate or false seasons (unaided) as the most prevalent cause of their food security issues, together with rising incidence of plant diseases and pest populations.

Perceptions of climate change

It is important to note that on day one, many younger participants used the term 'climate change' unaided, thus reflecting their familiarity with the terminology. 'Climate change' was not explicitly raised with participants until day two. Without prompting participants raised it on day one during general discussions about food security. Importantly when the term climate change arose, facilitators asked participants who mentioned it what they meant by the term, and participants said they could not explain it. As such climate change was perceived to be a term or word that could be used to explain many changes both within and outside its likely impact.

Signs of stress (climate and other) on food sources

The RAP aimed to uncover perceptions of the crops that are showing signs of stress, both generally and climate related, and the current approaches to dealing with these signs.

Women and men, in separate groups took part in an activity to identify crops that are showing changes or signs of stress. Participants were requested to write their main local food sources on a set of cards. They were then asked to rank the cards in order of the most frequently consumed local foods to the least consumed foods. Participants were then given a set of 'change or stress cards' and were asked to place them next to the foods that had shown signs of either medium or high stress.

Participants then shared stories of each food labelled as showing medium or high stress. Climate was the most frequently stated reasons for changes or stress. This is highlighted in Table 10.

Table 10: Most common locally produced and consumed foods with their stress ranking

Sanma		Malaita		Choiseul	
Men	**Women**	**Men**	**Women**	**Men**	**Women**
Banana*	Banana**	Coconut**	Bonito**	Potato*	Kumara/ potato**
Cabbage	Kumala/ potato**	Potato**	Reef fish*	Taro**	Kassava**
Coconut*	Taro/manioc	Bonito (tuna fish)**	Coconut*	Kassava**	Banana**
Fijian taro**	Coconut*	Kassava*	Kakake (swamp taro)**	Banana**	Kakake (swamp taro)
Manioc	Pawpaw**	Kakake (swamp taro)**	Potato**	Cabbage*	Slippery cabbage*
Island taro	Orange*	Koa**	Kassava*	Yam	Fern
Kumala/ potato**	Tomato*	Banana*	Koa**	Kakake (swamp taro)	Bean**
Corn	Cucumber**	Clam shell**	Cabbage*	Pumpkin*	Taro**
Peanut	Capsicum	Folu (turtle)**	Tomato**	Pawpaw*	Yam
Yam	Yam	Barakai / katukatu (small fish)**	Beans	Coconut	Pana*
-	Beans	-	Eggplant*	Fish**	Sugarcane*

** denotes high stress, and * denotes medium stress.

As reflected above, women and young women, were more likely to list garden vegetables in addition to the well known staples as they are the main caretakers of the gardens. It is important to note that the order of locally produced foods listed above may have been influenced by the time of year and season in which the RAP was undertaken. Further, during the RAP, many participants spoke in their local language, which was encouraged for participation and interaction between participants, however there were limitations in capturing this information.

Stressed foods

Key causes of stress included weather or climate and pests and diseases, although in some cases, the latter was perceived as being related to changes in seasons and weather. The main points of the discussion are documented below.

Sanma, Vanuatu

Most stressed foods:

According to male and female Sanma participants, the locally produced foods that are most stressed include: banana, kumala (sweet potato), coconut, Fiji taro, pawpaw and cucumber. These stresses were attributed to a combination of changes in weather patterns and pests/diseases.

Participants in Sanma from communities of Kole 1, Kole 2 and Manioc, asserted that, 'rain and sun' are the key factors that affect food quality. Accordingly the changes they have witnessed are documented below:

Taro: Fiji taro experiences pests as a major issue while Water Taro is being disturbed by 'too much' rain.

Kumula: Kumula is sweet when there is plenty of sun and although the leaf is big in heavy rain, the crop is ruined. The kumula now taste almost like a yam, it's also much smaller than before.(Man, Sanma)

Yam: Sweet yam is not planted any more as it is too hard to grow and is said to have lost its taste.

Bananas: During June and July bananas are not reaching expected size, participants noted that if they change planting seasons for bananas the fruit is small when harvest time arrives.

Bananas used to be plentiful with many types and sizes, but not anymore. Normally there are dry leaves and the bananas are ready, now the leaves are dry but the bananas are not ready.(Young Woman, Sanma)

Participants also related changes in pawpaw, cucumber and oranges:

Pawpaws are experiencing diseases maybe because of the heavy rain. Pawpaw used to be plentiful here, now there are not so many types and the size and taste has changed recently. Sores have appeared on the pawpaw and there are lumps on the inside. (Young Woman, Sanma)

The colour of the cucumber has changed, it used to change from green to white but now it just stays green. (Young woman, Sanma)

The amount and size of oranges have lessened and the taste is now sour. (Man, Sanma)

The sign of the mango flowers is different because the flowers fall off in the rainy season, when there's too much rain there is less fruit. (Young Woman, Sanma)

Weather patterns and climate change are cited as the primary reasons for the changes. As a contributory cause women in Sanma all agreed with a woman who mentioned the suspected effect from radiation from a nearby Digicel tower on community food sources. The Digicel tower is relatively new.

There's a problem (radiation) from the Digicel tower that's making our food have not good fruit. (Young woman, Sanma)

As with other RAP locations, men commented on pests and rodents. It is thought that the prevalence of pigs and buluk (cattle) are resulting in an increased number of rats which are eating kumala.

Malaita

Most stressed foods:

According to female and male participants in Malaita, locally produced foods that are most stressed include: bonito (tuna fish), kakarai and katukatu (language names for small fish), coconut, potato (three varieties), kakake, koa and tomato. These stresses are attributed to a combination of changes in weather patterns, saltwater inundation, lack of land, overharvest/ exploitation and pests/diseases.

The comments in Malaita (inclusive of just one community, Lilisiana), were often related to the lack of space for gardens (only one in 20 households has a sup sup garden and one in five families have access to a fishing boat). Accordingly, the stories shared related food scarcity:

In the past we took kaikai from the garden, but today it's effected by the weather and by lack of land, so we have to buy it from the market including potato, kassava and taro. (Woman, Malaita)

Before our parents used to plant coconuts but now they have become scarce and we have to buy them from the market, stealing coconuts is a big issue in this community. (Young Woman, Malaita)

Before we could catch bonito close in to shore, but now we have to use the engine for a long time (out to sea) to catch them, when we cannot find them we have to pay for them at the market. (Woman, Malaita)

Tuna get frightened of the big sea and they go deep when the weather gets rough in June and July we can no longer paddle out to catch them, we have to go further and use the engine. (Young man, Malaita)

Usually koa take five to seven years to harvest, when they are ready they get yellow leaves, and fall down, but now with the Ara [SE winds] we can't tell the right time for the fruits because the weather has changed. (Man, Malaita)

Choiseul

Most stressed crops:

According to female and male RAP participants from Choiseul, locally produced foods that are most stressed include: kumara, banana, taro, kassava, and beans. Participants attributed these stresses to infertile soil, changes in weather patterns and to pest and rodent issues.

Topical issues for Choiseul, including Panarui, Sasamunga and Boe communities, were cited as increased prevalence of pests, variation in weather patterns and planting a narrower variety of food to

avoid climate risk. Interestingly women in Sasamunga, Choiseul thought the Telekom tower in their community may contribute to the weather changing and be effecting the crops.

There are some crops which are not good. For example, kumara is now dying in its mound, the leaf is sick and there is less fruit. In the rainy times of June and July the slippery cabbage has worms, and bananas have worms too, kassava also doesn't like the rainy season, it develops fungus. (Woman, Choiseul)

Pest attacks were reported on taro, kassava (white fly), cabbage (worms), pumpkin (fruitfly), pawpaw (fruitfly) while other issues were discussed for yams (tuberless) and fish (stocks depleted).

There are changes in our fish due to overfishing for both selling and consumption. Also stones and coral that the fish use as homes or to feed are destroyed or extracted for road construction and export for money. This makes the fish look for sites further and further away. (Man, Choiseul)

The best time to plant potatoes (kumara) is in June. Because during this period it is not raining too much and the soil is not too wet. When there is too much water in the soil it makes the end of the potato vine rotten or sometimes it grows but will not produce many roots or fruit. Also when the soil is too watery the potato fruit becomes watery and it taste bad and not sweet. During the rainy season the pests hide and nest in the ground, and when it begins to sun, they hatch and come to search for food. During extreme sun the potatoes will not grow properly either, and the fruits will be tough and small. (Man, Choiseul)

Current coping and climate adaptation practices

All communities had some response when asked what their current adaptions to weather changes are to safeguard their food sources. The comments illustrate the ingenuity of some communities to cope with climate change. Representative stories are shared below:

We have thought of some ways to live with changing weather, like carrying soils for planting sup sup gardens and to raise the ground. We have also thought about building a big sea wall. Ideas like these are floating around. (Man, Malaita)

We are saving kumala seeds in a shed for when the cyclone comes, also we are now storing yam in dry places and splitting the tuber when planting. (Man, Sanma)

We now plant taro by the side of the house. The rain from the top of the house feeds the taro and it grows better. (Women, Choiseul)

Alongside my house I have made a raised sup sup garden up on the beach sand, I planted cabbage, eggplant and flowers for better air circulation. I also plant chilli that other people can harvest. (Woman, Malaita)

With pumpkin we can improve its quality by doing hand pollination but we must do it early in the morning before the insects disturb the powder on the pumpkin flower. (Man, Choiseul)

It was generally noted that the men in Sanma commented about livestock and marine resources while the women commented on the garden produce. When talking specifically about measures to particular crops, participants in Sanma mentioned the following:

We now plant pawpaw in different locations and not all together like before. We find if we spread them out there's more pawpaws and they are bigger and better. (Young Woman, Sanma)

Vietnamese bananas, we now dig out all of the suckers and plant them away from the parent tree, this makes them grow better. Before we didn't used to maintain crops, they would grow anyway, but now we need to make sure we separately plant things like bananas and pawpaw for growth. (Young woman, Sanma)

When asked why methods for the pawpaw and bananas work, the participants said they did not know (and could not make a link between improved growth and soil characteristics). Like many of their current adaptation measures to find new ways to do things, it is often achieved through trial and error experimentation. It was noted that when something works, others in the community adopted the practice.

Some community members were aware of some sustainable agriculture techniques and mentioned ideas like companion planting to keep away pest, agroforestry to provide wind breaks, and seed banks. Older community members were more likely to mention these than their younger counterparts:

We need to try and plant in areas that are wind resistant we also need to seek advice on how to best pollinate fruit bearing trees. (Woman, Choiseul)

We have kastom water (water collected from a secret location) that is sprinkled on the leaves of the taro to make it grow healthily or we grow the taro near basa (a flowering plant) to look after it and help it avoid disease and pest attacks. If these techniques don't work we have to pull the taro out to stop the disease from spreading. Sometimes we try other kastom methods to kill pests like putting ashes of the fire with chilli and water. We also tried putting a false man (scarecrow) to scare away pests from fruit and crops. (Man, Choiseul)

I burn the bottom of the bananas to scare away the worms that come in the rain. (Woman, Choiseul)

Our beans are affected by melon fly, we find if we plant it in the bush it will not produce much, but if we plant it next to our house it has more fruits. (Man, Choiseul)

Participants specifically mentioned some techniques to cope with extreme weather events such as cyclones:

We plant manioc lengthwise in cyclone season and cut off the tops top make sure they don't fall over in the cyclone. (Young Women, Sanma)

Wild yam and sweet yam can withstand cyclone so we will need to plant plenty of these types of species. With more rain the tree crops do better, with more cyclones the ground crops are better. Planting yam must be early enough for the plants to establish before the cyclone season. If we save the seeds from corn we can plant them continually. (Men, Sanma)

Participants related the difficulties in applying traditional conservation management systems today:

In the past people conserved coconut, fish, clam shell by putting in a stick to show the public that the area is tabu. Today it is different, conservation is encouraged but people do not follow or respect it because the community is not cooperating. In the village people should follow bylaws of the past where coconuts are tabu so that they have time to get more fruits. Later we can harvest the coconut so that they can sustain their yields. (Men, Malaita)

Participants also commonly acknowledged that the effort to garden requires much more effort than in former times:

Now we must work harder to look after our gardens than before in the same way we take care of our pikinini (children) because of weather changes and other things like wild pigs. In the past you just put something in the ground and it grows, but now you have to take a lot of care of it. (Young woman, Sanma)

Crop and food production calendars

On the second day of research activities, all RAP communities took part in drawing and discussing food production calendars. In the discussions it emerged that signs to harvest are more important than seasons

to harvest, as seasons are not predictable like in the past. Many of these discussions have been used in other sections of the findings.

An example calendar is shared below, some communities drew the months of the year while others showed seasons and weather patterns through depiction of clouds and suns etc.

Table 11. Sanma Kole 2 food production calendar

Food	Signs and timing for planting/catch and harvest	Harvest
Pawpaw	Plant anytime and harvest after five months however if planted in January in the wet season it's easier for the plants to grow.	After 5 months
Island cabbage	Plant anytime	After 2 months
Taro	Ideally harvest after 1 year, however at close to 2 years they are a better size. When the leaf reaches the biggest it can grow, then it starts growing smaller and it's a sign that it's ready. (Man, Sanma)	1-2 years
Wild yam	Plant and then harvest anytime after the vines have dried up and the flowers have turned brown. Wild yam is good to harvest after a cyclone.	After 9 months
Manioc	Harvest after three months dependant on when it is needed. Wait to plant it under a full moon and the size is best. This also applies to sugar cane.	1 year
Banana	Plant after the rainy season (January) and they are alright, however plant in November and they are not good.	After 9 months

Kole 2 (Vanuatu) women with their crop calendar highlighting the links between false seasons and impacts on planting time and crop production.

Perceptions toward food security

For some communities, the concept and the terminology of food security was new while others were familiar with idea of safeguarding food sources. In all communities planning for safeguarding food sources was not practiced as the norm.

Once the concept of food security was explained to women and men, they were quick to understand what it meant but their understanding varied (by location) in their ability to see its merits for the future. In locations where there are more exacerbated local food shortages and where production is extremely challenging, peoples' interest in food security was heightened and they were very receptive, asking many practical questions of 'how' to adapt their practices.

There were one or two people who formed exceptions, as such this same level of recognition of the need for food security was not mirrored across 100% of participants as explained by one woman:

I think people are still healthy from what they eat, look at them, they are smiling, if there was something wrong they cannot smile. (Woman, Malaita)

On further discussions with this woman it emerged that her indicator of health and adequate intake of nutritious food was a smile.

During the RAP small groups of participants were asked to reflect on what their community would look like if they had food security in 10 years time. Men commonly drew pictures of marine conservation sites while women drew pictures of happy families and small gardens full of crops for home consumption as opposed to marketing.

Of interest, across all small groups across all countries, at least some people drew pictures that reflected that they thought food security could be achieved through planting more of individual species in the same method as is currently used, rather than transforming methods of food production. Other participants showed they had a firm understanding of some of the methods or ideas that could move toward food security.

Some participants picture descriptions and their stories are shared below:

In ten years time we will have more food from the sea because of conservation and sustaining of food security in our seas. (Men's small group presentation, Malaita)

Comments like the one above were common and showed a positive approach to community self ability to act to bring about better outcomes in sometimes extremely challenging conditions, this optimism appeared to be matched by a realisation of the veracity of food security issues which is positive for pilot communities to move forward with realistic expectations and actions.

Another group of men chose to depict food security as a canoe and explained the food security 'journey':

Food security is a journey, it is a canoe that is travelling to reach a destination. There needs to be a plan, skills, awareness, training, commitment, conservation and sacrifice for survival. For Lilisiana the sea represents everything we need for survival.(Man, Malaita)

In an attempt to conceptualise food security another group of older men draw a livelihood village plan, illustrating their approach to whole systems, and not to compartmentalise the issue of climate adaptation toward food security in the absence of the bigger picture and integration systems. The picture included regrowing mangroves within ten years to help the economic viability of sea cucumber and clam shell farming. They also saw an opportunity to make the community viable for a community-based tourism venture that would include the relocation of some community houses away from the tidal insurgence. Ultimately they announced that these measures could 'fix our cash flow problem'. These men had a vision and desire to make changes, however they commented that they were not supported by many of the *'lazy and unorganised community members who wait and see what happens before getting involved'.*

By day two more education and discussion around food security saw a transformation in men and women's mindsets and approach, reflecting their capacity, need and advocacy toward a future pilot project on climate adaptation toward food security.

In deconstructing the activity and sharing pictures with one another, participants were asked what food security in the community might look like in the future if behaviour, weather changes and management systems prevailed as they are today:

Climate change affects peoples' livelihood, for example, no proper resources or food for everyday use. If things continue like this our future will be a disaster and the future generation will suffer most. (Woman, Malaita)

According to my thinking, if it (weather) continues to change for five years, conditions will get worse. People will get hungry because climate change affects food security. Our future will be blurry. Even in two years I think people can get very hungry and things will be no good. We need to start preserving our food today. (Woman, Choiseul)

If there is no action now our future generations will hear the name 'fish', but they will only hear it and never see it anymore. (Young woman, Sanma)

Attitudes toward probable outcomes of food security

During the RAP small groups of participants were asked to reflect on what food security could mean for their families, community and province. Women and men, young and old responses were similar across research sites and are presented below:

Table 12. Women and men's perceptions of food security outcomes at the family, community and Provincial level

Responses are as close as possible to the word used by participants:

Food security at the family level would mean:	Food security at the community level would mean:	Food security at the Provincial level would mean:
• Increased food for families (enough and surplus) • Increased quality of food for family • Family is happy, healthy and looks smart • Family will have a balanced diet and enough food to share with other families • Extra food can be taken to the market and church (increased income can cater for basic needs)	• Supported community through more being able to market more to gain more money to build nakamal (chiefly meeting house) • Less sick people • Enough food will be available and stored for a disaster (noted by Choiseul communities) • Community is healthy so they can undertake more community work • Reduced theft	• Communities help each other • Survival • Reduced budget for disaster supply (noted by Choiseul woman) • Less work for provincial nurses due to healthy community (noted by woman)

Women were able to participate in this discussion in a much more insightful manner than men. A representative contribution concerning the breadth of food security impacts is illustrated by the comment shared by a woman in Choiseul:

If we have food security our market can flow again and we can have more food, there will be no more malnourished babies and hungry people in the community, we will look healthy again. Communities will also be more resilient during disaster times. (Woman, Choiseul)

Youth were specifically asked to comment on what safeguarding food resources would mean for them and their future:

If we have food security, when a cyclone comes we will have plenty of food available if a crop is destroyed. (Young man, Sanma)

All the young people will like and eat local 'island food'. (Young woman, Sanma)

Food security is a good thing for youth, it means you can feed your family and you can benefit from an increased life span, there will be good quality food and we can help our neighbours. (Young woman, Sanma)

When participants were asked what needs to happen to move toward food security both women and men, young and old made suggestions summarized in Table 13.

Table 13: Women and men's identification of changes and conditions required for food security

Women	Men
• Sell only some food (and eat the rest) • Education and awareness on food security and what it means for the whole village • Families need to work harder and be more clever on their land • Introduce logging practices • Involve women and girls in decision making • Stop using dynamite to kill fish • Food security and nutrition should be a bigger part of the school curriculum • Plan and conserve and manage the reef and sea for future • Plant kakake in swamp areas for the future • Need to plant more varieties of food for the future • Population control, awareness for both young men and young women	• Predict the seasons better • Conservation and tabu areas • Replanting • Seed banks • New varieties of crops • Improved soil management • Settle disputes • Population control • Food security plan

Common to both women and men's lists for food security is the identification of the need and the importance for land and sea conservation areas and overall land and sea use planning:

We need to plan for the future, land should be blocked out to become healthy and we need to have little areas to plant a variety of crops for each family, our forest should be preserved for biodiversity and our children. There should be virgin forest areas in the future. There should also be designated area for livestock as well. (Woman, Choiseul)

The emphasis on planning, futures thinking and intergenerational equity was common in women's remarks such as the two shared below:

We must try to change our system of gardening, we need to plan how to plant food in the gardens and plan roles for our family in the garden. We need to plant different types of crops e.g. to replace kumara. We also need to emphasise tabu area and sites to preserve areas like the sea for future generations. (Young Woman, Sanma)

For me food security means we need to change our attitude if we do not prepare it will result in unhealthy living, an increase in poverty and our situation will get much worse. We need to spend a lot of time planning for the future, for our family and the wider community. Food security will improve our lives. (Man, Choiseul)

Climate adaptation knowledge systems, gaps and capacity for transformation

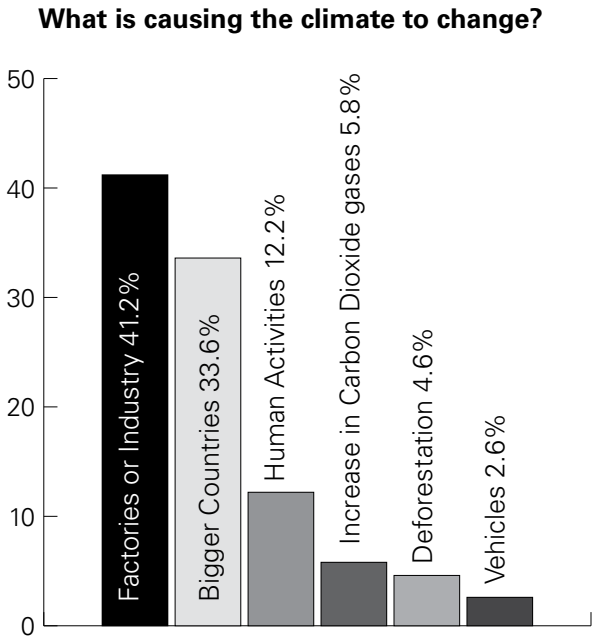
Generally indepth knowledge and awareness on climate change were low across all RAP sites and the need to be able to adapt to changes in climate was extremely high. All participants, via an individual survey, were asked how extreme weather events such as increased rains and cyclones affect their lives. Most participants spoke of the stress it put on their food production and livelihood systems. Representative responses include:

Mentally I am affected. I worry about how the continuing rain will affect our food supply. (Man, Choiseul, referring to Choiseul experiences during the Tsunami in 2006)

Seeing this weather changing I feel weak. It's hard to make the garden, as it always bears small tubers and fruits (Woman, Choiseul)

Participants were each asked what they thought was causing the weather or climate to change. No significant differences were found between RAP locations or between male and female answers.

Figure 2: Perceptions on what is causing the climate to change



41.2% of participants cited either factories or industry as the prime reason for climate change, 33.6% citing 'bigger countries'. 12.2% of responses mentioned human activities (these responses were predominantly male and female youth). Interestingly, 5.8% of participants used the words 'an increase in carbon dioxide' or 'gases', these participants were usually the most educated in each location and importantly, were unable to explain in any more depth how the gases impact on the atmosphere. Other responses included deforestation and vehicles, 4.6% and 2.6% respectively.

On day two men and women gathered together to discuss changes in climate via an open forum, with questions and answers and discussion with the aid of some picture stimuli. The session commenced with an explanation of the basic science of the greenhouse effect and flowed in a semi-structured pattern of discussion dependant on the interests and concerns raised by community members.

What do communities want to know?

All Solomon Islands' communities had heard of the words 'climate change' while youth and some older community members were familiar with the term 'greenhouse effect'. There was a great level of interest from all ages to know more about the causes and practical actions communities can take to live with a changing climate.

In the open question times the following questions were representative of what people wanted to know. It reflects their interest and ability to take a whole systems viewpoint and futures thinking approach to the realities of climate change.

Table 15: Questions raised by participants in open community forums

Scientific, investigative	• Climate change seems to be happening fast, what is causing it? • What is causing the greenhouse effect? • What are some more effects of climate change? • Can you please tell us about sea level rise and what we can do about it? • Can you give us a report on the percentage of ice melt in the North and South Poles?
International context	• What is happening internationally on climate change? What are the big countries doing or not doing? • Bigger countries know they cause climate change through their industries and activities, why don't they change and stop their factories? • What do other people in the world think about adaptation to climate change?
Local impacts	• Can we encourage the planting of trees to store carbon? • What exactly can we do here to adapt to climate change? • It's clear that climate change affects our food production, what are the other effects of climate change? • What is our Government policy on climate change and food security? • Is there a national level plan for youth on food security and climate change? We need support to promote and achieve benefits of youth in food security (Man, Choiseul)

These types of questions were commonly asked by chiefs and youth who had received secondary education. Typically the majority of community members had a much less developed grasp of the meaning and causes of climate change. The following comments below are reflective of the current knowledge foundation most prevalent in RAP communities:

I heard that the changing climate is caused by human activities, but I don't know what it is that we contribute. (Young man, Choiseul)

This climate change thing is new to me, I want to know more. (Woman, Choiseul)

I want to know why these changes are happening. (Young woman, Malaita)

For myself, I'd like to know what's going on so I can make plans for my future in case the greenhouse effect gets worse. (Man, Malaita)

Increasing machines, cars, trucks, and factories they are giving out bad gases that spoil our climate but I don't know how it works in nature. (Women, Choiseul)

In rural areas we do not understand climate change. We need awareness, education and training on it. (Young woman, Sanma)

A young woman in Vanuatu commented on the need for a shift in thinking toward food security to support changed techniques and behaviours:

We need to change mentally for food security; we need to change from just thinking of gardening to get Vatu (money). (Young girl, Sanma)

Capacity to act

The RAP aimed to explore the following questions: What existing strengths and capacities can communities build on to embrace a changing climate and ensure future food security and ecosystem health? And, do women and men feel able to make changes to the way they produce/source food? The following section seeks to give a summary of how the research explored these enquiries.

At the practical level, desire to adopt new techniques and technologies is very high. However it must be noted that while capacity to adapt by some farmer families is high, the capacity of others is undetermined. Those who attended the RAP are likely to be the most motivated and interested people, and consequently the ones to make the 'first move'. It is expected that other community members may take the approach of sitting back and watching for improvements prior to choosing to participate.

It is worth noting that none of the RAP communities have formalised farming groups or networks. As such food production is mainly undertaken within family groups. Those who attended the RAP are highly motivated to be involved and the majority stated, unassisted, that they believe they can teach others, once they have received new ideas and practices. Willingness to act on climate adaptation for food security is high in RAP communities because food security it is now at a stage where it's viewed as a matter of survival and development, and livelihood prosperity.

There are new things I need to learn and apply new skills to gardening. If I don't do anything, if I don't share ideas and knowledge, then in ten years time my children and I will have nothing to eat. (Woman, Choiseul)

What we experience is not stable now, so if we do nothing in the future it will be a lot worse. (Woman, Malaita)

Capacity to identify solutions to food security

In separate gendered groups, women and men were asked to select a pressing issue from their cause and effect diagram and identify solutions to the issues, taking into account existing barriers. The tables below illustrate some of the group work undertaken. The work is evidence of women and men's ability to not only identify solutions to problems (in a limited time), but their ability to work together in applying logical approaches to complex issues that will place them in a willng position for involvement in the pilot project. *Note that the solutions are not solely about climate adaption but about addressing food security more broadly. Their thoughts on climate adaptation followed.*

Table 16: Issue analysis by male RAP participants in Choiseul

Issue	Solutions	Current Barrier	Action to overcome barriers
• Low yields and quality of garden food caused by poor soil quality	• Soil conservation • Crop rotation • Improved farming techniques	• Lack of know how • Lack of seeds • Lack of alternative land	• Sup sup garden approach together with other livelihood activities • Assistance with sourcing seeds • Business employment opportunities • Need education and awareness on appropriate farming techniques

Table 17: Issue analysis by female RAP participants in Sanma

Issue	Solutions	Current Barrier	Action to overcome barriers
• Logging	• Plant more trees for the future	• Lack of wood to cut so there is less Vatu (money) • Lack of seedlings	• Education and knowledge about sustainable logging
• Overfishing	• Reintroduce Tabu (conservation zones)	• People do not respect the tabu law • Lack of fish	• Make one person or leader responsible and educate people so they change the way they act

Table 18: Issue analysis by female RAP participants in Choiseul

Issue	Solutions	Current Barrier	Action to overcome barriers
• Food crops (we do not have enough for both our family and for marketing)	• Need advice from agricultural officer • Family planning • Separate gardens for marketing and family use	• Lack of awareness and education • Lack of decision making between families	• Improve family planning education and awareness • Build relationship with provincial agricultural officer • Need training and then we can train others

Table 19: Issue analysis by male RAP participants in Malaita
(The information in the tables below is documented as closely as possible to the original discussions)

Issue	Solutions	Current Barrier	Action to overcome barriers
• Overharvesting	• Conservation for selected areas • Sustainable harvesting • Selective harvesting and replanting	• Lack of cooperation by community members	• Increase education, training and awareness on conservation (e.g. do not catch small fish)
• Low cash flow	• Increased education, and employment opportunities • Skilled youth	• Cost of school fees and materials • Lack of qualified community members • Lack of financial management skills in families	• Government and NGO support for financial management planning
• Grow crops	• Access to technical and practical expertise	• Lack of land • Land pollution • Changing weather	• Stop logging activities • Technical support from government /NGOs

Further to communal capacity for identifying ways forward, it is evident that there are individuals in every community who hold clear leadership qualities who are not currently in leadership positions.

Planning for the future

During the second day of the research, activities were interested in exploring: Food security plans for the future and community capacity for innovation/ transformation in food production practices.

On the second day of the RAP, participants were invited to group themselves in their communities (women and men together) and develop community plans representing the practical changes they would like to occur in their communities to reach food security. The results from all communities saw that the plans generally fell across three thematic groups identified by the participants, these were:

1. Increased focus on appropriate techniques for climate resilient local food production for family consumption
2. Conservation of land and sea areas
3. Focus on alternative or value-added livelihoods (cash and non-cash) to survive in an increasingly cash based economy

Participants share their visions for the future to safeguard their food sources.

Full Community Food Security Plans and gendered entry points to communities can be found in Annex II.

Gender relations in food production

Participants in Sanma and Choiseul reflected and shared stories at the end of day one about the times when they have worked alongside the opposite sex (men/ women) in food production that worked well and made them feel valued. They were asked to share any stories they had to identify the best part of experiences and how they could seek to replicate it. The purpose of the question was to focus on the positives of gender relations so that both sexes could seek to identify strengths in cooperation and enhanced gender relations in food production.

There are times when you (men and women) plant something together and it grows well, it makes you feel happy. There are also times when mixed crops are taken to market and sold, so you have money to pay school fees. At this time when the mamas (women) manage the money, it works well. (Man, Sanma)

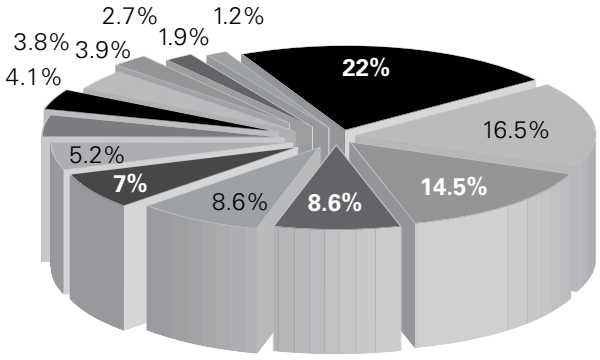
I get a nice feeling and I know what my role is when I learn from my older brothers and sisters, when we work together the work is done faster and it's easier. I wish it happened this way more, it's good for men and women to work together to achieve a common goal. (Young Woman, Sanma)

Being open and understanding enables good experiences with men and women working together. We need to encourage both (sexes) to work together to deal with the problems of our community development. (Man, Choiseul)

Gendered desires for changes through a climate adaptation for food security project

By the end of day two, one on one discussions with participants included questions phrased around what they want and strategically need and desire from the impending pilot project. The gendered results are below:

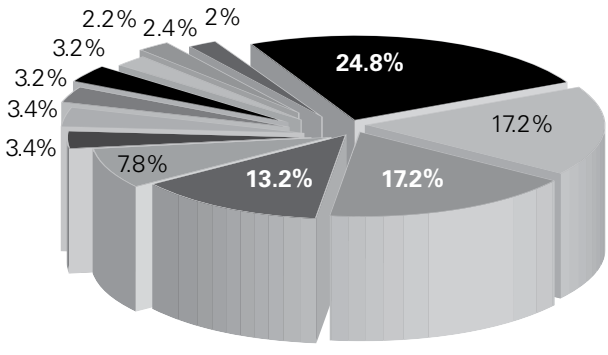
Figure 3: Men and young men's desired project coverage and activities (frequency of responses)



22% New pest management, 16.5% Appropriate or weather resistant agricultural methods, 14.5% Demonstration gardens, 8.6% Soil management techniques, 8.6% Youth-led food security initiatives, 7% Seed banks and storage, 5.2% Testing of new varieties, 4.1% Food security education and planning, 3.8% Conservation sites, 3.9% Land use planning, 2.7% Intercropping, 1.9% Agroforestry training, 1.2% Improved livestock management

Male responses saw 22% of male participants seeking new pest management approaches, with many citing practices akin to integrated pest management, 16.5% cited exposure to appropriate or weather resistant agricultural methods as being relevant, closely followed by 14.5% highlighting the need for demonstration gardens. Other answers included soil management techniques (8.6%), youth-led food security initiatives (8.6%), seed banks and storage (7%), testing of new varieties (5.2%), food security education and planning (4.1%), conservation sites (3.8%), land use planning (3.9%), intercropping (2.7%), agroforestry training (1.9%) and improved livestock management (1.2%). Notably, most the suggestions highlighted practical approaches that are consistent with what has been working in other communities where Kastom Gaden are active in the Solomon Islands.

Figure 4: Women and young women's desired project coverage and activities (frequency of responses)



24.8% New climate resilient techniques, 17.2% Climate resilient crops, 17.2% Improved soil management techniques, 13.2% Improved market access, 7.8% Livelihoods training, 3.4% New crop calendars, 3.4% Composting knowledge, 3.2% Improved seed storage methods, 3.2% Land use planning, 2.2% Conservation sites, 2.4% Gardening tools, 2% Financial management training

Women's responses had overlaps with men's responses however there were some notable differences. 24.8% of women and young women requested new climate resilient techniques for sup sup gardens supported by 17.2% highlighting the need for climate resilient crops and techniques to care for them. Women's relationship with the ground was reflected by 17.2% citing the need for improved soil management techniques, and their role in marketing was reflected with 13.2% citing improved market access. Other responses included livelihoods training on value adding to garden crops (7.8%), new crop calendars (3.4%), composting knowledge (3.4%), improved seed storage methods (3.2%), land use planning (3.2%), conservation sites(2.2%), gardening tools (2.4%), and financial management training (2%).

Community strengths and entry points

Many women and men indicated that they felt they could play a leadership role in helping others in the community transition to new climate resilient food production techniques. These aspirations need to be married with existing strengths and entry points in the community. Table 19 draws on some of the obvious strengths and thematic entry points for the RAP communities.

Table 19: Community strengths and thematic entry points for climate adaption toward food security pilot project

Location	Strengths/thematic entry points
Choiseul Communities	• Readiness to actively consider intra and inter community marketing • Desire for sea conservation areas • Links to health message dispersal via the Sasamunga church hospital • Council of Women via the United Church Women's Group • Links to existing farmer networks in Choiseul • Linkages to APHEDA's life skills work • Linkages to Kastom Gaden's existing work with women and youth in Sasamunga • Link to CSP work • Links to work done by WWF • Linkages to the Zai ba Project
Sanma communities	• Strong mothers' group • No existing farmers' groups or networks, but interest in forming one • Well organized communities • Support for increased gender equity in food production • Desire for sea conservation activities • Links to the French funded project POPACA working together with Lapita Café (a locally owned business) to develop the use of manioc flour • Proximity to Vanuatu Agricultural College and Agricultural Research Centre • Linkages to Department of Health nutrition programs • Linkages to many other NGOs working out of Luganville
Malaita (one community)	• Strong and organized church, panpipe and soccer groups • Established and active disaster management committee • Desire for land and sea conservation activities • Links to existing farmer networks in Malaita • Proximity to Provincial Fisheries Office • Proximity to Asia Pacific Sustainable Development (Japanese funded sustainable and organic agriculture project out of Auki) • Potentially the most challenging community to work with due to social fragmentation, lack of leadership and challenging environmental conditions

The research found that gender needs to be considered in the identification of community entry points. Women and men participate differently in formal and informal community-based organisations and use of networks for the management and use of natural resources. The RAP found that participation of women in formal organisations beyond church women's groups is limited in all communities except in Sasamunga where some women are actively involved in KGA sup sup garden activities that focus on mother and child health. Women rely on soft social networks to assist in management of gardens and women, in particular, are found to be intensively engaged in building social capital through informal soft networks.

Cash networks are more likely to involve men, however men in two RAP locations commented on the benefits of involving women in the management of finances, and women cited that they seek improved financial management skills.

In all RAP communities, churches were found to have their own organisations notably for women and youth. As such strong youth groups, like those in Lilisiana could provide a good mechanism for pilot project entry.

Most outside support to RAP communities has reportedly been via short training workshops. To date the small number of men who have received training, have commonly received technical training (agriculture, and mechanical) whereas women who have received training have acquired home based skills (such as flower arranging, food preparation and storage, baking and sewing skills). Notably, nearly all participants from Sanma and Malaita communities have never received any 'outside' training of any kind.

Such division of training reflects some of the roles of women and men in communities, but generally does not acknowledge women's roles particularly in respect to gardening. To assist with this, incentives such as the Kastom Gaden focus on women in agriculture through their 'women and nutrition' and other women focussed initiatives could be well placed to be replicated in the pilot communities. Acknowledging women's natural resource roles, would give space for women and young women to lead the way in sup sup gardening for diversified food security and for cash economies.

Social capital

The term social capital attracts a number of definitions; it is used here to refer to the core idea that social networks, families and individuals have differing levels of value or 'social capital' to facilitate change processes and support each other. Co-operation and mutually supportive relations provide a valuable means of combating many of the issues highlighted in this the RAP.

Social capital in the communities was found to be high among young women and young men of all socio-economic standings and is a clear strength to build on. The challenge is that 'spaces' which enable this capital to come forward are currently very limited and for every youth that is willing to be involved, another is not currently engaged. Men and women in most RAP communities commented that youth's general lack of direction and purpose was linked to no perceived livelihood opportunities and few organised youth social activities outside the church. As such many very able youth are currently bored and not included in community building activities. Women and men, young and old across all sites highlighted the need for the pilot project to have a strong role for youth.

In some communities such as Sasamunga and Kole 1, Kole 2 and Manioc, some youth are well educated but have no outlet for their academia in the community context. Many described this frustration. Some individual young women and men were identified as having very strong capacity to become youth leaders. Several women and men in each RAP community showed they had the capacity and attributes to excel in leadership positions if given the opportunity.

Assessing institutional capacity to support community-based adaptation for food security

The RAP considered: What is the ability and alignment with existing organised institutions, government departments, and networks to support and champion climate adaptation toward food security in pilot communities?

There are many networks, organisations, individuals and agencies working on issues related to climate change and/or sustainable agriculture in Vanuatu and the Solomon Islands. There are less that deal

with both areas at the community level. KGA is the notable exception in the Solomon Islands. However there is great potential in drawing from this large pool of expertise, to bring them together and to build on existing relationships to support the community level project and to ensure that the project is fully supportive of other climate adaptation for food security initiatives in the Pacific.

Of utmost importance and focus will be the support the pilot project can be in addressing the National NAPAs while sharing information and support from regional organisations such as SPREP.

Key national stakeholders who may play important roles in supporting communities and Live & Learn at different stages of the project are likely to include:

Vanuatu: Partners of supporters may include: the Ministry of Agriculture, Department of Environment and the national adaptation program, and Department of Health, Vanuatu Marine Authority, provincial agriculture officers, Vanuatu Agricultural College and Agricultural Research Station, Melanesian Farmer First Network, farm suppliers other NGO partners and provincial councils in the community provinces.

Solomon Islands: Partners or supporters may include Ministry of Environment, Conservation and Meteorology and the National Adaptation Program, Department of Agriculture, National Disaster Council, National Disaster Management Office, Kastom Gaden, Melanesian Farmer First Network, AusAID's Livelihoods Program, Rural Water Supply, SINPA Livelihoods Reference Panel; AusAID's Rural Livelihoods Program through CSP; as well as Mother's Union Provincial Agricultural Extension Officers, farm suppliers, other partners and provincial councils in the community provinces. The role of Provincial Government is intended to be strengthened. Consultative meetings were held with many of these organisations during the RAP.

Coincidently, during the RAP in Sanma, the Province celebrated the inaugural Sanma Yam festival, to support the Pacific regional focus on the International Year of Biodiversity championed by SPREP. The Department of Agriculture, Vanuatu identified yam as the focus of the inaugural festival since there are hundreds of yam varieties and the fact that yam has a central cultural role in ni-Vanutau life. The two day festival consisted of education stalls, discussions, visual displays of different yam varieties and included women and men

Young women with their illustrated vision for marine food security through climate adaptation.

from all ages and locations across the Province. The celebration is due to continue in future years focussing on a different food source each year.

In discussions with the Provincial Agriculture staff, an interesting and topical discussion arose concerning the new research being undertaken regionally, and in Vanuatu into new techniques and varieties in planting yam. Importantly, some of these new techniques challenge traditional ecological knowledge (TEK) that is central the Pacific way of life, (e.g. propagating multiple yams from slices of the original yam) highlighting the need to identify appropriate education methods to integrate TEK that is appropriate, together with new ideas that require cultural acceptance and uptake.

To date there are no known formal activities on the ground in Sanma communities that are concerned with food security.

The Department of Agriculture in Vanuatu is set up a small research station close to the research communities to explore different methods of planting yams, manioc and taro. Along with these planting materials, they provide natural fertilizers in the form of seeds called "mokura". These are given to farmers for free and the farmers are taught how to grow these seeds to fertilize the soil for planting. All planting materials are provided for free. To date over 20 farmers have sought help from the research station and have been supplied with planting materials more than once. This could provide an added opportunity for pilot communities who have not yet made contact with the station.

6

Recommendations and considerations

The RAP identified some core principles and mutually strengthening processes that will need to occur in the forthcoming project design.

These include:

- Build on existing local strengths, leadership, ownership
- Utilise and support existing organised groups, systems and structures
- Promote an inclusive society through inclusive equitable implementation
- Build up the relationship, accountability and engagement between governments and smallholder farmer families
- Use an innovative and holistic approach to climate change education
- Deliver visible results, in rural areas in the short term as well as the longer term
- Avoid over engineering, use realistic timeframes and ensure predictability
- Develop and promote programmatic approaches and ensure activities are fully embedded in the National Adaptation Programme of Actions (NAPA)
- Promote mutual accountability, disciplines and responsible partners
- Obtain the support of existing community leaders and other respected people in the community
- Promote coordination and harmonisation with other funded programs in the Pacific region

The RAP identified some core principles and mutually strengthening processes that will need to occur in the forthcoming project design.

The findings call for an integrated approach to project design. Based on evidence gathered during the RAP the pilot project should practically and strategically focus on the following key areas:

1. Strengthening existing rural networks, and seeking to build-on and replicate successful models of sustainable agriculture, livelihoods products and market access in other areas.
2. Provision of sustainable agriculture technical training and support especially for women, young women and young men.
3. Development of Food Security and Ecosystem (land and coastal) risk assessments to inform the creation of Adaptation Plans.
4. Identification of policy and networks that promote equity in reaching markets.
5. Institutionalising long-term natural resource (land and sea) governance, risk assessment and planning skills for women and men, young and old:
6. Community-led natural resource plan development will ensure communities, tribes or clans, can set their own strategies for sustainable development, improve their inclusive management and tackle obstacles.
7. Fostering young women's and young men's leadership in agriculture and focusing on building community relationships through the transfer of traditional ecological knowledge together with new approaches to agriculture that is appropriate for a changing climate.
8. Supporting and promoting evidence-based cross-sectorial policy development ensuring policies are inclusive, gender responsive and sustainable while addressing practical and strategic needs.
9. Supporting the regional food security plan for national and regional climate adaptation plans.
10. Respecting and utilizing traditional mechanisms, values and practices to enhance food security such as customary management of fisheries and traditional ecological knowledge and stewardship techniques.

These processes need to be strengthened by:

- Piloting projects before going to scale.
- Building on positive patterns of change as an entry point for staging integrated approaches.
- Focusing on facilitation processes that stimulate and support community-led social change that enables leadership space for women and men, young and old, in developing and sustaining livelihoods and land and sea natural resources.
- Building on existing community and gendered strengths, and giving upward importance to working with and strengthening established and organised women's and men's and youth bodies, groups and networks. Further, the project should seek to embed the outcomes within community structures (farmers' cooperatives, women's groups, youth groups etc) and provide new tools and approaches for communities to achieve NAPA goals.
- Facilitating dialogue opportunities between women's, men's and youth community organisations and the Department of Agriculture's extension officers and provincial and national governments.
- Acknowledging that tackling natural resource management in a gender sensitive manner is more about strengthening awareness and education of alternative approaches to agriculture than increasing financial resources to climate adaptation.
- Establishing supportive policies and structures which are responsive to women and men working together for food security.
- Maintaining involvement and support from an institutional, national policy levels.

At the institutional level the project already has wide spread support from government departments and regional organizations. To sustain involvement and benefits at a national level, government departments will be involved throughout the project, e.g. agricultural extension officers will attend training forums and renew or enrich dialogue with community farmers to gain a better understanding and provide support for realities occurring within the pilot communities. At a national policy level the project will link closely with NAPAs. While most countries do not have specific food security strategies, it is part of broad based national development plans and policies. The project will link to these policies and related people.

Recommendations for design activities

Implementation of project activities is not encouraged to take a linear approach and will likely vary by location. It is of vital importance that on-the-ground action is seen to be occurring alongside any risk assessment preparation and leadership training. Some suggested activities to support women's and men's strategic needs arising from the RAP and stakeholder consultation are detailed below.

Practical key delivery approaches

It is deemed appropriate, based on the findings of the RAP, and alongside stakeholder consultation, that the project is delivered via the following two delivery approaches and seven activities:

Delivery Approach 1: Education and climate change leadership

Managing risks involves the strengthening of people's knowledge, skills and leadership capacities. The lack of information and awareness among community level farmer families is a key barrier to adaptation and risk management. The project should seek to enhance leadership capacities in ecosystem based approaches where food producers seek to enhance the local environment through sustainable and locally appropriate farming practices. Key areas to increase awareness include educating people about the science behind the changes they have noticed in the connection between change variability and crop stress and resilience. Community members noted the changes in yields and fruiting, flowering and catch seasons of a number of traditional plants, crops and marine food sources. All RAP participants also noted the connection between changing weather patterns and changes in production, yet wanted to understand more about the connection, the causes and solutions. As such, to ensure that local communities and the farmer families within the communities understand and appreciate the relevance of climate change to the products of their labour, it is recommended that efforts be continued to raise awareness and understanding, in an appropriate, solution-based manner, of the potential impacts of a changing climate on both cash and non-cash livelihoods.

Delivery Approach 2: Appropriate and transformed agricultural practices

As evident throughout the RAP and raised by several men and women, managing change requires modifications in attitudes, and practices (behaviour) and the ability for futures thinking applied to livelihood strategies. The lack of knowledge and 'soft technology' at the community level makes these modifications difficult. It is essential to couple education and awareness with appropriate methods for effective adaptation to take place. The pilot project should enable the testing of agricultural methods including initiatives like 'no dig gardens' and the establishment of rainwater irrigation systems (as successfully trialled by Live & Learn in the Maldives and Marshall Islands). The transfer of knowledge would be best placed to pass from field based support staff to farmer families via demonstrations, noting that transfer of maintenance knowledge is essential to project and infrastructure longevity and legacy.

To support these delivery approaches the following activities are recommended to form the foundation of the pilot project:

› *Development of education and leadership resources.*

The project would be well placed to develop an education and leadership resource providing information on how to live with a changing climate from a food security perspective. Aside from being informed by this RAP, the resource should include FAO and KGA studies regarding food security and climate change. The leadership manual focus could include:

- Risk assessment and methods to monitor risks at the village level (and where appropriate and relevant, include this alongside existing natural disaster management plans).
- Diversification of food sources and income generation in the context of a changing climate.
- Development and implementation of broad-based adaptation livelihoods strategies.
- Practical methods regarding 'new techniques' such as companion planting, agro forestry systems, integrated pest management, stubble retention, and other characteristics of resilient and sustainable farming systems.
- Innovative methods for small scale rain water capture, storage and use.

- Soil management for increasing soil biota and nutrition for fertility and long-term productive capacity.

The output would be a food security and climate change manual with locally relevant practical information for community-based small scale farming families as requested during the RAP. The RAP highlighted that it is particularly important, that this resource is also useful for illiterate community members, with a strong focus on pictorial messages and advice to suit indigenous modes of learning.

› *Development of specific crop production schedules and information packages for a selection of island crops*

The development of a series of visually informative and appealing information packages would support the activity described above. Useful information would include soil conservation practices together with practical links between such approaches, crop diversifications and related benefits. Information packages could be water resistant if possible and distributed through channels including: project trained community climate leaders, agricultural extension officers, farm suppliers, local markets and government authorities. In some communities it will be contextually appropriate to extend the breadth of content to embrace behaviour change and stewardship approaches to safeguarding marine based resources affected by climate variability (e.g. Lilisiana). The output would be crop schedules to support the information packages.

› *Delivery and dissemination of climate change education and leadership training at the village level*

Training forums in each of the pilot communities would assist with the practical uptake and application of the manual. The output from this activity will be training of several hundred food producing families as Community Climate Leaders.

› *Identify community-based opportunities for innovation and climate resilient food producing methods and exhibit them via look and learn demonstration and education sites within communities*

This activity would form part of Live & Learn's ongoing Climate Adaptation Programme. The activity would be well placed to test, model and apply agricultural methods and 'soft technologies' that have the capacity to overcome challenges such as dealing with salinity and water scarcity. Community Climate Leaders may wish to nominate their communities to become a pilot site to test new technologies/methods and approaches. The core focus of the activity is to display and promote the practical application of at least two of the methods promoted by the manual. The core focus of this activity will be to tie the agricultural education manual resource and training forum workshops to practical application and displays to encourage widespread uptake and interest in adaptation methods that have been proven to work. This activity will enable and support practical, empowering, and research proven methods using farmers' own knowledge and skills, linked to the latest research and testing of agricultural techniques. Introduction of new approaches will promote resilient farming systems and cropping schedules and advocate and showcase the benefits of diversification.

These activities could be supported through links to projects that focus on improvement in energy access, transport access and ICT coverage to link people with markets and other communities.

Expected benefits and outcomes of pilot project activities

Expected benefits and outcomes of the activities outlined in the preceding section are summarised in Table 20 below:

Table 20: Expected benefits, indicators and sources of verification for pilot project activities

Expected benefits	Indicators of achievement	Sources of verification
Risk management among women and men farmers improved	80% of target villages completed food security risk assessments (with inclusive input of women and men, young and old) by end of June 2011	Food security risk assessments
Risk management of ecosystems: land (garden, bush and livestock) and marine environments (e.g. mangroves, foreshore, lagoons, corals) among women and men improved	80% of target villages completed ecosystem risk assessments (with inclusive input of women and men young and old) by end of June 2011	Ecosystem risk assessments
Crop varieties adapted to changing climatic conditions identified and tested	At least three new crop varieties (and/or methods) identified and tested by end of June 2011	Field assessment, photos and Reports including village based change stories
Improved management of cultivated land	Introduction of improved composting and soil enrichment activities carried out in all target pilot villages by end of June 2011	Field assessment, photos and reports including village based change stories
Improved agricultural water management	Rainwater catchment systems installed in 25% of target pilot villages by end of June 2011	Number of functioning rainwater irrigation systems installed using water for agricultural purposes
Improved management and use of degraded land	Plans to enrich degraded land established by end of June 2011	Field assessment, photos and reports including village based change stories
Village land and marine degradation prevented	Adaptation plans development and villages to discuss and action phase out and seek alternatives to e.g. tree felling and dynamite fishing, enacted in all villages by end of June 2011	Adaptation plans
Preservation of mangroves and their contribution to coastal fisheries	Community to discuss alternatives and action cessation of wetland reclamation by end of June 2011	Field assessment, photos and reports including village based change stories
Preservation of coastal biodiversity	Plans to monitor and curb beach erosion across all villages where relevant by end June 2011	Adaptation plans

Other performance data will be captured using methods such as Most Significant Change (MSC). The MSC process involves the collection of stories of change from villages and the selection of the MSC stories by beneficiaries, target groups, other stakeholders and partners. Once they have been captured, all stakeholders discuss the value of the stories, the limitations, opportunities and, importantly, how successes can be replicated. MSC techniques are well suited to projects that;

1. Are complex and produce diverse and emergent outcomes
2. Work at multi-levels
3. Are focussed on broad based social change and research

The stories themselves are indicators of progress and success and these stories can be presented through:

1. Change in crop diversification and resilience
2. Changes in uptake of adaptation planning (including the protection of ecosystems)
3. Opportunities to embed outcomes in the NAPAs
4. Meaningful participation of women and young women in adaptation planning

Maintaining a gender lens

The RAP identified that deliberate efforts should be made to create space, particularly for young women, to utilise new knowledge and skills, and to embed new approaches to decision-making in organisational and community processes and practices.

Putting gender equity into practice will be challenging, in and through the design and implementation of the coming project. Civil society together with Solomon Islands' government (SIG) and communities are in a position to build space for this change. Accordingly, in partnership with organisations such as IWDA and provincial women's networks and councils, particular focus should be given to gender needs of the pilot project.

Coordination and collaboration for gender lens on climate adaptation for food security

It is recommended that the project work in close coordination and collaboration with other interested stakeholders throughout the Solomon Islands including government ministries, donors, non-governmental organisations and other stakeholders, in the following ways:

- Collaborate with relevant partners, national and international (regional) actors and other organizations involved with agriculture and fisheries and health departments to design practical community–based materials which mainstream gender equity at the rural level as well as the national level, and showcase best practice in men and women's advancement in rural agriculture and climate adaptive techniques for food security (particularly young women).
- Coordinate and build upon existing strong rural or community-based networks (of any kind), to facilitate the expansion of their focus to include messages about food security in a changing climate awareness, skills and associated action.
- Work with rural women's networks, and facilitate the expansion of their focus to include natural resource governance, food security planning and sustainability knowledge.
- Establish a community-based advisory group across the pilot communities of interested staff, community members and others outside the project to support sharing of challenges and celebrate success over the life (and beyond) of the project.

Community uptake of new ideas

Community members, as a whole will be more likely to accept and lead change if foundations in place to ensure new ideas are:

- Expressed in local concepts
- Fit with existing social structures and values
- Economically feasible (no or low cost)
- Are entirely 'proven' and tangible – adopting a 'look and learn' approach
- Expressed attractively through community 'media' and communication channels
- Reinforced with celebrations
- Supported by female and male Community Climate Leaders who are chosen by the community in partnership with Live & Learn, based on attributes, achievements and abilities (recruitment and mobilisation of Climate Leaders has been identified as a key component to the forthcoming project). It is envisaged that female and male community leaders will act as focal points of information, momentum, and communications with project stakeholders inside and outside the community. The premise behind having community leaders is that they will be able to provide upward support to the project through their understanding of the community language, ways of thinking, values and communication channels and will deepen the engagement.

Evaluation

An external process and impact evaluation will serve to determine:

Relevance: *Did the action maintain its relevance to local needs and context and the priorities of AusAID and the MDGs?*

Effectiveness: *Did the action utilize partners effectively? Did activities add value to other programs and synergize with them?*

Efficiency: *Did the action deliver 'value for money'? Were budgets managed effectively?*

Impact: *Were the outcomes and outputs achieved? What extent were people's situations improved as a result of the program?*

Process: *Was the process appropriate for the project? How could the process have been improved for heightened effectiveness?*

Sustainability/legacy: *To what extent were methods, tools and learning institutionalised? Will outputs and benefits be sustained through national policies and development strategies?*

Lessons learnt and practitioner reflections are intended to be widely distributed through Pacific wide networks, web based tools and platforms and through a series of communication tools. Making the farming practices, tools, methods and soft technologies available to other communities through networks and partnerships will serve to increase opportunities for replication.

Concluding remarks

Long-term food security can only ever exist where systems and change are community-led, owned, managed and contextually appropriate. Unfortunately it is commonplace for ill-fitting frameworks to be placed on communities from outsiders. The expectation that 'projects' where NGOs come in and "make us rich" or "give us tools" (e.g. garden equipment and outboard motors) result, all too often, in no systemic change and models of development that build dependency. Conversely, through the RAP approach ownership building processes have already commenced by engaging communities in the project design phase which will need to be consolidated throughout the project.

This RAP provides a basis for project design that is both effective and appropriate to the expectations and context of both farming families and female and male beneficiaries. This is not an exhaustive research study, however it does provide a useful insight and overview into gendered perceptions toward climate adaptation and food security, and serves to indicate areas for focus, places to build on existing strengths, future visions, and spaces to bring community desires for the future forward.

Pilot communities have a unique opportunity to increase their food security through practical uptake of new approaches. They are able to begin to address climate vulnerabilities and wider ranging development issues associated with safeguarding their food sources. The upcoming project is not only timely but paramount to the future of healthy and safe communities; there is much work to be done and communities are ready and willing to adapt.

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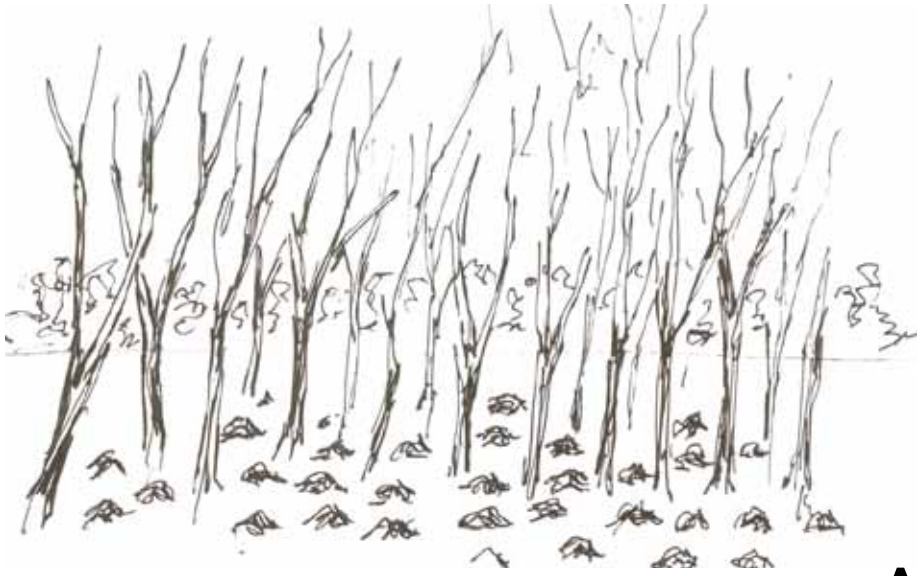

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Annex I: Community profiles

Information provided on the RAP communities below reflects the views of the RAP participants. This information has been collected and collated by Illeama Paul, Judy Kate Inapi and Diana Hinge.

Malaita Province RAP community Solomon Islands

Malaita Province is one of the largest and populated provinces of the Solomon Islands. The provincial capital and largest urban centre is Auki.

Lilisiana Community

Lilisiana is a coastal fringe community of more than 800 people. Land is scarce and the small amount of soil available is described as infertile. Rainfall is described as consistent and predominantly heavy and soaking. Lilisiana is located less than 1 km from the provincial capital of Auki. Income generating activities centre around selling fish and baked goods (cakes and buns). Garden crops are not common as only one in twenty houses has a sup sup garden.

Main items of expenditure from cash incomes include kerosene, outboard motor fuel, schools fees, store foods and garden crops from the Auki market. The village has a kindergarten, however access to education is average with most children not proceeding past primary school. Access to health services is described as poor due to financial constraints despite proximity to Auki and many of the villagers are exposed to malaria and have developed diabetes. The main energy source is from generators.

Main garden products sold at Auki market (when available) include potato, kassava and island cabbage, and more regularly seafood including, bonito, reef fish and shells. Nuts, watercress and swamp taro are also sold occasionally. There are no formal agricultural or marketing groups and fishing, gardening and marketing is done by individual families.

A young male depicts the marine resource depletion that has occurred in his village of Lilisiana, Vanuatu.

According to RAP participants the main challenges faced by the community include land shortage, male youth kwaso consumption, limited access to safe and consistent fresh water, a large population of children from teenage pregnancies and lack of access to secondary education. The strengths of the community are believed to include a public phone in the village, a good kindergarten, and strong panpipe group, mixed boys and girls soccer team and women's and church groups.

There are no current conservation initiatives or credit or savings schemes in the community.

The community has been involved in Disaster Management training and has a functioning Disaster Management Committee as part of the Pacific Community Focussed Integrated Disaster Risk Reduction Project. and National Disaster Management Office initiatives.

Lilisiana was formed out of a natural disaster. In 1952 a tidal wave struck parts of the Solomon Islands and left affected communities to question their future and how they were going to recover. As a result some people of the Langa Langa Lagoon, known by its small man-made coral islands, resettled on the mainland. Some people moved to Lilisiana and others to Ambu and areas around Auki.

Today there is extreme pressure on limited land and resources compounded by ongoing selling of coral and sand to people around Auki for land reclamation as well as the collection of sand, coral and mangroves for local building materials and firewood. These activities continue in an effort to raise cash necessary to meet basic needs. However these actions contribute to the further vulnerability of Lilisiana to sea level rise, coastal flooding and inundation.

Since the community is comprised of settlers there is no space for expansion as people do not own the surrounding land. In 1970, twenty years after people settled in Lilisiana, Cyclone Ida struck and people started experiencing sea level rise. In 1986 Cyclone Namu struck. By 2000 sea level rise and flooding became issues as the sea had eroded 100m of coastline. A road that runs along the coast as well as parts of the graveyard, are now under water and the whole village floods during peak high tide months in December and January.

Choiseul RAP communities The Solomon Islands

Choiseul Province is the most environmentally diverse location of the nine provinces of the Solomon Islands and lies between the island of Bougainville (part of Papua New Guinea) and Santa Isabel in the west of the Solomon Islands. Choiseul has a population of 20,008 and covers an area of 3,294km2. The highest point is 1,060m. The capital of Choiseul Province is Taro.

Sasamunga community

Sasamunga and its neighbouring communities of Panarui and Boe are all located in the south of Choiseul with a spread of 26 villages in the area and an estimated population of 7,300 people. These communities are situated with an approximate two hours sea travel by OBM from the Western provincial headquarters in Gizo. The main income generating activities for the communities include marketing of garden crops, livestock, sea foods and bush food.

Sasamunga is the largest of the three target RAP communities in Choiseul. There are 15 villages within the community with an approximate population of 4,000 people. Sasamunga is located in the coastal area, with lush green vegetation and rainfall occurring three times a week.

Sasamunga is where Kastom Gaden demonstration activities were first implemented including a demonstrated sup sup garden located near the hospital area. The project showed how to use kitchen wastes such as potato peelings, coconut scraps etc. to improve soil fertility. It also demonstrates a garden where mothers and families can access local food during emergencies.

Some of the main expenses for families in Sasamunga are cited as clothes, food from stores, school fee/ materials, and household materials. There is a primary and secondary school within the village and also good market access. The hospital at Sasamunga provides health access to other communities including Panarui and Boe. In terms of electricity, few have access to solar power and the hospital has a hospital generator.

In terms of cash livelihoods, some of the major income generating activities in the community are small businesses, marketing and timber milling. Garden products vary widely for subsistence and kumara, cassava, and banana are commonly sold at the market once a week, along with pig, chicken, fish, trocus, fern and wild pig. The closest market to Sasamunga is within walking distance (0.3km) and takes 10 minutes to reach. There are no existing formal agricultural or marketing groups, most agriculture and marketing is done by each individual family.

The community owns about 94% of the land, with 2% allocation to the Government and the other 4% privately owned. There is some land allocated for church centre and Telekom communications services.

Some of the strengths of the community as seen by RAP participants include the centre for Telekom facilities, the market and the presence of the main hospital for Central South Choiseul. There are also challenges faced within the community which are perceived to include a lack of community cooperation sometimes due to its large population and the need for strong leadership.

Panarui community

Panarui is the second largest RAP community in South Choiseul. It was also the host community for the Choiseul RAP. Panarui is located near the sea, with lush looking vegetation and a steady rainfall occurring three times a week. Panarui is the home to six villages with an approximate population of 2,400.

The only agricultural training provided was cited as being during 1970–1986, when agricultural field officers were very active. Since that time community members feel there has only been occasional forestry training on teak trees and nursery raising. Some of the major income generating activities in the community is copra, livestock (pig), remittance from relatives, timber products, marketing and small scale businesses (baking, dying etc). There are currently no saving schemes or financial credit projects implemented.

The community has no specific farming groups/ organized groups, though there are existing youth groups and women's groups. Agricultural activities are mainly done in family groups.

Some of the main expenditure items for families are store goods for consumption, school fees, clothing and household goods. Access to education and health services are described as average. There is a primary school within the community, however other services such as a clinic and a secondary school are located in Sasamunga, 10 km away. Access to energy is very poor.

Panarui community is mainly subsistence; however some products (garden, livestock, sea and forest) are sold monthly at Sasamunga market and other small market outlets. Markets are not frequented weekly, due to contributing factors such as a 10 km distance between Panarui and Sasamunga, which is one and a half hour walk. The closest small market is 1.5 km away and only accessible by foot, which is a ten minute walk.

Land is tribally/clan owned with 95% belonging to the community, 4% privately owned and 1% owned by the SIG.

Reportedly there is a strong collaboration between the community and its people. However there is a wish for better quality crops, due to poor harvests now compared to 20 years ago.

Boe community

Boe is the smallest community of the pilot communities, with a population of nine hundred (900) people. Boe is located at the coastal area with celebrated fertile soil and lush vegetation and a rainfall averaging three times a week. In terms of services provided, there is a primary school at the community, however other facilities such as a secondary school, hospital and market are accessible outside the community. The main items of expenditure are cited as clothes, store food, school fees, and building materials.

Major income generating activities in the community include small business, copra production and marketing. Agriculture crops include potato, cassava, and taro, mainly for subsistence use. Marine resources such as fish, trocus and shark fin are sometimes sold at the market along with pig, chicken and other

bush foods like fern, wild pig and birds. Due to the 1km distance and a 10-30 minute walk to the nearest market, it is only accessed once a week.

Currently 98% of the land is owned by the tribe, 1% is owned by the Government and another 1% privately owned. There is no agricultural training program in the community, most existing agriculture is done by families. The main strength of the community is believed to come from a strong collaboration amongst the people. One of the stated major challenges faced in the community is shortage of food supply and an inability to cater for communities' cash income needs.

Sanma Province RAP Communities, Vanuatu

Sanma Province is home to Espiritu Santo, Vanuatu's northern and largest island. Areas around the main centre of Luganville are developed for cattle grazing and copra plantations. Inland villages are more isolated.

Kole 1

Kole 1 and its neighbouring communities of Kole 2 and Manioc are all located on the eastern side of Espiritu Santo. Kole 1 is home to around 317 people and is located 25 km from the main provincial headquarters of Luganville. Income generating activities include: copra, marketing of small market supplies and timber milling for export.

Kole 1 has a flat topography with stressed dry soils and is located inland from the coast. The community cites that it does not experience heavy soaking rains.

Main items of expenditure from cash income include rice, education and fuel. There is a primary school within the village and market access to Luganville is considered good with a newly improved road, however transport to town costs 5,000 Vatu and a mamas program shares the cost fortnightly. The community has a nurse and access to energy is considered to be good with a mix of generators, solar power and kerosene used.

Main garden products sold at markets include island cabbage, with pana and taro commonly sold every fortnight, along with nanabae, breadfruit and oranges. There are no formal agricultural or marketing groups and most agriculture and marketing is done by each individual family.

The community has two main land owners.

According to RAP participants the main challenges faced by the community include access to water and community laziness. The closest fresh water source is 1 km away. The community is interested in a small scale water hydro scheme, has never received any outside assistance, and has no financial savings schemes.

Kole 2

Kole 2 is situation 1 km from the sea and is home to around 400 people. The soil type is described as rich and lush with high rainfall. A virgin forest conservation area exists close to the village. Kole 2 is located 55 km from the main provincial headquarters of Luganville, taking around one hour in a pickup truck. Income generating activities centre around copra.

Participants feel that access to education, markets and health facilities are all satisfactory. The main energy source is kerosene and use of hurricane lamps.

Main garden products sold weekly at markets include island kumala, manioc and bananas. Secondary to the main foods island cabbage, bananas, tomatoes, capsicum, sugar cane, peanuts, oranges and pawpaws are also sold. Bush foods such as naus, nakatambo and navels are sold occasionally. Common sea foods sold at market include shells, fish and prawns. Chickens and pigs are also sold occasionally. There are no formal agricultural or marketing groups and most agriculture and marketing is done by each individual family.

The community has two main land owners. According to RAP participants the main challenges faced by the community includes water shortages. There is a lending scheme in the community. According to the community they have received no agriculture, health or conservation related training.

Manioc

Manioc is a coastal community of more than 700 people. The soil type is described as rich however rainfall is sporadic. Manioc is located 40 km from the main provincial headquarters of Luganville. Income generating activities centre around copra.

Main items of expenditure from cash income include schools fees, health costs, benzene for generators, sugar, rice and clothing. Good access to education is provided with both a primary and secondary school

Participants in Vanuatu, describe the changes in fruit sizes and quality occurring at different harvesting times and possible causes for the changes.

in the community. Health services are described as average as the service of the health post is not good and the prevalence of malaria is high. Generators are the main source of energy.

Main garden products sold weekly at markets include island taro, bananas and island cabbage, and bush foods such as wild yam, watercress and red crabs. Cattle, chicken and pigs are also sold occasionally. There are no formal agricultural or marketing groups and most agriculture and marketing is done by each individual family.

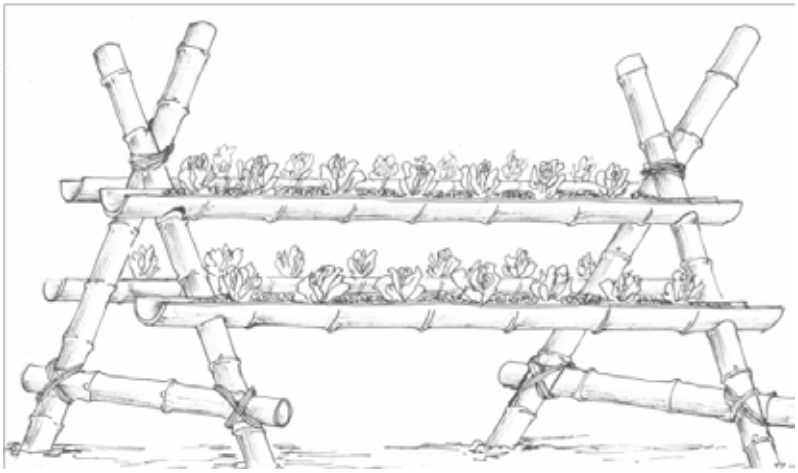
The community has two main land owners.

According to RAP participants the main challenges faced by the community includes a lack of coordination and poor dispute resolution. The strength of the community is believed to be a well organised church structure and very good education services.

There are no current conservation initiatives or credit or savings schemes in the community.

The community has received some TVET in 2009 spanning courses for men (with a poultry and cattle raising focus) and courses for women (with a screen printing and cooking focus).


Survivor
new projects
new plantation
population growth
logging
Green House Effect
overfishing
STRONG SUN
FOOD ISSUES
lack of space for planting crops
tornado cyclones
gardens destroyed
Heavy rain floods
Too many houses
pests/diseases



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Annex II: Community Food Security Plans

The community plans presented are recorded in a language as close as possible to how they were presented by communities during the RAP (via written and verbal presentations). Varying amounts of time were available for this activity in different RAP locations. Discussions were often more extensive than the plans presented below. Key discussions have been included in the relevant places of the main Findings section of this report. Participants were briefed that these were draft and mock plans, to help with the design, and as such their expectations were not to undertake these exact plans but rather to use them as a basis for discussion.

Sanma province food security plans

Community	Initiative/change sought	Current challenges/ barriers to undertaking initiatives	Enablers of change
Kole 1 and Manioc Village	Find varieties or ways to look after peanut, manioc, taro, kumala and yam that is resilient to climate changes	Over marketing Pests (rats and wild pigs)	Need to know more about 'financing', managing pest populations and put effort into making two gardens, one for home consumption and one for marketing
Kole 2	Less marketing	Less money for store bought foods	Enhanced knowledge on how to manage money
	Manage fishing	Current lack of respect for catching fish sustainably	Increased knowledge of fisheries management
	Reduce cutting down of fruit trees	Trees are cut down to use as building materials	Long-term thinking and planning for future generations
	Stop throwing tin, plastic, iron, and fuel into the sea and review the killing of animals such as turtles	Disrespect Lack of waste disposal systems and rubbish bins	Educate people about the right way to dispose of rubbish that is not harmful to the environment

Participants in Choiseul gather following their garden walk where they shared stories on issues affecting food security and discussed changes in agricultural practice to adapt to the changing conditions.

Choiseul Province Food Security Plans

Community	Initiative/ change sought	Current challenges/ barriers to undertaking initiatives	Enablers of change
Sasamunga	Taro and corn plant collection	Lack of land availability Lack of corn and taro Tools No funds available Lack of leadership	Negotiations with land owners Network with farmers, NGOs, Agricultural Officers Local member of Parliament should encourage dialogue between locals and NGOs Need agriculture leadership training
Boe	Establish taro bank for youth	Lack of management No assistance Shortage of land Shortage of taro stock	Need NGO, provincial government, Agricultural Extension Officers and community to work together Chief and leaders to support and assist youth Seek assistance and links to nearby communities to provide planting stock Youth need local knowledge from elders because the knowledge has been lost
Panarui	Yam bank	Lack of planting materials Lack of land Lack of know how Lack of funds Lack of cooperation	Seek assistance from others and exchange ideas Consult land owner to provide fertile land Training and awareness from KGA, Live & Learn and others Establish committee working groups to support actions
	Food security workshops	-	Involving NGOs, Government and community

Malaita Province Food Security Plan

Community	Initiative/change sought	Current challenges/barriers to undertaking initiatives	Enablers of change
Lilisiana	Plant more sup sup gardens	Soil is poor Lack knowledge on how to grow a sup sup garden on the sand No seeds, tools, water	Technical training, awareness of new techniques and government and NGO support Negotiate with landowners in Auki for some land to plant our gardens, as we have no space left in the community
	Mangrove replanting	Mangroves have been destroyed	Community support and respect toward replanting
	Conserve the sea and learn new fishing methods that do not harm	Sea pollution Dynamite fishing Mangroves (fish breeding grounds) are destroyed Reef stones have been removed for building a sea wall People have removed coral	Introduce conservation laws Fisheries to provide awareness and training

Participants in Malaita.

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This Research of Aspirations and Perceptions (RAP) study presents the views of seven communities in the Solomon Islands and Vanuatu on their capacity to safeguard local food resources in a changing climate.

The research will contribute to the design and development of Live & Learn's forthcoming Climate Change Adaptation for Food Security pilot project.

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