People on the edge

A report of the 2005 Kastom Gaden Association assessment of the food security, livelihoods potential and energy resources of the Guadalcanal Weather Coast, Solomon Islands.

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A report on the assessment of food security, agricultural pests and diseases, small scale food processing and village energy options along the Guadalcanal Weather Coast, Solomon Islands, April 2005.

The assessment was made as part of the AusAID-funded Sustainable Livelihoods for Isolated Rural Areas Project.

A production of Kastom Gaden Association, Honiara, Solomon Islands

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Participating organisations

These organisations participated in the assessment of the Guadalcanal Weather Coast, either directly through their personnel or in a support role.

Kastom Gaden Association (KGA)

KGA is a Solomon Islands-based development assistance agency specialising in training for food security, livelihoods and community development. Practicing since 1995, KGA is associated with the Solomon Islands ***Planting Material Network*** *(PMN) which works with local farmers to produce, process and distribute agriculturally-useful seed and vegetative planting material. KGA is a member of the regional organisation, the Melanesian Farmer First Network.*

KGA & PMN: www.terracircle.org.au

TerraCircle development assistance consultants

A number of the participants who took part in gathering and assessing information for this report are associated with the South Pacific development assistance consultancy, TerraCircle, which works with local NGOs and agencies, governments and intergovernmental organisations in the region.

www.terracircle.org.au

Secretariat for the Pacific Community (SPC)

SPC is an intergovernmental body based in Fiji and made up of representatives of South Pacific island states. The Secretariat assists development within the region. SPC contributed a plant genetic resource specialist to the team.

Australian Agency for International Development(AudAID)

Part of the Department of Foreign Affairs, AusAID administers the Australian government's aid budget and provides financial support to aid and development projects and programmes in the region. AusAID funded the assessment.

Abbreviations

APHEDA	Australian People for Health, Education and Development Abroad
AusAID	Australian Agency for International Development
CBTC	Community based training centre
CEMA	Commodity Export Marketing Agency
CIAT	International Center for Tropical Agriculture
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CPRF	Community Peace and Restoration Fund
CSP	Community Support Program
DME	Direct Micro Extraction
EU	European Union
HF	High frequency
K	Indigenous knowledge
KGA	Kastom Gaden Association
KPSI	Kokonut Pacific Solomon Islands
NARI	National Agricultural Research Institute
NGO	Non-government organisation
NTBG	National Tropical Botanical Gardens
PAPGREN	Pacific Plant Genetic Resources Network
ParaVET	Regional PARAVET Training Programme
PEDC	Paruparu Educational Development Centre
PFnet	People First Network
PICs	Pacific Island countries
PGR	Plant Genetic Resources
PMN	Planting Material Network
PNG	Papua New Guinea
PRAP	Pacific Regional Agricultural Programme
DPI&F	Department of Primary Industries and Fisheries Queensland
RAMSI	Regional Assistance Mission Solomon Islands
RGC	Regional Germplasm Centre
RSIP	Royal Solomon Islands Police
RTC	Rural Training Centre
SBD	Solomon Islands dollar
SDA	Seventh Day Adventist
SSEC	South Seas Evangelical Church
SIARTC	Solomon Islands Association of Rural Training Centres
SPC	Secretariat of the Pacific Community
TB	Tuberculosis
TCBTC	Turusuala Community-Based Training Centre
VHF	Very High Frequency — a reference to a type of radio communication

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People on the edge

Executive summary

The Guadalcanal Weather Coast faces severe difficulties that have a direct influence on the future development of the region.

A mountainous, rugged terrain, an almost complete lack of roads and land transport, irregular shipping services, the expense of open-sea motor canoe transport, lack of coral reefs and safe anchorages and the closure of the Coast's two airstrips has produced an isolation that inhibits personal movement and the transort of agriculturland craft goods to markets.

Adding to the burden has been the recent communal conflict known as the 'ethnic tensions'. The Weather Coast was home to militias active in the conflict and their presence displaced village populations into the hinterland, reduced food production and the availability of agricultural resources necessary to recovery.

Economic and social development, the restoration of food security and access to markets for processed and fresh agricultural products are necessities if the Coast is to recover and avoid future political instability.

Why an assessment?

This assessment of the Weather Coast of Guadalcanal was made as part of the AusAID-funded Sustainable Livelihoods for Isolated Rural Areas Project (hereafter referred to as 'Isolated Areas') that is being implemented by Kastom Gaden Association.

The four-year project aims to improve food crop production and agricultural income-generating opportunities for residents of the remote coastal areas and hinterlands of Guadalcanal, Makira and Malaita.

The project began in May 2004 with a six-month, pre-project phase that tested potential food processing opportunities at Turusuala Community-Based Training Centre, AvuAvu, on the Weather Coast. This report complements these studies and looks at a wider range of livelihood options along the entire Weather Coast.

The team that was to carry out the assessment assembled on 10 April 2005 in Honiara and travelled by canoe to Marasa on the western side of Guadalcanal. For the next 13 days the team walked the Weather Coast, staying in seven villages (Duidui, Raeavu, Madakacho, Avuavu, Bokasughu, Belanimanu and Kopiu), for one to three nights each.

The Kastom Gaden Association (KGA - www.terracircle.org.au), a Honiara-bsaed organisation specialising in food security and livelihoods lead the team, which included lead farmers (from Guadalcanal and Malaita), the principal of TCBTC and experts in food crops, plant pests, small-scale food processing, and rural energy.

Our approach

Meetings were held in each village to collect information on people's livelihoods and their concerns.

Separate groups of men and women drew seasonal calendars, timelines and community maps and made lists of plant genetic resources, income and expenditure and detailed the types and uses of household energy.

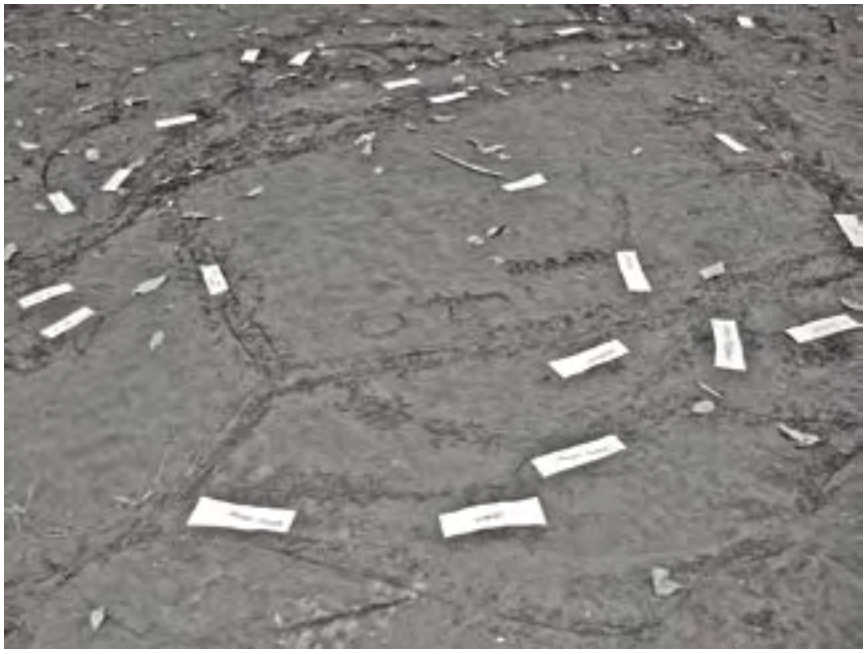
In addition, individual interviews were held, stories collected and case studies made.

At the end of the assessment the team assessed the assets and vulnerabilities of people living on the Weather Coast and made recommendations for food crop diversification, management of existing crops and livestock, income generation, and ways of strengthening the enabling environment.

In carrying out the assessment, the team took note of the draft AusAID Solomon Islands Rural Livelihoods and Broad Based Growth Strategy of December 2004, its technical annexes on markets and marketing, cost-benefit analysis of the component recommendations and the reports on Solomon Islands' provinces. Six of the Strategy's 14 recommendations relate to the Weather Coast including those on food security, copra and cocoa production and village-based processing for domestic markets.

Collecting information with PRA

PRA (Participatory Rural Appraisal) involves communities in producing information about their situation. (Above) A map of the village and surrounds made in the soil and lebeled. (Below) Producing a farming calendar.



The Weather Coast — an overview

A characteristic of the Weather Coast is the extreme rainfall, with two 'wet' periods from January to March/April (Koburu west winds) and from May to August/September (Ara'a, Southeast Trade Winds).

Agriculturally, less than optimal

A double wet season results in rainfalls of 5000 to 8000mm per annum with up to 13,400mm in the hinterland (recorded at Koleula in 1972 [op. cit. Tedder & Tedder 1974]), making the Weather Coast among the wettest places in the world.

Gardens are on unstable hillsides or the flats of river deltas., They are planted to taro and yams — traditionally — banana, sweet potato, cassava and diverse leafy greens.

Soil fertility is maintained through fallows of three to four years and, for some crops, retention of organic matter.

Bush foods (yams, mango, nuts) and trees planted in and around villages (orange, papaya, breadfruit, cut nuts, etc) provide important supplements.

Pigs and chickens are kept for extra protein and are sold for cash. There is fish when turbulent waves and a lack of fringing reefs allow canoes to put to sea and when migrating bonito are in season.

May to July, sometimes longer, is an annual 'time hungry'.

Taro and yam are no longer grown in most villages due to pests and diseases and sweet potato fails to tuberise in waterlogged soils.

Pigs, too, have died in many villages, possibly due to swine influenza and secondary complications.

When farmers want help there is no one to turn to. — there are no government personnel, or none that are equipped to provide the kind of advice needed. When problems occur people suffer the consequences. Cassava, sweet potato, taro and yam have major pests and diseases, but they go unreported. When crops fail, the burden falls to women as they, more than men, provide food for the family.

Isolation, heavy rain, rough seas and strong winds combine to make the Weather Coast a least developed part of the country. Transport is problematical; there is a lack of roads and reliable shipping services. There is no electricity and poor communications, which contribute to the isolation experienced by the Weather Copast population. Education and health services are insufficient — there is a shortage of trained staff and resources. Health concerns are malaria, TB and pneumonia, the latter more prevalent in the bush where even wetter conditions prevail. I

Additional to these limitations, five years of ethnic tension (as the communal conflict is known) has taken a toll. At the peak of the tension, entire communities sort refuge in the bush for periods of between six months and two years to avoid local militias and government forces. They survived on the remnants of bush gardens and on wild forest foods. Peace has returned, but fear continues to exist among communities that took opposing sides.

The assessment team crosses one of many rivers on the Weather Coast

Regions of the Weather Coast: their assets and vulnerabilities

An analysis of people's livelihoods on the Weather Coast shows that, in general, they are little different from those in other parts of Solomon Islands. The same crops are grown, the same livestock kept. They fish, make handicrafts, use forest products and make sales in local markets and, occasionally, in Honiara. Their assets (physical, human, natural, social and financial) are also similar.

But the Weather Coast is not uniform. Assets and vulnerabilities differ from one end to the other.

Seven sub-regions of the Weather Coast are recognised:

Tina River delta – from Marasa to the Tina River

This is a productive agriculture area in an extensive flood plain. There is marketing of cocoa, coconut and betel nuts in Honiara, local markets, schools, clinics and the area is near the airfield at Mbabanakira.

Vulnerabilities include flooding, problems with pigs, high dependence on a single staple food (sweet potato) and a lack of market information**.**

Keke coast – from Komate to west of the Kuma River

An area of steep mountains falling to the sea, small coconut plantations and few cash opportunities except for some remittances from Aruligo settlement.

The area is vulnerable because of poor yields from sweet potato, a lack of greens in the diet, taro and yam pests, landslides, earthquakes, little cash, unresolved ethnic tensions, and a lack of transport.

Putting to sea in a motor canoe

Kuma River – from Kuma River to west of Avuavu: s

There is some flat land with alluvial soils and small cocoa and coconut plantations, a little solar power and yam varieties that have been retained.

Vulnerabilities include susceptibiity to river flooding, extreme isolation (the area is in the centre of the Weather Coast), irregular shipping, taro, yam and cassava pests and diseases and unresolved ethnic tensions.

Avuavu area

Avuavu has more services — there is a large mission, school and clinic— stores, an rural training centre (RTC), email, connection via the high frequency radio network, a lake providing substantial resources for both food security and livelihoods and an old road that is still in reasonable condition in places. There is an airfield (Avuauv).

The area is vulnerable because of isolation — there are no regular shipping services and outboard engine/canoe trips to Honiara are expensive.

Moro coast – from east of Avuavu lake to Sukiki

Similar to the Kuma Coast, but better off with plantations, markets and handicrafts.

The Moro coast is vulnerable because of lack of land for expansion, poor water supplies, low income, unreliable shipping and pig diseases.

Tractor coast – from Sukiki to west of Marau

Similar to the Tina River delta, with relatively better climate and better transport links to Honiara — people walk to Marau to access regular shipping. There is a tractor and local cocoa and copra buyers.

Vulnerability is to pigs problems, pests and diseases of food crops and a high level of emmigration.

The bush villages

These occupy the coastal hinterland, often the steeper terrain. The villages are vulnerable to a very demanding environment, to diseases of taro and pigs and to unresolved ethnic tensions.

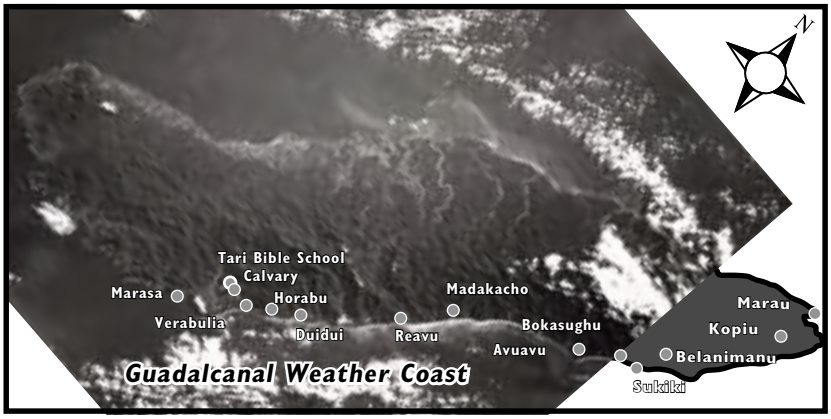


Fig. 1
Weather Coast Villages Visited
Image courtesy of the Image Science & Analysis Laboratory, NASA Johnson Space Center (www.eol.jsc.nasa.gov)

Recommendations For Isolated Areas Project

Strategy 1: Diversification of food production

Along the Weather Coast, land use is intensifying because of escalating populations. Fallow periods are declining, soil fertility decreasing and pests and diseases are increasing. Taro and yams diversity has been reduced considerably since surveys were made 25 years ago and sweet potato and cassava are not adequate substitutes. The situation is serious and needs immediate action.

For each of the staple food crops, the Isolated Areas project has made detailed recommendations involving the introduction of improved varieties from other Pacific Island countries (yams and sweet potato) or from the international agricultural research centres (cassava) via the SPC Regional Germplasm Centre (SPC RGC).

For some crops, such as sweet potato, the favourite Weather Coast varieties collected during the assessment will be reintroduced after they have been freed from viruses at the SPC RGC. For taro and yam — the crops that have been lost due to pests and diseases — collections will be made where varieties still exist on the Weather Coast and elsewhere in Solomon Islands. Recollecting will be done with farmers from the villages that want to replace lost varieties.

Apart from these collections, the introductions will be established at TCBTC initially and then at Taro Bible School and Belanimanu Training Centre.

Strategy 2: Management of livestock, planning for food production and improvements to existing crops

There are three parts to this strategy, involving livestock, family food planning and the control of pests and diseases.

There is need for training in improved pig management. Pigs are not fed properly or penned adequately and this is leading to social problems as well as diseases, eg. teh disease 'cough-cough'. Local pigs will be crossed with introductions that have done well elsewhere in Solomon Islands and an attempt will be made to reduce the wild pig population.

Traditional bush gardening remains important to the nutrition of Weather Coast people, producing crops of tubers, vegetables and fruit.

Improving the stability and fertility of soils, reducing crop loss to plant pests and diseases and to wild pigs are important to increasing the productivity of the bush gardens and to meeting the matierial needs of a growing population.

For chickens, the Isolated Areas project will link to the ACIAR poultry feed research and build capacity through villages workshops in poultry management and the ParaVET training offered by SPC.

Many families have difficulty during the 'time hungry' and need to plan for this contingency. Village workshops are needed on a number of issues: understanding what crops to plant at different times of the year, cultivation techniques, soil fertility, size of plantings to meet family needs, rotations and other issues.

Trials will be done at TCBTC to understand the effect of weather on sweet potato varieties to produce a greater understanding of the problem. Advice will be sought from Queensland DPI&F (Department of Primary Industry and Fisheries).

Control of the pests and diseases of food crops are crucial to the success of the Isolated Areas project. In this regard, the project will align its activities with those of the ACIAR project: *Improved Plant Protection for Solomon Islands* to start in October 2005. The focus will be on chuaka of taro (a lethal virus), pange of yam (*Pratylenchus* nematode), biological control of white peach scale of cassava and management of fungal root rots of orange.

Strategy 3: Income generation

The report takes the view that transport on the Weather Coast is not likely to improve in the near future and development of light, high value products from existing or new crops is the most appropriate strategy to generate income.

Ideas include the production of virgin oil from coconuts, cocoa for chocolate and a drink (similar to 'cocoa Samoa'), market information for betel nut, linking with the AusAID project and coffee, if still grown in the highlands.

There is also potential to market fresh produce in Honiara (melons, pineapples, citrus, root crops, etc) — linking areas of the Weather Coast where transport arrangements allow, ie. the Tina River and Tractor Coast — to the KGA Farmer Fresh project.

The development of local farmer networks to pool resources for more efficient marketing may help to resolve present problems.

Work will continue on product development of indigenous nuts (*Canarium* and *Barringtonia*), including methods of drying and suitable packaging to extend shelf life.

Similarly, the work already initiated on chips, jams and chutneys will be taken to the next stage. Fruit tree nurseries will be established, packaging options investigated, market linkages developed and gross-margin analyses carried out.

Two new crops will be trialed: cardamom and pepper. Cardamom has been grown previously and did well in experimental plots; the need now is to establish nurseries and encourage farmers to plant the crop. Links will be established with Bougainville (PEDC) for assistance in agronomy and processing.

For pepper, planting material will be introduced from Papua New Guinea and Vanuatu via the SPC RGC and evaluated with farmers and the Honiara Bulk Store, which is willing to seek overseas markets.

Strategy 4 — Strengthen the enabling environment

The project will develop links with Guadalcanal Province and the Department of Agriculture and Livestock. In particular, it will support the operations of the TCBTC, its partner organisation for project implementation on the Weather Coast. Staff will be financed by the project, trained and helped to develop a business plan and students from the Centre will provide links to the community.

Women are an important target group for many of the Isolated Areas' activities. The project recognises that women already have heavy workloads and it will ensure that it does not increase their burdens.

People on the edge

Part 1 – Introduction

This report is the result of a rapid assessment of food security and rural livelihoods on the south coast of Guadalcanal, known as the Weather Coast.

The assessment was made as part of the AusAID-funded *Sustainable Livelihoods for Isolated Rural Areas Project* (Isolated Areas project) by Kastom Gaden Association, together with experts from other organisations.

Preamble

THE assessment provided an opportunity to comprehend problems faced by village communities over the entire coast in the context of recent social and political problems.

It allowed KGA to consider interventions through the Isolated Areas project as well as those that were outside the reach of the project.

The assessment was timely for two reasons:

- first, reports in 2004 suggested that the effects of the ethnic tension were continuing and were leading to widespread food shortages
- second, the visit was made shortly after the release of a livelihood analysis for Solomon Islands by AusAID (*Solomon Islands Rural Livelihoods and Broad Based Growth Strategy.* Australian Agency for International Development [AusAID] Canberra, Australia. December 2004. Draft: 57 pp.), in which the Weather Coast of Guadalcanal was mentioned as an area of special need.

Methods

A team of eight (Attachment 1) spent a total of 13 days on the Weather Coast. The team walked approximately 140 km from Marasa village in the west to Marau in the east.

The following villages — chosen by Celestine Aloatu, Principal, Turusuala Community Based Training Centre and Isolated Areas project coordinator for the Weather Coast — as being representative of the wards and typical of the different parts of the Weather Coast were visited: Marasa; Mbabanakira;

The Guadalcanal Weather Coast village of Horabau

Calvary; Duidui; Raeavu; Ngalarurua; Madakacho; Avuavu/Boliu; Bokasughu; Karivalu; Sukiki; Belanimanu and Kopiu.

The wards visited were: Wanderer Bay, Duidui, Vatukulau, Talise, Avuavu, Moli, Tetekanji and Birao, a combined population numbering around 20,000.

In each village, participatory rural appraisal exercises were carried out. These included:

- seasonal calendars
- timelines/ routines of men and women
- community mapping
- assessments of energy use
- focus group discussions on times of hunger and livelihood issues
- transect walks.

Detailed information on food crops and plant genetic resources was collected. The present number of crops was obtained from group discussions with women in seven villages, who listed the crops in order of importance, ranked the varieties — including those no longer grown — and identified whether they still grew them or not. Generally, group discussions included either men or women.

Varieties of sweet potato were collected, together with information on preference, number of tubers, size, taste, time to maturity,and productivity.

Transect walks were made to assess gardens and village hinterlands. Information collected was used to produce garden diagrams. Garden questionnaires were completed using the format of the *Mapping Agricultural Systems in Papua New Guinea Project* (Attachment 2). Case studies and interviews were recorded. Discussions were conducted in a mix of Pidgin and local languages, with translation into English where needed.

After completing interviews and discussions in each village, team members summarised the situation under a series of common headings, concluding with a list of key issues and recommendations for assistance.

At the end of the assessment the team spent three days analysing the data. Seven zones were recognised and the assets and vulnerabilities (divided into physical, human, natural, social and financial) of each were identified.

The steepness of Weather Coast terrain and of the bush gardens that are cultivated is demonstrated in this view from a bush garden to the beach in which sweet potato (foreground) and taro (behind) grow.

From these, strategies for the AusAID Isolated Areas project were developed by concentrating on four key areas:

1. diversification of food production
2. management of livestock and existing crops
3. income generation strategies
4. strengthening the enabling environment.

Limitations

The scope of the study encompasses food crop production and agriculture-related, income-generating opportunities. Other livelihoods, such as fishing, timber milling, trade stores, etc, were noted but not explored to depth.

Transport is, arguably, the major need of the Weather Coast. None of the team had expertise in this matter although it was obvious to all that the isolation of the area was due to a lack of infrastructure, roads, shipping services etc and that, without major improvements, the Weather Coast would not progress and prosper.

Population growth is another area that was of concern to the team because of its obvious impact on people's agriculture enterprises. Reference is made to this in the report but no recommendations are made.

The team did not visit bush communities in the mountains and the upper reaches of the river valleys. Some data was collected on communities along river deltas and there was a meeting with people from the bush inland from the Belanimanu Training Centre. Assumptions have been made concerning the bush communities and their needs, but further visits are needed to verify these.

Only limited discussions were held with youth. The team drew upon the experiences of TCBTC in identifying particular youth issues of relevance to food security and livelihoods generally.

Grasses overgrow an airstrip. There have been no operational airstrips on the Weather Coast since the ethnic tensions. Strips are fast falling into disrepair. Bringing them back into service would improve the region's limited transport options.

Part II – The findings

The Weather Coast is unique in all of Solomon Islands. Other regions have high rainfall but not as high; other regions are remote but are not without roads or regular shipping; they are isolated but not locked in by steep mountains and shores that dip precipitously to meet huge seas that make anchorage dangerous or impossible.

This is a perilous place to live: tsunamis, earthquakes and flash floods have taken their toll within living memory. So has the conflict around the recent ethnic tension.

This is the Weather Coast, and the weather costs the people dearly.

The situation — a short summary

Climate, topography, soils

ON THE WEATHER COAST, topography and climate interact to produce extreme rainfall.

In the middle of the year, the Ara'a, the southeast trade winds, bring moisture-laden cloud that rises over the northern plains and high mountains of the interior (Popomanasiu c2,440 m) and releases their moisture on the Weather Coast (Fig. 2).

Starting in November, a change brings the Koburu or west wind. First, there is a brief interlude of sun, but from January to April depressions, frequently associated with cyclones and heavy rain, destructive winds, high seas and flash floods, are common.

This double wet season results in rainfalls of 5000 - 8000mm a year with up to 13,400 mm in the hinterland (Recorded at Koleula in 1972. [op. cit. Tedder & Tedder, 1974]). This makes the Weather Coast among the wettest places in the world.

According to Hansall and Wall (1979), there are five main soil types on the Weather Coast. The most widespread are moderately shallow to deep, yellowish to red loams and clays, with low base saturation, found on the steep hills. These are relatively infertile. The river deltas and coastal strips have more-fertile alluvial soils.

Sources of food

Gardens are made on steep hillsides or on narrow flats along wide, meandering rivers.

Neither terrain is secure: hillsides are prone to landslides and rivers often change their course, erode their banks and flood.

Crops – a changing menu

Traditionally, the main carbohydrate crops have been taro and yam, but in many places population pressures and plant pathogens have forced their replacement by sweet potato, cassava and banana.

Vegetable crops are plentiful and diverse, with many indigenous and introduced species and ferns. Bush foods are an important dietary supplement, as are fruits from trees grown in villages. These include: papaya (pawpaw), orange, breadfruit, *Barringtonia* or cut nut and more. Forest foods include *Canarium*

Fig. 2
Seasonal weather patterns affecting the Weather Coast

Image courtesy of the Image Science & Analysis Laboratory, NASA Johnson Space Center (www.eol.jsc.nasa.gov)

(a nut), wild mango and the wild yams, *Dioscorea nummularia* and *Dioscorea bulbifera*.

Protein sources include:

- pigs, both fenced and free-ranging, tame and wild; pigs are absent in some places due to disease and from the depletion of breeding stock during the ethnic tension
- chickens
- fish; fishing is impossible for the many months of the year when seas are high.

Scarcities exist and store foods are unimportant but people have little cash, except where villages are located near markets, such as Madakacho and Avuavu, or where cash crops like coconuts and cocoa are grown — eg. the Tina River area.

Other crops

Narcotics are:

- betel nut (grown everywhere), an important cash crop in places with access to the Honiara market
- tobacco (eg. Bokasughu), which is sold locally.

Maintaining soil fertility

Soil fertility is maintained with three to nine year — three to four years being common — restorative fallows of grasses, trees, and, occasionally, *Pueraria* ground covers as found in the Tina River basin.

In the river deltas, silt from periodic flooding augments fertility from vegetative sources. There exist traditional mulching practices, such as used with yam and sweet potato, that retain organic matter. This is, perhaps, a response to the difficulty of burning vegetation as traditionally is done in the swidden or slash and burn method of agriculture.

Today, there are signs that traditional agricultural systems are under stress, with shortening rotations and families going further into the bush in search of more fertile land to cultivate.

Time hungry

May to July or, in some years, April to September, is the 'time hungry' which brings a sense of insecurity (Fig. 3):

- people lose the yams, which have been harvested and stored, and which previously carried them through this period
- taro was also once important but in many places has been lost to disease; although the crop is seasonal on the Weather Coast — with most harvests at the end of the year — short-seasoned varieties (kake bake) mature mid-year and complemented the role of yam in the diet.

Unfortunately, sweet potato provides no useful alternative during time hungry. It either fails to form tubers in waterlogged soils or the tubers rot.

Of the remaining crops with potential to fill the void, banana is present and so is kongkong taro and breadfruit. Plantings, however, are limited. Another alternative — cassava — is grown along the Weather Coast but suffers from debilitating attacks of scale insect, affecting yield and taste.

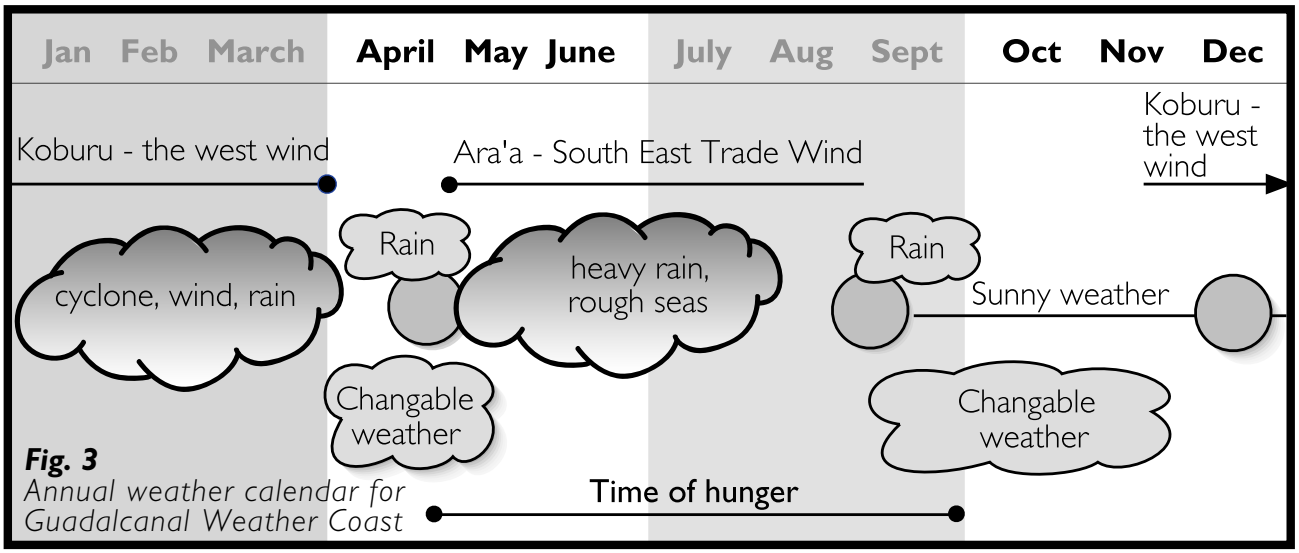


Fig. 3
Annual weather calendar for Guadalcanal Weather Coast

Services on a neglected coast

In comparison with other parts of the Solomon Islands, development has been slow to reach the Weather Coast.

It is likely that this has contributed to feelings of dissatisfaction and influenced involvement in social movements and the recent ethnic tensions.

Despite a lack of development, the Weather Coast has potential to contribute to the economy of the country: it has marketable products such as betel nut, livestock — pigs and chickens — nuts and fruits, vegetables and handicrafts. What is lacking is a reliable way to market them.

Transport is the key issue on the Weather Coast. There are no roads — the Kuma to Marau road is overgrown but is used by a tractor in parts — and now all the airstrips have been closed.

The unreliability of shipping

The Coast is a very difficult place for ships and, consequently, schedules are erratic at best. The coast faces the open sea. There are only a few offshore reefs and they do little to protect the shoreline and provide safe anchorage.

Some villages have one or two privately owned canoes with outboard motors. These make occasional, albeit expensive trips to Honiara. Fuel for the journey can cost SBD$1500 for a passage from Avuavu.

The journey by canoe is a difficult ride at the best of times. Departure and arrival is dangerous in tumultuous seas and can only be done safely if people come out from the villages and help. Otherwise, cargo and passengers may be soaked or thrown into the sea.

Other communication

The main method of transportation is by foot, so it comes as no surprise that there are well-worn footpaths along the Weather Coast, except for a section at Noro. Foot tracks link the Weather Coast to Honiara in a journey that takes from one to three energetic days, depending on fitness.

The only means of telecommunication is by high-frequency (HF) radio. There is a PFNet (People First Network) email station at Avuavu which transmits via the HF radio network but which can carry only small files. Several HF and VHF radios remain in use in villages along the coast but many were destroyed during the ethnic tension. The HF radios permit limited communications with Honiara.

Education and health care — available and limited

There are primary schools, community high schools and one provincial secondary school along the Weather Coast. Many have been repaired by the post-tension AusAID Community Peace Restoration Fund.

Three community-based training centres — Tari Bible School, Turusuala Community-Based Training Centre and a recently-reopened Belanimanu Training Centre — provide literacy classes for coastal and bush communities.

Government and mission clinics exist in a few villages but distances are too great between them, especially for women. There is no hospital along the entire coast (the one at Marau was destroyed), and visits by doctors are irregular.

Medical evacuation is by canoe with outboard motor, but considering the nature of the seas it is a perilous journey for a person in a critical medical condition and is seldom attempted.

The major health concerns are malaria, tuberculosis and pneumonia; the latter being more serious in the bush.

Infant malnutrition is at 25 per cent, which is about the national average. Diabetes is reported to be very low, perhaps, due to low consumption of processed foods .

Overall, these constraints on development are frustrating for the people living along the coast.

Ethnic tension brings lasting fear and food shortage

Today, the Weather Coast is emerging from five years of civil unrest that brought unprecedented turmoil.

Local militias held the people captive through fear, intimidation, extortion and threats of supernatural power, but in late-2000 they started to fight with each other.

Areas under the control of Harold Keke fared worse than those controlled by Andrew Te'e. Keke became more fanatical. His reign of terror only ended when he surrendered to RAMSI in late 2003 (the Regional Assistance Mission to Solomon Islands which arrived in-country on 24 July 2003).

To stay in the coastal villages meant coping with the militia's demands for compensation, with loss of pigs and household goods, beatings, summary executions and rape.

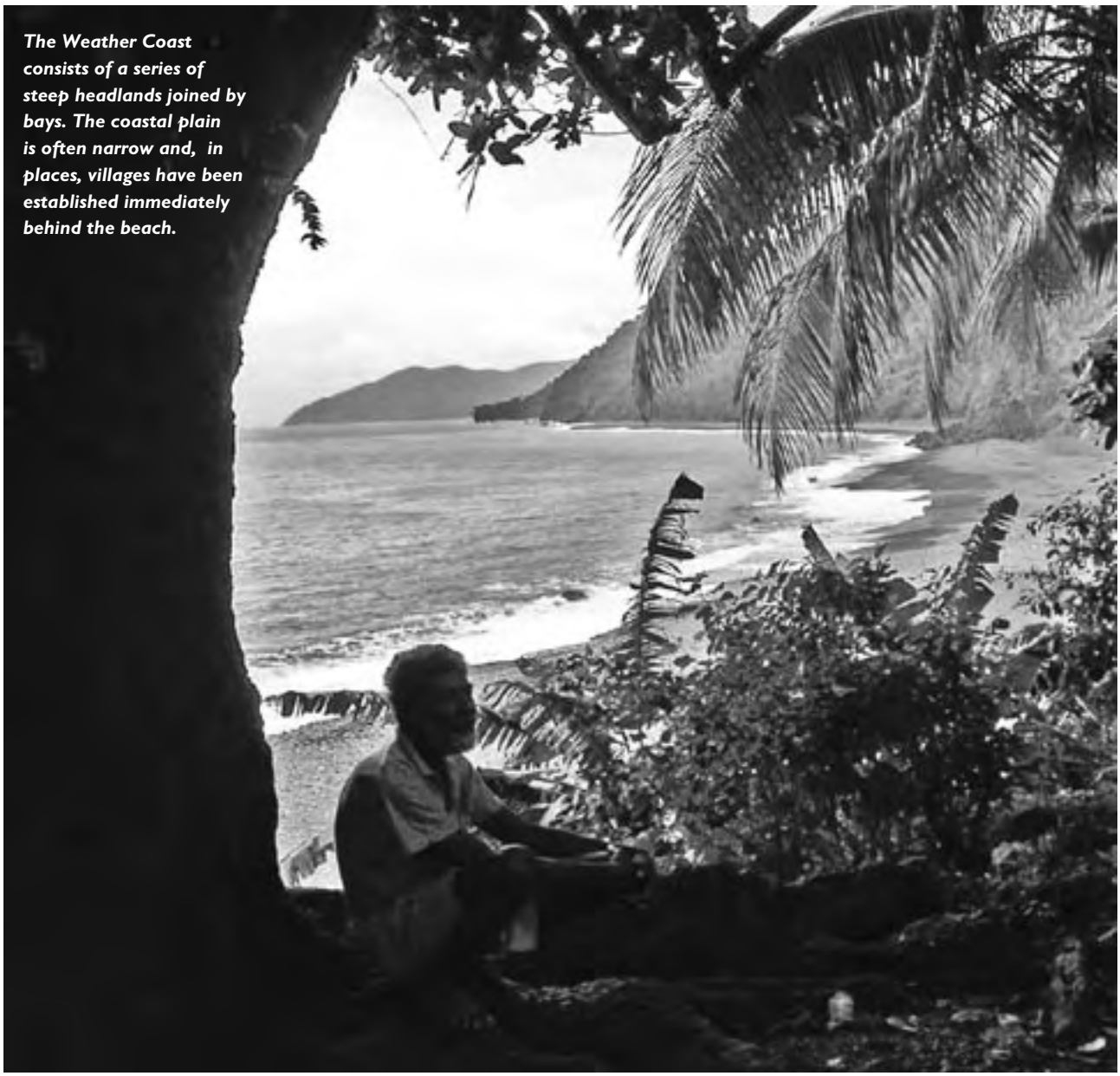
Entire communities fled in fear of the militias, the government forces and the constant extortion and harassment by armed. young men. Most went to the mountains for periods between six months and two years. There, they lived in temporary housing and on food gleaned from old bush gardens or from the forests, and struggled to support themselves.

There remains a great deal of fear on the Weather Coast, even though law-and-order is no longer an issue now that there are RAMSI/ RSIP (Royal Solomon Islands Police) posts at Avuavu, Mbabanakira and Isuna.

Some dread the return of Harold Keke or live in fear of the small group of his supporters still at large.

Reconciliation between villages has started but people are wary of visiting places that were on the 'other side'. Until people are reconciled, life for many will not return to normal.

The so-called ethnic tensions impacted food security and livelihoods, with the loss of crops and crop varieties, the loss of pigs and the depletion of forest food being the most obvious.



The Weather Coast consists of a series of steep headlands joined by bays. The coastal plain is often narrow and, in places, villages have been established immediately behind the beach.

Current livelihood strategies

In order to develop recommendations for improved livelihoods and food security on the Weather Coast, the data obtained from village visits (Attachment 3) were examined in detail.

The results are tabulated below in terms of people's subsistence activities, cash earning opportunities, their assets and vulnerabilities in maintaining their present livelihoods.

Subsistence and cash

Table 1, following, lists the most important livelihood activities undertaken by most households.

Table 1: *Livelihood activities on the Weather Coast*

MAJOR		MINOR	
Subsistence	**Cash**	**Subsistence**	**Cash**
Grow starchy crops in rotations/manage bush fallows	Occasional sales in local markets		Charge batteries using solar power
Grow vegetables/leafy greens in home gardens and bush gardens			Hire canoes & outboard motors
Grow fruits/nuts in home gardens and bush		Cutting timber for household use	Hire chainsaw &/or sell timber locally/Honiara
Collect yams/fruits vegetables/ nuts/ mushrooms from bush			Work in Honiara or other provinces
Process foods, eg puddings, taumana		Grow tobacco	Occasional sales locally
Keep pigs/chickens; hunt bush meat	Sell in local markets & for cultural obligations		Charge for HF radio
Grow betel nut/ coconuts	Sell copra to traders – processed or not; sell betel nut locally & Honiara	Make canoes	Occasional sales locally
	Grow cocoa & sell to traders as wet or dry beans		Labour to build houses
Make handicrafts	Sell locally/Tavanipupu Resort (Marau) & Honiara		Operate stores
Fish	Occasional sales in local markets		Operate dryers
Collect water & firewood			Cattle ranching
Build houses, etc from bush materials		Collect plants for traditional medicines	Occasional sales
	Government/church employees		Sell kerosene
	Remittances from relatives living elsewhere		Sell wildlife locally

Local Ice Cream

Taumana is a special food made from a wild yam (sometimes cultivated) that has aerial tubers. They require processing to make them edible.

First they are grated and then soaked in running water before being mixed with coconut milk. The result is considered a special food called 'local ice cream'. It reflects the ingenuity of local people to turn this seemingly inedible wild plant into a tasty, popular food, and to give it cultural stratus. It also has great food security value.

Table 2: *Assets and vulnerabilities affecting livelihoods and food security.*
Assets of families on the Weather Coast, presented as five components of a livelihoods' analysis.

Physical	Human	Natural	Social	Financial
Boats (outboard and dugouts)	Farming systems in keeping with the environment	Sea resources, especially bonito	Cultural obligations (social safety nets)	Fresh produce and cooked food sold in local markets
Water supplies (piped or carried)	Indigenous knowledge about crops and wild plants	Sun for solar/ drying	Social cohesion: including custom and churches	Coconut
HF Radios	Women's groups (both formal and informal)	Medicinal plants	Ability to respond to crisis	Cocoa
Clinics	Skills in house & canoe construction	Village agroforestry (home gardens)	Pig keeping (in communal and fenced areas)	Betel nut
Schools	Local technologies eg ngali nuts (dry with shells)	Wild yams (at least 3 species)	Markets and stores	Pigs
Rural training centres	Able to adapt agriculture to changing situations (flexibility)	Crop varieties (staples)	Communal work for school, clinic and church	Remittances
		Timber	Promotion of sanitation	Shell money
		Nuts/ fruits		Chickens
		The bush (eg, materials for construction)		Handicrafts
		Wild & cultivated greens		

Resiliency and adaptation

The data presented in Tables 1 and 2 indicate that people on the Weather Coast have numerous ways to support themselves. and that they are resilient in face of adversity. They have the ability to adapt.

Their seem, in the main, to be no different to those on other parts of Guadalcanal or the other islands of the Solomons. Lists, of course, are deceptive, as there is no indication of the number of people carrying out particular activities or the vulnerabilities they may face. Vulnerability is an important issue and can define the difference between livelihoods on the Weather Coast and elsewhere in Solomon Islands.

Vulnerabilities take two forms: natural and infrastructural. The natural include the rough seas that make travel impossible or dangerous — there are few of the fringing reefs which shelter coastlines in other aprts of the Solomons — earthquakes, tsunamis, high rainfall that spans months at a time, cyclones, landslides that bring death and loss of soil and flash floods that block access to bush gardens have all been mentioned before. Infrastructural impediments to community develoment include a lack of roads for the movement of goods and people and of access to modern forms of energy.

These realities make life on the Weather Coast physically and emotionally demanding. Feelings of insecurity have always existed and may explain why Weather Coast populations have been vulnerable to exploitation by cults, militias and criminal gangs. Recent political events — the so-called ethnic tension — has added to perceptions of insecurity by introducing tensions between communities. These have yet to be resolved.

Crop loss exacerbates decline in food security

Recent intercommunal tension has to be seen in the context of substantial change to Weather Coast farming systems that have now continued for 30 years or more. For reasons that are unclear, major staple crops have been lost. This has occurred without government authorities noticing it. The loss of major staples crops can have dire consequences if there are no suitable alternatives.

The Weather Coast has lost two important crops: yam and taro, yet both flourished as little as 30 years ago.

A report by Margaret Tedder (Tedder MM, Tedder JLO (1974). *Yams: description of their cultivation on Guadalcanal in the Solomon Islands,* South Pacific Commission, Noumea) described

the production system and listed innumerable yam varieties, their different uses and cultural significance .

Taro was an equally important crop but it was affected by pests and diseases because of neglect during the ethnic tension. The crop is now diminished.

During the tension, people were hungry and were forced to eat yam planting material — the plants that would otherwise have been planted to produce the next crop.

Now, yam and taro are absent in many villages along the Coast or their production is only a fraction of former times.

Loss of food crop diversity would be serious even if there were alternative crops. However, both sweet potato and cassava are less than satisfactory as replacements. The results is that, in many places, food security has been compromised.

If farmers want help there is none to be found outside of their social networks. Advice may be sought from relatives in Honiara, but never from agriculture extension personnel — they are never seen. Additionally, farmers' incomes are so low that to get started in any commercial venture is extremely difficult and is rarely attempted. There are no banks and obtaining credit is virtually impossible. At present, the only places where help on agriculture matters might be obtained are the CBOs (community-based organisations) at Tari, Avuavu and Belanimanu.

Livestock in decline

Not only have crops been lost, but livestock too. Large numbers of pigs have died in several villages (including Raeavu, Bokasughu and some bush villages) from a condition known locally as 'cough-cough'. This may be swine influenza, with secondary diseases brought on by poor health .

Peter Saville, formerly Animal Livestock Officer, SPC, suggests it is swine influenza — the porcine version of the influenza virus, which is very contagious — characterised by coughing and sneezing. There is no treatment, just supportive therapy, ie. access to quality feed and water. If swine influenza is superimposed on an initial chronic parasitic infestation and followed by secondary bacterial infection in an already malnourished pig, death is likely.

In places such as Marasa and Kopiu, as well as others, the management of pigs is poor: fences are in disrepair and pigs destroy food gardens. Fenced pigs are often released and left to fend for themselves as there is insufficient food. Wild pigs, and those that became feral during the ethnic tension are an increasing problem. Farmers have no guns to shoot them as hunting rifles were handed to RAMSI as part of the peace process.

Health issues complicate community wellbeing

There are a number of human health concerns.

Malaria, TB and pneumonia were mentioned previously, but there are also skin diseases that are in unusually high occurrence on the Weather Coast.

There is a lack of basic hygiene: rats and flies are common and sanitation poor.

The beach is frequently the toilet. Newly-installed pedestal toilets appear to be of little use.

In general, assistance from government is lacking and access to information difficult to obtain (there are no phones or postal services) and rarely sought. Widely dispersed clinics have been rehabilitated and staffed, but doctors rarely tour.

Alfred's Story

"I used to work for the government and earn a salary. I have been to other provinces, like Choiseul and Malaita, and seen that even in these remote places people have permanent houses and are earning some money. Yet my family, living so close to Honiara, cannot even afford to repair the leaking sago palm roof on our old and rotting house. My life is at its worst point now".

Alfered (aged 48) and his wife Anna (aged 38) come from the 'Keke coast' and live in a village of about 400 people. They have eight children with three at school. The family grow taro, sweet potato, cassava and pana and currently have four gardens. They gave up growing yam due to disease. Taro was the daily food when Alfred was young, but now it is a luxury. Cassava and sweet potato are the main foods. His family raised pigs, but an unknown disease has killed them; and wild pigs are damaging their gardens.

Their main worry is income and food – especially during the rainy season. They have no money to buy rice and in any case there are no stores selling it in walking distance - so they depend on their garden. They do not even have money for kerosene, soap and matches and consider these luxury items that they can buy only every few months. To earn a small amount of money, they sell some betel nut, fish, long beans and tobacco in the local market. They might earn SBD40 in a very good month, but usually it is less than SBD10 - about SBD500 in a year. They cannot afford their children's school fees, but this year they have been helped by the church which paid half the fees and by relatives in Honiara.

At the moment their simple bush house is leaking. However, Alfred cannot afford to buy the sago palm needed to repair it, and get enough from the family plot.

In addition to the general lack of medical information, there is little advice on family planning. Although a sensitive issue, the continued population rise and its effects on people's vulnerabilities needs to be considered.

Population growth — an issue in need of addressing

Populations have increased greatly in recent years and they continue to grow even though the last census, in 1999, noted a fall in the total fertility rate — the number of children per woman — compared to 1986.

There are now large numbers of uneducated, unemployed youth, a situation of potential consequence as the ethnic tension well demonstrated.

Increased population has led to the intensification of landuse with reduced fallow, increased pests and diseases and crop losses.

The 1999 census sums up the situation: "the census describes a situation in the Solomon Islands in which the population size is not remotely matched by the country's capacity to provide full eduction and meaningful employment for its population, or to provide a sufficient subsistence base and adequate health care or other basic services" (*Report on the 1999 population and housing census. Analysis.* Solomon Islands Government: Statistics Office, PO Box G6, Honiara. Page 259).

Nothing that was seen during this assessment of the Weather Coast would contradict this statement.

The consequences of rapid population increase do not affect men and women equally. They add disproportionably to the burden of women as they take care of children, grow the crops and cook the food. Women miss out on eduction opportunities; boys are favoured as girls often leave the village to marry. Consequently, and as seen on the Weather Coast, when problems occur, women have only their immediate family or women's groups to turn to. Neither have answers to complex social and technical problems.

Guadalcanal Weather Coast family - population growth outstrips the capacity of communities and government to provide education and income opportunities. The trees around the houses are edible species.

Summary of areas visited

For the purpose of this report, the Weather Coast has been divided into seven zones — six coastal and the bush — which are sufficiently distinct in terms of their assets and vulnerabilities. These are described in the follows notes and tables, and in detail in Attachment 3.

Tina River delta

From Marasa to the Tina River delta (parts of Wanderer and Duidui wards), is a very productive agricultural area with abundant alluvial soils and well-established cocoa, coconut and betel nut plantations.

It is relatively well serviced and connected to Honiara by a comparatively regular shipping service and canoes with outboard motors.

The marketing of produce using canoes to transport it is marginally viable if the prices (eg. for betel nut) are high.

There is an airfield at Mbabanakira but it is closed at present, although there are plans to reopen it soon.

Incomes are higher in this area, but, in general, the cash does not benefit women.

Villages assessed: *Marasa, Mbabanakira, Calvary*

Vulnerabilities:	Flooding. Inability to organise transport to market effectively — prices of betel nut, cocoa, copra, and other produce may change but no knowledge of this is available before departure. Managing and marketing of pigs. Wet weather. Very high sweet potato dependence — sometimes they rot in the soil.
Assets:	
physical	Access to Honiara (ship and canoe); driers for cocoa and copra; water supplies, clinic, secondary and primary schools; Tari Bible School (SSEC).
human	Good leadership potential (eg.Phillip Manakako). Women's fellowship — Calvary and other locations.
natural	River flood plan — good soil; cocoa; coconut; betel nut in abundance.
social	Local markets; buyers and middle men for processors for cocoa, copra and betel nut; church cocoa plot (eg. Marasa).
financial	Cocoa; coconut; betel nut; garden produce sold in local markets; twice weekly market at Mbabanakira; village markets weekly that that are supported by cash inflows from copra and cocoa.
Issues:	Continuous sweet potato cropping. Loss of diversity and indigenous knowledge. Landuse planning (cash crops and food crops conflict). Opportunity to add value to cacao (driers, management of plantations, organic certification of plantation crops a possibility. Post-harvest processing (eg. virgin coconut oil). Women's income and access to markets and transport for produce. Pig fence and damage to gardens. Youth without much to do.

Keke Coast

From Komate to just west of the Kuma River (parts of Duidui and Vatukulau wards) is a very difficult area with, in some parts steep mountains that rise from the sea with little or no beach.

Consequently, coconut plantations are small and the nuts are used for family food.

This area has the worse services and the fewest income opportunities of the entire coast.

Villages assessed: *Duidui, Reavu*

Vulnerabilities	Landslides, earthquake; tsunamis. Very low cash income. Very steep land. Unresolved reconciliation and conflict issues. Extreme physical environment
Assets:	
physical	RAMSI presence (provides security). Clinic.
human	Pig management (communal fencing). Coconut oil. Cultivation of wild yams by some families.
natural	Wild and domesticated mangoes; river resources (eel, fish, shells); slopes for taro production; hydro energy potential (abundant small and large rivers with steep head).
social	Honiara support from Aruligo settlement for out-migration; mother's union; youth group.
financial	Remittance from Honiara (very little); very small market once a month.
Issues	Low sweet potato yields. Transport and market access. Need for more greens and vegetables. Poor communication. Vulnerability to disaster (tsunami, landslides, earthquakes, flooding, rough seas and access). Distance to services. **Agricultural pests and diseases:** Chuaka (taro); Nisotra (sliperi kabis); beetle on banana; unidentified yam pest.

Returning from displaced people's camps in Honiara

"Living here is for us like having polio — one side unbalanced all the time. We are affected by every disaster. Organisations come and talk to us but then don't come back and work here.

"We are short of food. We are struggling to settle back since returning from the displaced people's camp. We have been back for one year but the rain has made things slow for us.

"We lost most of our yams when we had to run away and it will take a long time to get them back. The ones we would like back are vahato, doma, sakai, kaho, pava, laveinoro and habuna kidaki.

"We are confused about lots of things. We still have unresolved problems with our neighbours, so it is hard for us to go asking for these things from others".

*Wilson Halatia**, Chief, Horobau village***

Still Forgotten

"The Joint Operation shelled our village in October 2002. We ran away to the bush for two years since 2001. There were gun battles all the time.

"We would crawl with fear into our old gardens to harvest what we could. We lived off wild yams, bush greens and what little we could grow.

"We came back down when RAMSI arrived. Things are alright now.

"Since the 1980's we have had no regular transport to here.

"The tension is over but things are still the same. We have produce to sell but no transport".

*Anonymous**, Duidui***

Planting wild yams

"I realised how important wild yams are in hungry times and decided to plant some at the bottom of a tree outside my house.

"I planted a type called 'uvi matua'. It has been there for four years. When I am short of food I can dig it up. After digging up the tubers I bury it back again and it regrows. It tastes very good. The idea is catching on and a lot of people in Duidui are planting wild yams near their houses."

*Susan, **Duidui***

Kuma River area — Forgotten River delta coast

From Kuma River to west of Avuavu (Talise ward) is a more productive region than the Keke coast.

There are some flat lands, alluvial river soils and small-scale plantations.

The isolation here is extreme and shipping services are very poor because of its location in the middle of the Weather Coast.

Region assessed: *Kuma River — Forgotten River delta coast*

Vulnerabilities	Flooding of river. Low levels of education. Community tension (Madakacho). Divisions between churches. Water supplies are old and in need of maintenance. Clinic has closed.
Assets:	
physical	Fertile soils of delta.
human	Bush track to Honiara (1-2 days walk through mountains). Reliable water supply. Community high school.
natural	Some use of solar power. Traditional skills intact. Yam varieties retained even through there are periods of hunger.
social	Cultural practices remain strong.
financial	Remittance from Honiara, although they are very small amounts. Very small market once a month.
Issues	Low incomes. Some cocoa and coconut. Irregular transport by ship — often bypassed and in between east and west routes; too expensive to travel by outboard motor canoe to Honiara to market produce. Weekly local markets. Community relationships and conflict. Slow understanding and uptake of new ideas and change. **Agricultural pests and diseases:** Chuaka on taro; yam disease.

Avuavu Area

The area (all of Avuavu ward) has more services than other areas. These include a provincial secondary school, primary schools, large Catholic mission, area health centre, a few stores, an RTC and an email station.

The lake (Laovi) is a key resource that buffers this area and many nearby communities from food shortages. In the past, the airfield linked Avuavu to the outside world, but it has now closed.

Villages assessed: *Avuavu, Boliu*

Vulnerabilities	Airstrip closed (makes medical evacuation from health centre very difficult). No resident doctor. No regular shipping service; expensive outboard motor travel to Honiara. Legal issues around RTC land. Flooding of rivers makes movement difficult.
Assets:	
physical	Email station (PFNet); schools — secondary and primary; Catholic mission; a few radios; clinic, airstrip; RAMSI prsence; remains of old road still in reasonable condition in some areas; Turusuala RTC; church and provincial land available for lease for small commercial developments.
human	Good leaders (eg. Celestine Aloatu); good community organisation between and within villages; knowledge of wild yams and ferns; have imported virus-resistant taro; good management of lake resources.
natural	Alluvial plain; large freshwater lakes (tilapia resource); swamp taro and edible fern as recent introductions; exotic fruit trees at old research station.
social	Community organization; formal and informal women's groups; inter-village planning committees (eg. health and email).
financial	Market at secondary school.
Issues	Indoor smoke (general issue). Transport access and cost. School food expenditure and nutrition. Lake as key resource for food security and livelihoods. Email station — not used to potential. **Community health:** Skin disease of children. **Agricultural pests and diseases:** Cassava scale insect.

Avuavu Secondary School

"The 280 boarding students come from all over Guadalcanal and are enrolled in Forms 1 to 5. The school has 11 staff but it is supposed to have 20. It is difficult to attract staff to the Weather Coast. People from other provinces are afraid to come. They also have a problem with staff housing; — there are only nine. All the young staff are sharing one house.

"The typical diet for the students at the school is rice, noodle and Taiyo (canned Solomon Islands tuna) with a little fern or unripe pawpaw. The ration is one packet of noodle to 10 students and two tins of Taiyo for one pot.

"Once a week, they buy local produce — $20 for a 20kg bag of sweet poato. They tried to buy more but often there is not enough.

"There is a market at the school twice a week for staff and students. Students don't have much money and sometimes the goods go back unsold.

"The school has two large gardens but they were only started this year and they are not producing yet.

"Agriculture is all theory — only the senior class does practical.

"School fees are SBD$1000 per year for Forms 1 to 4. Cost of providing food for students is SBD$20 per week per student. There is an imbalance of male to female students (65:35)."

*Daniel Manengelea**, Principal***

Laovi Lake

"The lake is oval and covers 40ha. It has small islands inside. There are tilapia, mamula, eel fish, red water fish, chinese carp, silver fish, crabs, water shell and crocodile.

"Tilapia are in abundance. Maybe 10 tonnes of Tilapia are harvested a year, caught using bamboo pole, line or net. The lake is an important food source and both fish and fern provide income. The lake owners allow people from Longu to Naho, up to a days walk away, to use it for fund-raising activities or feasts.

"The lake can be used even at times when the ocean is too rough for fishing.

"Because the lake is so important, the community have a committee to manage it. The committee controls the use of fishing nets to prevent over-harvesting. Line and pole fishing is allowed at any time. "

*Celestine Aloatu**, Coordinator, Isolated Areas***

Dark empty nights at Laovi Lake

Once the sun has set there is little opportunity for additional productive or social activities as no effective lighting is available. Sources of light are limited to wood fires, battery torches and home made kerosene 'bottle' lamps.

Battery torches are only used for special purposes as dry cell batteries are expensive and hard to obtain. Bottle lamps are made from an old glass jam jars and a wick which burns kerosene to produce a very low intensity yellow light suitable for room lighting. Extended periods of fine work, reading or school work are not possible.

In Bokasughu village the principle source of household lighting is the wood fire. When kerosene is available — shipments from Honiara are infrequent — approximately 70 per cent of households purchase kerosene for use in bottle lamps.

Typically, a household will purchase a 275ml bottle of kerosene for SD$2.50 (SD$8 and SD$20 per month). This will last between 4 and 10 nights, depending on hours of use and size of lamp.

Given the low cash income of households — not more than SD$100/month for households surveyed — kerosene is a major expenditure item and is indicative of the high priority given to

improved lighting for households.

(Source: a short survey of 11 households in Bokasughu village).

*Andrew Mears, **energy systems consultant, TerraCircle consultants***

Moro Coast

This area — all of Moro ward — is geographically similar to the Kuma Coast and has similar income-generating opportunities.

The Moro Coast is slightly better off due to more local market opportunities (Avuavu and Makaruka) and more regular shipping. Despite this, income and opportunity here are very low.

There is a flourishing craft industry that has potential for further development.

This is the heartland of the Moro Movement.

Village assessed: *Bokasughu*

Vulnerabilities	Low income. Limited land for expansion in some coastal areas (bush communities occupy hill areas). No water supply. Expensive and unreliable transport to Honiara. Women have very little access to Honiara and to educational opportunity. Lack of market access for handicrafts.
Assets:	
physical	Copra driers. Secondary school. Use of solar power for lighting by some households.
human	KGA trainee, Leonard Ale, starting a farmer school. Traditional craft skills. Traditional and western province type of ngali nut processing.
natural	Fertile, flat land; watercress, yams, tobacco, pineapple, coconut, betel nut; more vegetables than some other areas. Imported virus-resistant taro.
social	Community at Bokasughu has pigs in individual fences to reduce pig damage to gardens.
financial	Tobacco is the major income earner. Handicrafts.
Issues	Loss of diversity. Lack of income opportunities. Tobacco issues. Pig diseases.

Tractor coast

From Sukiki to west of Marau (parts of Tetekanji and Birao wards), the geography is similar to the western end of the Weather Coast.

There are more cash crops on larger areas of flat land, an airfield at Marau which is not in use, a better climate and better transport links to Honiara.

While it is still a long way from Honiara by outboard canoe, farmers can walk to Marau to access more regular shipping and a safe harbour — a unique situation on the Weather Coast.

A tractor and local cocoa and copra buyers provide cash-earning opportunities.

This part of the coast gets less rain during the koburu.

Village assessed: *Kopiu*

Vulnerabilities	High level of emmigration to Honiara. Not all families have copra or cocoa. Wild and domestic pigs eat gardens. Long distance to clinic. Not enough teachers at school. Lmited land (for food and cash) due to internal migration and disputes with neighbouring communities.
Assets:	
physical	Radio and battery charging for household light .
human	Sago starch processing and cattle farming (the last cattle farmer on the Coast).
natural	Mangrove; Alocasia; cows; pit-pit; reef fish and other reef resources. Easier to launch and land canoes.
social	SDA (Seventh Day Adventist) network brings in information and opportunities.
financial	Cocoa, coconut, solar recharging; market in Marau.
Issues	Migration. **Food and agriculture:** Damage due to pigs; shortage of yam and taro planting material. **Potential opportunities:** existing know-how to process sago — could share this technology; interest in breadfruit. **Agricultural pests and diseases:** Chuaka; scale insect on cassava; Papuana beetle on taro and kongkong taro.

Bush communities

The bush communities live along the river deltas and on upland ridges. They suffer from much the same constraints as coastal villages but are more isolated, with long walks to small, local markets.

The higher rainfall increases their vulnerability.

At higher altitudes taro grows better than on the coast although chuaka is likely to be a problem.

There is potential for cardamom production.

Village assessed: *Belanimanu*

Populated by bush people settled close to coast but who retain their connection to the bush.

Vulnerabilities	Physically demanding environment. Bush communities very isolated. Unresolved tension in Belanimanu. Lack of involvement of women in training centre.
Assets:	
physical	Community-based training centre. HF radio. Network of trainers and contact people in bush community. Youth with interest in farming.
human	Strong and tenacious; network with bush communities through CBTC.
natural	Potential to produce unique products, such as cardamoms.
social	Donor support for CBTC through APHEDA (Union Aid Abroad— Australia) and SIARTC (Solomon Island Association of Rural Training Centres).
financial	Local markets. Generally, very limited income opportunities.
Issues	Supply of taro, yams. **Agricultural pests and diseases:** Control of chuaka; pigs suffer 'cough-cough'disease.

Part III – Solutions

Any attempt to improve the livelihoods of people on the Weather Coast of Guadalcanal has to tackle food security.

This means addressing the interconnected issues of subsistence food production, including the meeting of social obligations that form important social safety nets and of income generation from the sale of cash crops.

Food security necessary to reducing rural poverty

THE RECOMMENDATIONS presented in this report align closely with the thrust of *The Solomon Islands Rural Livelihoods and Broad Based Growth Strategy*, in that they aim to "improve the livelihoods of people in rural areas in a manner which is economically, environmentally and socially sustainable. Such interventions can address some of the key underlying causes of the recent conflict".

Furthermore, our findings conform to AusAID's rural development strategy to reduce rural poverty by increasing opportunities for the poor to generate income.

The recommendations are divided into four strategies, chosen to cover most aspects of people's livelihoods involving agriculture and related activities. These are:

- diversification of food crop production
- enhanced management of livestock and existing crops (pests and diseases, planning for food needs, soil fertility)
- strategies for income generation
- strengthening the enabling environment.

Not all of the recommendations are within the capacity of the Isolated Areas project to implement. Those that are, can be found in tables at the end of this section of the report (Table 8).

Banana - a most important crops on the Weather Coast

STRATEGY 1: DIVERSIFY FOOD PRODUCTION

The major focus of Isolated Areas project will be the diversification of food cops. This involves reintroduction of lost diversity of traditional crops as well as the introduction of new species and cultivars to enhance production in normal times and to help during periods of stress.

The staple crops of the Weather Coast, in order of importance are sweet potato; cassava; banana; taro; yams; pana.

There are relatively few varieties of cassava and pana (14 each), but more than 50 varieties of each of the other crops. Most farmers in a village grow about six varieties each of sweet potato, banana, taro and yams, with the other varieties being uncommon. Neighbouring villages might have an overlap of about 50 per cent of varieties.

New varieties (especially of sweet potato) come from people bringing them from other places on the Weather Coast and from much further afield. Occasionally, new varieties come from naturally generated crosses from self-sown seedlings (eg. sweet potato, taro, sliperi kabis [*Abelmoschus manihot*]).

There is some indication that the exchange of yams might be difficult, even among neighbours, because people think that selling or even giving away the planting material of yam is against 'kastom' (contravenes customary practice and belief), but this view is not held everywhere.

People said they grew and tested many varieties in order to find better ones and also to have a range of tastes and marketable characteristics. Whenever asked, people said they would welcome having access to more varieties.

Considerable loss of varieties has occurred, in particular for taro and yams, the cultivation of which has substantially decreased mainly because of increasing pest and disease problems (perhaps due to intensification of land use). People are extremely worried about this genetic erosion because taro and yams are important culturally, provide variety in the diet and fill a gap in the seasonal calendar during the hungry time .

For example, in Bokasughu, a group of about 10 women were asked about trends in the cultivation of major staples (Fig. 4). Given that the area of cultivation of each was 10 in 1980, how did this change through the years?

Table 3: *Food crops of the Weather Coast: number of names, their range and the frequency of the most common varieties.*

Crop	Total number of names	Range of names per village	Most common veriety found in how many villages
Sweet potato	69	7 - 30	5/ 7
Cassave	14	4 - 6	5/ 5
Babana	62	16 - 27	4/ 5
Taro	53	7 - 18	6/ 6
Yams	63	8 - 24	5/ 6
Pana	14	2 - 5	3/ 5

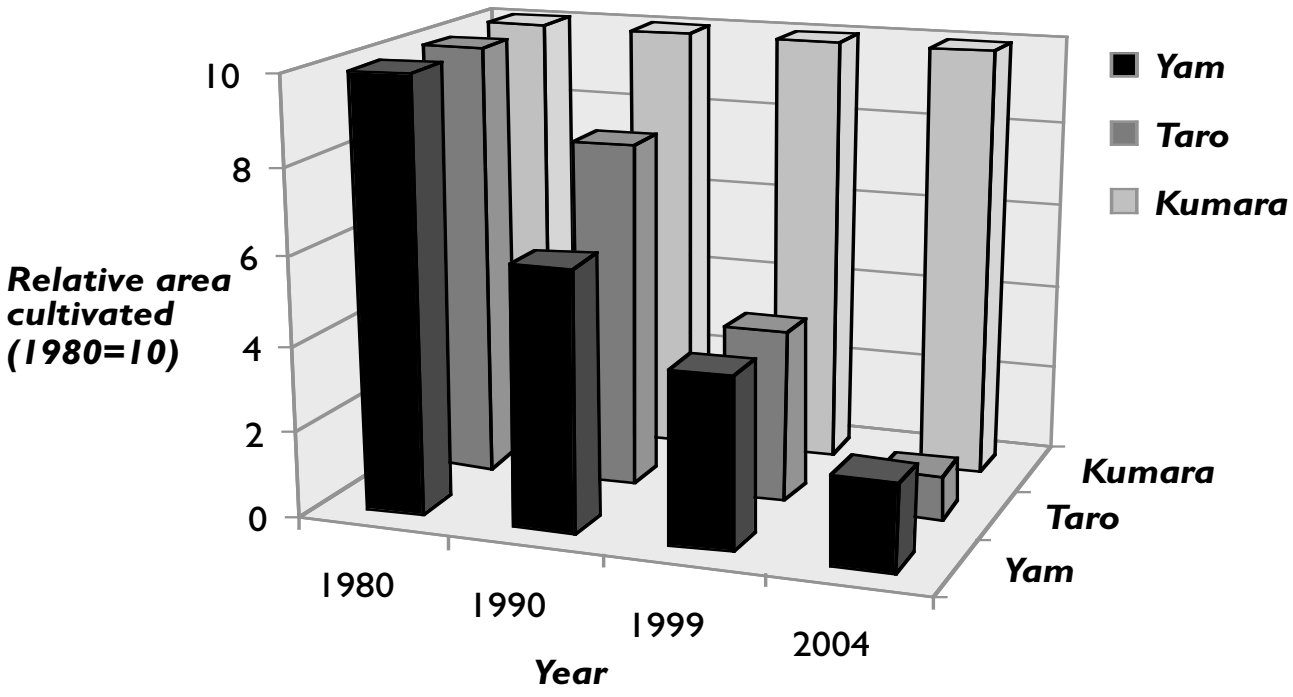


Fig. 4 Trends in the cultivation of major staples of the Weather Coast

Sweet potato

There is a need, and it is a priority need, to preserve the best varieties presently grown so they can be shared along the Weather Coast and to introduce new varieties of sweet potato.

Most varieties grown on the Weather Coast were collected during the survey and will be established at TCBTC as a field genebank especially for the Coast. From this collection, the best will be distributed to farmers. It is wise to make use of small tubers rather than vines, as there will be less damage. The selected varieties should also be sent to the SPC Regional Germplasm Centre. There, they will be regrown in tissue culture from meristems, tested for viruses, cleaned as necessary and reintroduced to the Weather Coast. In this way, the best varieties present at this time will be available from the SPRGC whenever needed. How quickly the varieties accumulate viruses and decline in yield will become known in time.

There may be cost implications that the project will need to discuss with SPC. It is important and SPC sees this work as a pilot for the region. The cleaned varieties should be kept as free from insects as possible on reintroduction by growing them in field igloos (the Queensland Department of Primary Industries and Fisheries has developed methods of growing sweet potato in the field under screened enclosures to prevent virus reinfection).

Although some 40 varieties are grown, only a few appear to be high-yielding and to have acceptable taste. Not all of the best varieties are in all villages. A programme of distributing the best varieties throughout the Weather Coast would be sensible, even though it is not known whether 'the best' in each village have been chosen because of their location-specificity. There is also a need to introduce varieties from elsewhere as quickly as possible.

There are many good varieties in Solomon Islands. For instance, a variety called 'No grade' has recently swept through north Malaita, so-named because it yields well in different soil types. There are many varieties in other provinces that could be tried.

In addition, varieties should be introduced from the RGC collection — for instance, those detailed under the pest and disease section (Table 5). These would include varieties screened in Papua New Guinea under the EU-funded PRAP programme of the 1990s and the best selections from the Solomon Islands collection at that time. All these are maintained at the SPCRGC.

Recommendations for sweet potato:

- identify the best local (Weather Coast) varieties, bulk and distribute
- 'clean up' local varieties via SPCRGC and reintroduce
- introduce Papua New Guinea and 'old' Solomon Islands varieties (via SPCRGC); bulk and distribute.

Sweet potato is planted into mounds to improve spoil drainage.

Cassava

There are only about six varieties of cassava on the Weather Coast. The number should be increased as they all suffer from white peach scale (*Pseudaulacaspis pentagona*), a major threat to production.

Via the SPCRGC, introductions should be made from other parts of Solomon Islands and from other countries, including from outside the region, taking precautions to ensure that they are low in cyanide. In this way, diversity will be increased and the introductions tested for resistance to scale.

Recommendation for cassava:

- introduce varieties via SPCRGC (Fiji and CIAT) and other areas of Solomon Islands (eg. north Guadalcanal and Malaita).

Yam (*Dioscorea alata* and *rotundata*)

There is considerable interest in regaining lost varieties in all villages that have lost yam germplasm. The difficulty is to know whether there is a place for yam in the present farming system which is now dominated by sweet potato and cassava. Only these crops, it seems, can meet the carbohydrate needs of the burgeoning population.

There is also the problem of 'pange', a disease of nematode etiology present in most villages. It is, perhaps, a consequence of the intensification of agriculture.

It may, therefore, be difficult to reinsert yam into the farming system under present circumstances. We have no experience in doing this in Solomon Islands or elsewhere in the region. People are keen to try and have asked for varieties, including specific ones they claim to have lost but now want back.

At the same time as varieties are distributed, training should be given on the control of pange, following the outline summarised in this report.

Making a collection of the yams that are still grown on the Weather Coast and sharing these with other villages might be a good start, but it has its drawbacks. Most likely, unless great care is taken, pange will also be collected and introduced to Avuavu (TCBTC) where the collection would have to be maintained.

To make a collection of yam, multiplying the best varieties and distributing them takes a lot of resources, probably more than the project has at its disposal (although there might be the possibility of complementary funding from PAPGREN).

The TCBTC should also be used for the introduction and multiplication of yams from Vanuatu and Fiji as well as African yams (*Dioscorea rotundata*) from the SPCRGC (see below). This alone will be a large undertaking and will make it difficult for the Centre to do more.

Careful selection avoids pange

Instead of making a collection of yams along the Weather Coast, it is best to collect from only a few localities where pange is unknown and where numerous varieties still exist, for instance, Duidui or the villages that follow the Moro cult.

Collections can also be made from the Guadalcanal Plains, many varieties of which are likely to be common to the Weather Coast. They are retained for their socio-cultural significance as much as their popularity in the Honiara market. Tests in the

1970s at Dodo Creek Research Station (Guadalcanal) by one of the team (Grahame Jackson), found that some displayed a good level of anthracnose resistance; that is, resistance to the fungus *Colletotrichum gloeosporioide*s.

Farmer visits would assist reintroduction

In order to collect those that satisfy local needs and demands,. farmers from the villages that require yam reintroductions should visit farmers on the Weather Coast and the Guadalcanal Plains during the harvest season and choose the varieties that interest them. Planting material should then be bought by the Isolated Areas project on the understanding that recipients share the harvests until everyone has sufficient material.

The collection from the Guadalcanal Plains should also include Kinabeyo. This yam, introduced from the Philippines by the Research Division, is vigorous, high yielding, has reasonable taste and resistance to anthracnose. It is known on the Weather Coast (some was seen at the Tari Bible School) but more needs to be obtained, bulked up and given out to farmers.

Multiplication of Kinabeyo should be done at TCBRC and the other CBTCs. The min-set, rapid multiplication method should be demonstrated by example and through workshops to accelerate the multiplication of the chosen varieties.

Introduce other Melanesian varieties

Introductions of yams are also needed from Vanuatu and Fiji. More can be found on this recommendation under the pest and disease section. These could be introduced as tissue cultures from the SPCRGC or from the CIRAD collection, Santo.

The Vanuatu and Fiji varieties recommended for the Weather Coast have characteristics preferred by commercial growers: round or oval tubers (facilitating harvest), high market appeal, good taste/ texture, resistance to anthracnose and some ability to grow without staking. Some varieties from Vanuatu are known already in Solomon Islands: variety 'Malakula' was collected from Bubunughu in 1979, so it is expected that those listed (Table 4) will also do well on the Weather Coast.

Introduction of African yam

There is also a case for the introduction of the African yam, *Dioscorea rotundata*.

This can be done as tissue-cultured plantlets from the SPCRGC. One variety, unofficially introduced to Solomon Islands, has done well in recent years. in north Malaita. Tubers of this variety should also be obtained and grown at TCBTC and at the other CBTC on the Weather Coast, at Tari and Belanimanu.

Recommendations for yams:

- collect the best varieties from Weather Coast villages that have retained germplasm and from the Guadalcanal Plains (take farmers to the areas to make selections); use rapid-multiplication methods and distribute; be careful that plants do not have pange
- introduce Kinabeyo from the Guadalcanal Plains, *Dioscorea rotundata* (from the SPCRGC) and Vanuatu yam (also *D. rotundata* from Malaita) to TCBTC (and other CBTCs, as appropriate), multiply and distribute
- 'introduce the best *D. alata* varieties from Vanuatu to TCBTC, bulk and distribute
- provide training in miniset multiplication for yams.

Pana (*Dioscorea esculenta*)

Pana is not grown in great quantities along the Weather Coast, although a few varieties were reported from most villages. Where it is more popular — in the Tari area, for instance — it is cultivated on the river flats.

Potentially, pana is an important crop, one that is high-yielding and grows without major problems in Solomon Islands. It takes longer to produce a crop than sweet potato but this is compensated by its reliability, high yield, lack of pests and ability to store after harvest.

Varieties should be introduced and bulked at the Tari Bible School. Land is available along the banks of the Tari River with soil that is ideal for pana.

Duplicate collections should also be established at TCBTC.

The best place to collect pana is Ngella in Central Province where the crop is grown throughout the year, a very unusual practice as it is seasonal elsewhere in the world.

Farmers from selected Weather Coast villages, and, especially, staff from the CBTCs, should visit Ngella to choose — after talking to local growers — those varieties that they think best suit their needs. A similar process of bulking and distribution should then be done, as described for yam.

Recommendations for pana:

- collect in Ngella (taking farmers and CBTCs to make selections); bulk in river basins and distribute.

Wild yams (*Dioscorea nummularia*, *D. bulbifera* and *D. pentaphylla*)

Apart from establishing collections at TCBTC so they can be distributed to people who do not have them, it is important to encourage people to plant more of these species, especially within villages and around houses. The wild yams are important reserve foods and need to be exploited.

The species are available in the bush. In some villages they are planted at the base of trees which are used as living stakes. There is a need to find out how many distinct varieties are available in the bush and their potential for domestication.

People of the Weather Coast have considerable knowledge of wild yams, especially methods of processing. This is illustrated by the preparation of 'taumana' from *D. bulbifera*. This yam is bitter when boiled but after pounding, washing for a long time in running water and baking in a stone oven, it becomes a local 'ice cream' that is considered a pleasant and special food, especially when eaten with grated coconut.

Taumana is sold in local markets and it may have potential for sale in Honiara. Even if it does not, its use as a reserve food on the Weather Coast should be encouraged — that means planting more of it.

At present, people collect the aerial tubers from the bush but there is no reason why it should not be grown around houses or cultivated in gardens, as was observed at Raeavu.

Recommendations for wild yams:

- determine if there are other yams with potential for domestication in the bush, and, if there are, grow them in food gardens as well as around houses
- encourage planting of *D. bulbifera* for taumana
- establish farmer demonstrations of wild yam cultivation within agroforests, based on the experiences of PEDC in Bougainville, perhaps focussing initially at the RTCs; planting materials could be shared using a farmer-to-farmer approach.

Banana

The Weather Coast has great diversity of banana. In some villages, informants listed more than 30 varieties. It is obviously an important crop, and one that is probably on the increase (for example, expanding banana plots around Avuavu), compensating for the decline in taro and yam and the limitations of sweet potato and cassava.

Apart from a banana problem at Duidui and ubiquitous leaf spots, the crop is without serious pest problems. Most of the common local varieties are resistant or tolerant to infections from black Sigatoka (*Mycosphaerella fijiensis*).

Banana is a crop that should be promoted by the Isolated Areas project, not only because it services a need during the middle part of the year, May to August/ September (the 'time hungry'), but also because of its potential to be processed into chips and puddings.

People should be encouraged to plant blocks or rows around gardens. For this to happen, a collection should be maintained at TCBTC and plants distributed as farmers see the need. It is relatively easy to maintain collections of banana; they have few pests and do not need to be replanted annually.

Access the Makira collection

Apart from collecting locally, selections should be brought from the Manivovo RTC on Makira, where an extensive collection has been established by the Solomon Islands Planting Material Network (www.terracircle.org.au). Banana is a major staple of Makira and the collection has more than 100 accessions.

Sharing germplasm between the two centres is sensible, with the Weather Coast not only benefiting from new germplasm but also from new ways of preparing banana-based foods. Staff of Manivovo RTC can provide training in the description and documentation of varieties as well as in the maintenance of the field collection. It would certainly make sense for the morphological and other information on the two collections to be managed together.

A farmer at Bokasughu has collected some one hundred and fifty names of banana varieties and has made a small collection. He would be interested in extending it and could be supported by the project on the understanding that he will share varieties with other farmers on the Weather Coast.

Recommendations for banana:

- collect banana varieties locally and plant at CBTCs/ Bokasughu
- select varieties from the Manivovo RTC collection, bulk at TCBTC and distribute
- exchange Weather Coast varieties with Manivovo
- train staff at TCBTC in use of descriptors and germplasm documentation
- encourage people to plant large stands (in blocks or around the gardens) as a reserve food and for processing into chips

KGA is currently developing a project concept in collaboration with SPC for the nutritional evaluation of banana cultivars. Similar work in Pohnpei showed certain cultivars were very high in vitamin A. If this progresses, it should be linked to the Isolated Areas project.

Taro

Much that was written above about the loss of yam also applies to taro.

Taro is affected by a lethal virus known as chuaka and by declining soil fertility. The crop has lost its importance along most of the Weather Coast, with some areas not growing it at all. In the Tina River basin, for instance, the people have abundant cocoa and coconuts, so the issue of food security is less pronounced: they can at least purchase food in times of need, and in most years sweet potato yields well in the fertile river flats. Elsewhere, in places where there is only a modest chance of cash income, the loss of taro (and yam) is keenly felt. It has caused and/ or extended the time hungry.

Varieties of taro can be resupplied to the villages where losses have occurred but, as stated previously, it is by no means certain that the crop can be reinstated to its former abundance and usage. Its day may have gone forever, as has happened in many parts of coastal Melanesia. However, efforts should be made to collect the different varieties as soon as possible, both the early (kake bake) and late (kake lava) types and hold them in tissue culture at the SPCRCG, in case the high-yielding, chuaka-susceptible, varieties are lost permanently.

The best way of doing this is by holding a diversity fair and, requesting people to bring their varieties. The taros can be judged and prizes given in the usual way of these fairs. Indigenous knowledge should be recorded and exchanged and varieties provided to the TCBTC for safekeeping. This strategy has already been used in the Solomon Islands. From the training centre, shoots can then go the SPCRGC and maintained in tissue culture under a custodianship arrangement.

Apart from actions that will help farmers control chuaka — training and a leaflet/ poster, for example — Malaita varieties resistant to chuaka should be bulked at TCBTC and distributed, as explained in the pest and disease section of this report. However, rather than bringing the taro varieties (Akalomamale and Oga) directly from Malaita it would be best to collect Akalomamale from Ngella (find the right village by asking at Boliu) and by collecting Oga from Bokasughu where it is already being grown. The reason for this is that taking these taros directly from Malaita is certain to bring bobone, a virus disease akin to chuaka. The strategy described will avoid that problem. There may be local varieties that are resistant and the TCBTC should learn about these and collect them. Information should be obtainable at the diversity fair.

The situation concerning taro (and also yam) in the bush villages is not known. The project should make an effort to find out.

Recommendations for taro:

- collect kaka lava and kake baka varieties via a diversity fair at TCBTC and establish a collection
- send shoots of the varieties to the SPCRGC for safekeeping
- collect chuaka-resistant variety Akalomamale from Ngella and Oga from Bokasughu; bulk at the TCBTC and distribute
- identify local varieties resistant to chuaka; bulk and distribute
- determine the taro (and yam) situation in the bush.

Taro remains a staple crop along the Weather Coast but is severely afflected by damaging pests in some areas

Breadfruit

Breadfruit is present on the Weather Coast but the trees do not fruit as well as in other parts of Solomon Islands.

Breadfruit is a seasonally important food and, at Bokasughu, people said that with coconut and wild yam they were the only reliable food source during the time hungry.

There is a small collection of Reef Island varieties at Tenaru, the site of the former research station, and these are worth checking to see if any have potential. One Reef Island variety is well known throughout Solomon Islands for its precociousness in different environments and should be tried on the Weather Coast. Normally, root suckers are taken for propagation although it is possible to marcot. The young plants should be assembled at the TCBTC and distributed from there.

A regional collection of breadfruit exists at the National Tropical Botanic Gardens, Maui, Hawaii. There are more than 100 varieties from most Pacific Islands. It would be worthwhile contacting the curator of the collection to find out whether there are varieties that have potential on the Weather Coast.

The plan is to make a selection of elite varieties providing year-round production that would be available as tissue cultures at the SPCRGC, though this is dependent on developing a protocol and checking for viruses.

Recommendations for breadfruit:

- collect a Reef Island variety from, for example, Western Province; check varieties from Reef Islands growing at Tenaru; bulk at TRTC and distribute
- introduce new varieties from the NTBG collection via the SPCRGC.

Greens/ vegetables

The diversity of leafy greens found on the Weather Coast is encouraging, especially as there are so many problems with food crop staples.

The greens commonly seen during the assessment were:

- sand paper cabbage (*Ficus* sp)
- bonio cabbage
- various forms of Polyscias (called 'boliu')
- many unknown varieties of 'pure'.

Taro leaves are used as a vegetable where the crop is still plentiful and kasumae, a fern, and watercress were said to be recent introductions (eg, at Boliu). The fern is an important vegetable and is generally liked. It should be distributed more widely by TCBTC.

The only cabbage that was not growing well was sliperi kabis (*Abelmoschus manihot*). It is infested with Nisotra sp., a problem that occurs elsewhere in Solomon Islands. It is also attacked by scales. On the Weather Coast, as elsewhere, people have given up growing it and now depend on alternatives.

Few people on the Weather Coast are members of the Solomon Islands Planting Materials Network. This is unfortunate as it limits their access to planting materials. An effort should be made to encourage membership. A recruitment drive is necessary in the area so that people have the best varieties of vegetables for home use.

Recommendations for greens/vegetables:

- encourage the cultivation of the fern, Kasumae, and other wild greens
- promote the Planting Material Network and make seed available to Weather Coast households.

Weather Coast greens identified during the assessment tour

STRATEGY 2: ENHANCE THE MANAGEMENT OF LIVESTOCK AND EXISTING CROPS — pests and diseases, planning for food needs, soil fertility

The value of keeping pigs

Pigs are critical to livelihoods across the Weather Coast except in SDA villages where faith forbid their rearing.

Unfortunately, many villages have lost their breeding stock through disease (auch as around the Raeavu area) and/ or as a consequence of the social and agricultural disruption at the time of the intercommunal ethnic tension on the Weather Coast.

Pigs have great cultural importance in Solomon Islands and elsewhere in Melanesia. They are an appropriate animal on which to base livelihoods:

- pigs are a valuable farm commodity, selling for around SB$300-700
- prices paid for pigs have remained stable despite the socio-economic impacts of recent years
- demand for pigs around Christmas, a traditional time for feasts, is especially high
- pigs are an established farm animal in the Solomons and knowledge of their keeping is widespread.

Pigs provide an opportunity to 'invest' or to 'save', then to turn the animal into capital when it is sold. For many families, this is their only means of getting enough money for school fees.

Women traditionally carry out the day-to-day care of pigs and, generally, make decisions on the number to keep. Some women breed their own pigs, often sharing or borrowing a boar,. Others purchase piglets for SB$50-150 dollars.

Most families keep one or two pigs as they can produce enough excess feed for them, although problems occur during time hungry. Keeping more than this number requires further planning and effort, but it does happen — in the Moro area, for instance, where five to seven pigs per household is common.

While a good source of income and prestige, pigs can be a threat to family food security because of their labour and food needs. Improved management can avoid such problems. KGA has some experiences of this in other parts of Solomon Islands and has produced a manual in the keeping of pigs KGA could introduce these methods to the Weather Coast.

The pig is a culturally important animal that could yield a potentially high income for farmers.

Avaiding damage to gardens

Pigs threaten food security by destroying food gardens. In some areas wild pigs are the culprits (eg. at Marasa, Mbabanakira, Duidui, Avuavu), while at other times free-ranging, domestic pigs are the source of trouble (eg. Madakacho, Bokasughu and Kopiu).

In the case of domestic pigs, the situation can worsen in times of food shortage as pigs are fed poorly at that time (usually being fed only coconut) and are released from pens to find their own food. This is often found in neighbouring food gardens.

In Kopiu at the time of the assessment, damage from pigs was leading to serious food shortages and, in other places, exacerbating an already difficult situation.

Conflict worsens problems with pigs

During the ethnic tension, problem with pigs worsened. Many domestic pigs escaped or were released, increasing the feral population.

Since the arrival of RAMSI, all guns have been surrendered, so hunting — a traditional means of controlling pigs — is now impossible. In places, though, the reverse happened and domestic pig numbers plummeted due to repeated extortion and compensation demands by militants. These areas need support to recover their domestic pig populations. This would provide an ideal opportunity to introduce better management techniques and encouraging people to build fences around their pig yards or to repair those that have been damaged.

Free-ranging pigs are usually healthier than domesticated and poorly managed and fenced animals. Evidence of this was noted in a number of villages visited during the assessment tour, where fenced pigs were clearly suffering from health problems, the biggest of which was 'cough-cough' — probably influenza and secondary bacteria infections — which is often fatal.

Piglet deaths were also common, in some places reaching 50 per cent of the litter, well above the death rate of well managed village pigs. Skin diseases were also prevalent.

Domestic pigs frequently mate with those in the wild. In Duidui, for example, wild boars are allowed into the fenced areas to mate with domestic sows. This improves the health and vigour of the herd but also makes them less-tame. They are more likely to break out of all but the strongest enclosures. Any attempt to improve pig production will have to introduce superior domestic breeds as well as look into better feeds, fencing and general management.

Recommendations for livestock:

- training in improved feeds and management strategies for penned pigs (demonstrate at RTCs and follow up with farmers, particularly women)
- investigate 'cough-cough' disease and provide information to farmers on how to reduce it
- breeding/ cross breeding of pigs through the making available of new breeds that have proven successful in other parts of Solomon Islands; possible support of pig-breeding entrepreneurs to make the new crosses more-readily available
- discuss with RAMSI options to control wild pigs, as the previous method of shooting is no longer an option.

The keeping of pigs is an opportunity to save for Weather Coast residents. Recovering the domestic pig population is an important activity in the post-tensions period.

Chickens

Chickens are kept by about 50 per cent of the households but the number of birds is low. Chickens are an important source of :

- income — chickens sell for SB$20-$35 and eggs for SB$1 each
- nutrition — through with the consumption of meat and eggs.

Traditionally, chickens are kept in low-input, free-range systems. There are many mixed types and they generally appear very healthy. A few families keep up to 20 chickens by the improved management of broody hens (that are often cared for in kitchens) and improved feeds (including coconut and white ants).

The KGA's experience (documented in thet raining manualby Russell Parker — *Kai Kokorako*; 2004; Kastom Gaden Association, Honiara, and the accompanying student handbook) is that the free-ranging system can be easily improved by fencing the birds and giving them better feed, however it requires more time and greater attention to the care of the birds. For those with the interest and time it can lead to a 100-300 per cent improvement in productivity and a significant contribution to nutrition, particularly for infants, through the regular consumption of eggs.

Recommendations for chicken-keeping:

- link to the ACIAR poultry feed project in Solomon Islands; TCBTC will be one of the trial sites for testing new feed formulations as well as extending the results to farmers
- build training capacity and support of TCBTC through facilitating linkages to the ParaVET training currently offered by SPC
- consider providing poultry training workshops to selected villages, with a follow up program run by the staff of RTCs after training by KGA
- continue trials on new poultry feeds, particularly those high in protein, that are not currently used for human consumption and appear suitable to the Weather Coast, eg. sorghum, mung bean, pigeon pea, sunflower, Leucaena (need to consider weed potential).

Plan for family food needs

The extent of food shortages experienced during the period of hunger varies between families. Those that are better able to plan and manage resources are better able to cope.

For example:

- families with large plots of bananas and kongkong taro were able to get through the failure of sweet potato crop in 2004
- at TCBTC, there were no food shortages for more than 50 residential students despite the poor weather.

This experience indicates that an awareness program would encourage families to plan ahead and to take into account the likelihood of adverse growing conditions. This is very important, as *The Solomon Islands Rural Livelihoods and Broad Based Growth Strategy* points out: "while the rainfall requirements and tolerance of extremes vary from crop to crop, a working figure for the southwest Pacific is that a mean annual rainfall of 1800 - 2500mm is optimal for agricultural production and a mean annual rainfall of over 4000mm is excessive".

Most families of the Weather Coast depend on their ability to produce crops for their survival. Most of their time is spent

in garden production and little goes to planning what might be the best options.

The situation could be improved through:

- increased understanding and awareness of the need to plan for the months of heaviest rain
- which crops are best suited to planting at different times of the year
- what soil types are suited to different types of crops
- what methods of cultivation are suited to hill and to flat terrain
- the size of garden blocks necessary to meet family needs
- how to plant and ensure continuous harvests
- what crop rotations should be used
- how to plan to make best use of available time
- techniques for protecting soil from erosion and maintaining soil fertility.

Additional are experiences from regions other than the Weather Coast that could be worth sharing. These include:

- the raised bed and trenching system for sweet potato production
- crop rotation with peanuts that has proved very successful in high rainfall areas of Bougainville
- models of increased *xanthosoma* taro and banana cultivation on Makira.

These experiences could be shared and farmer field trials established with interested, innovative households.

Recommendations for planning for food needs:

- develop an awareness program that can be integrated into other training activities
- set up a 'food security awareness program' planning and design meeting be held at TCBTC and to be made up of innovative farmers from along the Weather Coast who are identified as being successful in managing food security; they would be joined by farmers/ trainers from PEDC in Bougainville and a few lead farmers from other parts of Solomon Islands identified by KGA; the group, with facilitation, would develop a plan and content for an awareness program based on practical, local experience
- follow-up plans developed in the workshop — this may involve simple handouts and printed materials to go with the awareness program.

Pest and diseases

Pest and diseases have a severe impact on the food crops grown along the Weather Coast. This is surprising, as work by one of the survey team (Grahame Jackson) completed 25 years ago found the area to be relatively free from serious problems. At that time, taro and yam were abundant, with lesser amounts of sweet potato and cassava.

Now, the situation is completely different. In many places taro and yam have gone, sweet potato dominates and the planting of cassava has increased greatly. Everywhere, people are concerned about the loss of taro and yam (including pana) — these are traditional crops and have great socio-cultural value as well as providing a variety of foodstuffs. The situation might be less serious if sweet potato was able to tolerate the high rainfall of the Weather Coast and cassava was not everywhere infested by scale insect. The combination of decreasing cultivation of taro and yams and problems with sweet potato and cassava is creating an extensive 'time hungry' in the middle of the year.

Our tentative explanation for the loss of taro and yam is that:

- increasing population is placing increased pressure on the land in an attempt to increase food production
- declining fallows and decreased soil fertility have left the people with no option but to increasingly rely on sweet potato, which can be grown throughout the year and matures early, to feed increasingly large families.
- taro and yam are longer-term crops and vulnerable to pests and diseases, which, undoubtedly, would worsen as production intensifies.

It is surprising that these crops have declined in importance over such a large area so quickly, although in some places ethnic tension has exacerbated the situation. Large plantings of taro and yam are now present only in the isolated Keke Coast and in the Duidui/ Raeavu area. But even here pests are of concern.

The following describes the problems in detail.

Taro

The main problem is 'chuaka' (or 'kakemate' as it is called in villages to the east). This is the same as 'alomae' on Malaita.

One or more viruses are the cause and it is spread by an insect, a planthopper, *Tarophagus proserpina*, or related species.

Over the last 40 years there has been much research done into the disease in Solomon Islands and Papua New Guinea, the results of which are being put to use in the PestNet/ infoDev Linking Farmer project on Malaita in which KGA is a partner.

The project is exchanging information on the disease with farmers and testing some ways of improving its management. Thus, KGA has the expertise to bring assistance to taro growers on the Weather Coast.

There are two ways to control chuaka:

- the first is to rogue affected plants as soon as they are seen
- the second is to use resistant varieties.

Rogueing

The removal of affected plants will bring about control, but it has to be done by all growers as the gardens are close to each other,, making it easy for the planthopper to spread the disease. Gone are the days of isolated taro gardens hidden in the bush.

This brings a social dimension to disease management and it is right that KGA takes the lead in this. Training needs to be carried out in all the villages along the coast and backed with an illustrated leaflet (and/ or poster) in Pidgin. At present, growers just leave affected plants to die in the gardens, increasing the opportunity for planthoppers to acquire the virus and transmit it to other taro plants.

The introduction of resistant varieties

The second solution is more complex. Varieties resistant to chuaka exist on Malaita and there may be resistant varieties locally, but this was not clear from talking to the people.

At Boliu, a village close to Avuavu, the variety Akalomamale — a famed Malaitan variety common in coastal areas — had been introduced from Ngella. It is resistant to alomae (chuaka) but suffers from a related disease known as bobone: plants become distorted but eventually recover.

Another introduced, resistant variety, Oga, was seen at Bokasughu. The yield of these varieties is modest compared to the susceptible varieties but they provide farmers the opportunity to continue with taro cultivation. Without them, there is less chance of successful taro cultivation continuing unless the community-roguing program is successful.

The planthopper vector is controlled naturally by a mirid egg predator, *Cyrtorhinus fulvus*. None was seen during the survey so it may be worthwhile collecting it from other islands or other parts of Guadalcanal and introducing it to the Weather Coast. On its own, however, it will not control chuaka.

Interestingly, taro leaf blight (*Phytophthora colocasiae*) is not a disease of consequence anywhere on the Weather Coast. Some farmers mentioned it but it is unlikely that there are the epidemics that occur in coastal areas elsewhere in Solomon Islands. It may be that the cooler temperatures of the Weather Coast are not favourable to the disease, a similar situation to that existing in the highlands of Malaita. Alternatively, leaves may dry quickly in gardens that face the sea and on-shore winds.

Taro with chuaca > disease at Raeava

Yam

The Weather Coast was previously noted for its diversity of *Dioscorea alata*. Now the crop is under threat from a disease known locally as pange. This is almost certainly caused by the nematode, *Pratylenchus coffeae*.

In Pidgin, people refer to the symptoms as 'rough skin'. What is surprising is that the nematode is so widespread: it was mentioned in all the villages visited except in the Marasa area where sweet potato dominates and yam is rare.

Those that still had yam complained of anthracnose, caused by the fungus *Colletotrichum gloeosporioides*. *Pratylenchus* was not a problem on the Weather Coast 25 years ago when yams were collected to develop a national genebank.

The nematode attacks the roots, living and feeding inside them and causing considerable damage, eventually killing them. On the tubers, the infection is superficial beneath the bark but often covers large areas and assists secondary infections of fungi and other microorganisms. Tubers are commonly small because plants are weakened by root damage and infection of the tubers, which invariably progresses during storage, leading to loss of planting material, a serious consequence.

Control of the nematode requires farmers to understand what causes 'rough skin'. Seeing nematodes under a microscope and learning about their life cycle, especially how they infect and feed on the roots and tubers, is important to their understanding of what they are dealing with.

In order to bring about control, the planting material needs to be inspected carefully and be free from infection. Preferably,, any tuber with rough skin should be eaten and not planted. This is not always possible, especially when the disease is widespread. Inspection and removal of the diseased parts of the set is the next best option.

At Duidui, a tuber was inspected that had been bored by an insect. Damage was considerable (see illustration). The

Matamata — an unidentified disease resulting from a borer worm that affects yams at Duidui.

problem is called 'matamata' (worm), which refers to the larva that causes the damage. There is little more that can be said about until the cause has been identified. It did not appear to be common elsewhere on the Weather Coast and has never been reported in other parts of Solomon Islands.

At Raeavu, larvae were seen in yams affected by *Pratylenchus,* however the burrows were smaller than those of the matamata at Duidui and, probably, the larvae were secondary to the nematode infection.

As part of the attempt to broaden the diversity of yam grown on the Weather Coast, varieties from other Pacific islands should be introduced as well as local varieties that have been lost reintroduced. The best source is Vanuatu, where varieties have been identified (under the EU/ CIRAD South Pacific Yam Network) with good tuber shape, resistance to anthracnose, good taste and the ability to grow unstaked. Some of the selections are at the SPCRGC as tissue culture and others can be obtained from CIRAD, Vanuatu. A list of the recommended varieties, including some from Fiji and New Caledonia, is provided in Table 4.

< Yam (Dioscorea alata) with nematode damage (rough skin)

Wild yam under cultivation in a village

Table 4: *Yam varieties from Vanuatu, New Caledonia and Fiji recommended for the Weather Coast. Some are in tissue culture at the SPC RGC, others can be obtained as tubers from Vanuatu*

Vanuatu		New Caladonia		Fiji	
RGC no.	**Country name & no.**	**RGC no.**	**Country name & no.**	**RGC no.**	**Country name & no.**
DA/VAN-07	Patapata (480)	DA/NC-01	Koupet	DA/FJ-03	Taniela Vula Leka (rough skin)
DA/VAN-41	Basa (401)	DA/NC-02	Noumea Rouge	DA/FJ-04	Taniela Vula Leka A
DA/VAN-11	Lakon (603)				
DA/VAN-09	Letslets Nambas (578)				
DA/VAN-14	VU 029				
DA/VAN-16	VU 401				
DA/VAN-22	VU 461				
DA/VAN-28	VU 563				
DA/VAN-31	VU 633				
DA/VAN-35	VU 699				
Import directly (not at the RGC)					
	Suk (502)				
	Neitpnesi (723)				
	550 Mombri				
	Maligni (232 or 425)				
	Tumas (562)				

Cassava

Cassava is now an important staple crop on the Weather Coast, second only to sweet potato, however increased plantings have brought about infestations of the white peach scale, *Pseudaulacaspis pentagona*. Farmers all along the Weather Coast complain of the problem.

The same insect attacks sliperi kabis. The scale occurs in large numbers on both of these crops, forming a white stocking at the base of the stems.

People interviewed invariably talked about a white fungus or a white powder. It looks like that from a distance, but, on close inspection, masses of male and female scales can be seen, with the males the more prolific. Plants are damaged by large numbers of insects inserting long feeding tubes into the stem, sucking the sap and, in effect, starving the plant.

At Boliu, people said that the scale is worse in the wet season and that yields are affected at that time. Elsewhere, informants said that plants did not grow well and at Raeavu the edible roots were said to be 'strong' and sour when cooked.

To bring the scale under control requires expert advice. Assistance should be sought from the ACIAR-funded *Improved Plant Protection for Solomon Islands* project (starting mid-2005).

Cassava with white peach scale

The steps would be as follows:

1. Check what natural enemies (ladybird beetles and parasitoids) are present in the Solomon Islands. Samples from infested stems should be taken from the field and incubated to see what parasitoids emerge. Ladybird beetles can be collected from the plants. Identification of the parasitoids and coccinellids is necessary and needs to be arranged. SPC should be asked to bear the costs.
2. If 1. suggests that the parasitoid, *Encarsia diaspidicola*, is not in Solomon Islands, then it should be imported from Samoa (or Fiji, if present). It will be necessary to rear the insect for at least one generation on *Pseudaulacaspis* in the lab (the scale can be reared on potatoes) and sent to Solomon Islands under permit.
3. If 1. suggests that the parasitoid is present in Solomon Islands other than the Weather Coast, it can be transferred and monitored. If it is found to be on the Weather Coast already, then the situation will need to be assessed and plans made for further introductions of potential bicontrol agents.

It is recommended that varieties be introduced from Fiji to see if any are more vigorous under local conditions and can withstand the effects of the scale. These can be obtained from CIAT, via the SPCRGC.

The varieties of interest are: Yassawa vulatolu; Yabia damu; Vulkatolu; Merelesita; Tavioca Falawa; and New Guinea. In addition, the best local Solomon Island varieties, not present on the Weather Coast, should be collected and distributed; for instance, the variety 'my life' from Malaita.

The SPCRGC does have some CIAT varieties but these appear to have moderate or higher cyanide content. More information is needed about them before they are introduced.

Sweet potato

In contrast to the problems of taro, yam and cassava, sweet potato is relatively healthy.

There is the occasional problem of *Corticium rolfsii* (white fungal growth with small sclerotia the size of cabbage seed) causing stem rots at soil level, but little else. There is not much that can be done about *Corticium*, which is also a problem on peanut, but to grow crops that are not susceptible for a few years or fallow the land. Cassava is not attacked by *C. rolfsii*.

The main concern with sweet potato is its inability to yield in very wet soils where oxygen levels are low. If conditions are not favourable in the first 40 days after planting, the roots will not tuberise. Cultural techniques, such as digging deep trenches around the mounds, as used on Bougainville, offer some hope. It may be beneficial to introduce new varieties of sweet potato that can better tolerate the high rainfall of the Weather Coast, a recommended in the AusAID Strategy report.

The way forward is to obtain sweet potatoes from the SPCRGC.

The RGC has a number of varieties from Papua New Guinea that were selected for good performance under coastal conditions in the 1990s, from a collection of over 1000 accessions (EU-funded PRAP programme). Some of these are now being evaluated by an ACIAR/ World Vision project near Madang.

The RGC also has sweet potato varieties from Solomon Islands. These were the best varieties in the 1980s and were also selected by PRAP.

In addition, some of the highland varieties from Papua New Guinea have been suggested by Eilck Guaf (NARI) for the high bush of Guadalcanal and Malaita. In total, 31 varieties are recommended for introduction (Table 5). This is in addition to the clean-up and reintroduction of the best varieties grown on the Weather Coast at present.

How long the yields remain high before reinfection occurs is unknown, but the gain may be worth the effort, even if short term.

Not only will this strategy give farmers potentially high yielding varieties which may perform better under wet conditions (as they will be without internal pathogens), it will save farmers the constant search for better varieties. There is a continuous replacement of varieties because of virus-mediated decline in yield and other reasons.

New varieties come from seedlings that farmers throughout Solomon Islands find in their gardens. These are evaluated and, if found to be acceptable, are added to the number grown. In time, they replace those that are not growing as well.

At first, new varieties from seedlings are free of viruses but in time they become infected and decline in yield and the search for better varieties continues.

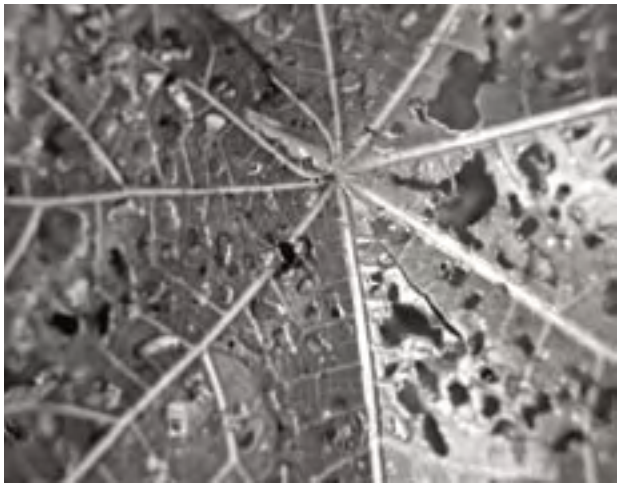
Sliperi kabis

All over the Solomon Islands, sliperi kabis is infested with Nisotra sp., a *Chrysomelid* beetle that makes numerous small — and sometimes not so small — holes in the leaves.

The only known control measure for this beetle comes from Papua New Guinea, where extracts of *Derris eliptica* are being used. This is an exotic species and is not present in Solomon Islands. Some local Derris varieties have been tested on Malaita but so far none has been found to be affective.

Fortunately, there are many alternative 'cabbages' that can be used on the Weather Coas. Diversity there is probably greater than elsewhere in Solomon Islands.

The other problem affecting slipper kabis is the white peach scale (see *cassava* for biocontrol recommendations).



Slipperi cabbage with insect damage

Table 5: *Sweet potato accessions held at the SPC RGC and recommended for testing on the Weather Coast (coastal and the bush)*

Solomon Islands		Papua New guinea		Other	
RGC IB no.	**SI no./ name**	**RGC IB no.**	**PNG accession no.**	**RGC IB no.**	**IITA accession no.**
087	172 WV5	225	K9*	047	TIS 3017
088	108 Sinulu	286	RAB 36*		
135	41 Moreai	241	KAV 61*		
183	85 Basana	239	L949*		
216	286 Anuta 2	261	K142*		
217	67	062	L46*		
234	279 Jimi		L125		
240	104 Wao		L997		
			L676		
			RAB45		
			RAB 35		
			RAB46		
			MAS1		
			NUG5		
		Selections from the bush			
		Naveto; Wanmum small; Gonime; Habare; Amasando; Sevento; Munduena			

*Selections in the ACIAR/World Vision trials in the Madang area, PNG

Orange and mandarin

Both crops grow well on the Weather Coast — the region has a reputation for producing good fruit. The fruit is planted among houses in the villages but the trees are not well cared for.

Two problems were observed during the assessment:

- the more serious is the premature tree death due to root rots caused by bracket fungi; several different types, including what looks like a *Ganoderma sp.* were collected for identification; the people do not realise that the fungi attack the roots and, if dead trees are left, they provide a food base for the fungus to spread along the roots to other trees nearby; dead and/ or dying trees should be dug out and burned, and any roots over 2.5cm should be pulled from the ground
- scale insects on the leaves, usually tended by ants, which can be controlled either by spraying the plants with a soap solution made by adding two tablespoons of soap (not detergent, as this might damage the foliage) to one litre water; alternatively, prevent the ants from tending the scales; if the ant nest is some distance from the roots of the orange it can be destroyed with boiling water; preferably and more safely, the trunks can be banded with a sticky gum taken from the bush; without ants, natural enemies will be able to attack the scales and keep them under control.

Citrus scale of the leaf

Citrus scale at Raevau

Bracket fungus of citrus attacks the roots, can kill the tree and spread along roots to nearby trees.

Banana

Everywhere, banana leaves show infections by leaf spot diseases. The importance of infestation varies with variety.

The most important disease is black Sigatoka (*Mycosphaeaella fijiensis*), most often seen on Cavendish clones, whereas the local germplasm has resistance.

At Duidui, people complained of the premature death of bananas. Inspection showed large holes (c.2cm dia) bored into the pseudostem at various heights from the ground.

In one area inspected, a nearby sago palm had symptoms of leaf damage caused by *Scapanes* — typically a truncated, small leaf. This occurs when the adult *Scapanes,* a large dynastid beetle, bores into the growing point of the palm and partially eats the leaf.

The beetle also attacks young coconuts and can kill them. It seems likely that the beetle is attacking bananas at Duidui by boring into the stem and eating the young leaves, after which secondary infections occur which lead to the collapse of the stem. No beetles were seen in wilted bananas but the holes in the stems were the size that *Scapanes* might make.

Control is difficult as the beetle has left by the time the symptoms are noticable. The most that can be done is to clear weeds and fallen trees from near the bananas to discourage the beetle attack (*Scapanes* is believed to lay its eggs under rotten logs and the larvae can often be found in the compacted soil beneath). Planting away for sago palm may also be a sensible precaution.

Summary of recommendations for pests and diseases

- **management of chuaka on taro:** educate farmers about the disease (leaflet/ poster in Pidgin); introduce resistant varieties from Malaita, Ngella or by bulking those locally available from Boliu and Bokasughu; introduce *Cyrtorhinus* egg predator
- **management of pange on yam:** provide information on the nature of the disease; introduction of varieties from Vanuatu/SPCRGC
- **improvement of sweet potato yields** (that may be linked to virus infection); introduce the pathogen-tested varieties from SPCRGC originally from Papua New Guinea and Solomon Islands
- **investigate biocontrol of scale on cassava and slippery kabis:** check if parasitoids are present in Solomon Islands and introduce them from overseas if necessary; introduce new varieties from SPCRGC an,d possibly, CIAT
- **management of orange fungal root rots and scales:** provide information to farmers on the use of soap sprays and ant control
- **link work to ACIAR project:** integrate plant protection needs of Weather Coast into *Improved Plant Protection for Solomon Islands* project that starts in late 2005, a project focussing on Malaita and Guadalcanal.

STRATEGY 3: STRATEGIES FOR INCOME-GENERATION

The greatest improvement to the livelihoods of Weather Coast farmers would come through investment in the construction of road access to markets in Honiara.

It is the lack of markets that limits productivity at different times of the year although the goods that farmers produce are of quality.

The assessors hope that a road connection or improved shipping services will eventuate and propose that the establishment of reliable transport links be seen as a national priority, although the cost would be high. It should be realised that the lack of livelihood opportunity and food insecurity on the Weather Coast have potential to contribute to political instability.

For the purposes of the Isolated Areas project:

- it is best to assume that transport issues will continue to determine regional opportunity
- an obvious solution would be to add value by processing crops that are grown at present
- a further initiative would be the introduction of new, high-value crops with market potential.

Enhancing and adding value to existing products

A key strategy of the Isolated Areas project is to develop products that do not deteriorate rapidly after processing, so that the constraints of transportation are minimised yet returns on investment are adequate. This section combines data from the assessment, the recommendations of the Isolated Areas project food technology consultant, Richard Beyer, with information from the AusAID Strategy marketing study carried out by Andrew McGregor (*Solomon Islands Sustainable Rural Livelihoods and Broad Based Growth Strategy Development: Markets and Marketing Situation and Issues Report*. Prepared by AndrewMcGregor).

This section also briefly considers possibilities for handicrafts.

Coconut

In Solomon Islands there is average consumption of 0.7 coconuts per person per day (McGregor) and we can assume that there is still considerable coconut production on the Weather Coast, with most of it consumed as food for humans or pigs.

Copra is being sold in some parts of the Weather Coast, particularly the Marasa area and the area from Avuavu to Marau, where there are private copra buyers. There is some, albeit limited, copra made from Avuavu to the Kuma River

Table 6: *Domestic prices for coconut products (September 2004)*

Product	Where sold	Price SBD / kg or litre
Copra	Honiara & Noro	1.3 to 1.5
	Provincial centres (ie rural traders)	0.8 to 1.10
Coconut oil		
▪ copra oil	Solomon Soap	2.5 to 3.4
▪ virgin oil	Kokonut Pacific	8
Whole nuts		
▪ dry nuts	Honiara market	0.5 to 1.0
▪ drinking nuts		1/nut wholesale & 2/nut retail

Of the interventions suggested in the AusAID Strategy on markets and marketing, the following recommendations have relevance for the Weather Coast:

- "Support for a promotional campaign to encourage the increased use of virgin coconut oil, produced by small hand oil presses (direct micro-expellers), as cooking oil on the local market."
  - for the Weather Coast, this could be done through promoting small-scale producers of virgin coconut oil using DME or micro-expellers to initially supply oil for food processing in the livelihoods component of Isolated Areas project
- "Marketing support for virgin coconut oil. This would include five years of support for meeting the overhead costs of organic certification."
  - for the Isolated Areas project, this might involve keeping project partners informed of market developments, and, if an organic market develops, facilitating links with the private sector.
- ongoing technical assistance in the development of coconut-based bio-fuel. (See Attachment 6 — energy).

Cocoa

Cocoa is a very important crop from Marasa to the Tina River and is clearly a very productive crop in this area.

Management issues include:

- Black Pod, caused by the fungus *Phytophthora palmivora*
- damage by rats
- trees are in need of pruning and, in some places, thinning where self-sown trees have grown.

Cocoa is also present in pockets on the Tractor Coast, especially in the area from Madakacho to Kuma and near Bokasughu.

In the AusAID Strategy on markets and marketing, a number of recommendations are made to rehabilitate the cocoa industry. The following have relevance for the Isolated Areas project and the Weather Coast in general:

- the inclusion of steel flues for cocoa driers as part of the CPRF copra drier program, highlighted as a major need in Marasa and Mbabanakira
- the rebuilding of the centralized cocoa facility at Marasa on the Guadalcanal weather coast
- inclusion of cocoa in support provided for organic certification
- facilitating the introduction of improved Black Pod-resistant varieties from PNG
- the attachment of a cocoa specialist to the DAL (Department of Agriculture and Lands).

The third and fifth points are areas where the Isolated Areas project might provide assistance, particularly in the Marasa to Tina River area where cocoa is the main livelihood. It could facilitate training by DAL or CEMA cocoa technicians and also help to explore value-adding possibilities as well as organic certification (this might be done in conjunction with other organisations, eg. World Vision).

Betel Nut

Betel nut is an important cash crop in local markets on the Weather Coast and in occasional sales in Honiara.

The nut has a relatively long shelf life and, being a narcotic, the demand is always high.

The Isolated Areas project could help farmers make sound marketing decisions, to disseminate market information on betel nut prices in Honiara and encourage families to plant more of the crop as one in a range of cash crops options.

Marketing betel nut from the Weather Coast

Betel nut prices on the Honiara market fluctuate widely, according to supply. Villagers at Kolina say that this can be from SB$80 to SB$200-3000 per 20kg rice bag.

At a price of SB$80, they say that they would make a large loss after taking transport and living expenses into account.

At present, coming to Honiara to sell betel nut is a gamble as growers will not know what the prices are until they arrive. The wrong decision can be expensive.

A farmer will base his decision to travel to Honiara on market information received from those who have just returned. The information can be several days, even weeks, out of date.

Coffee

The agricultural research division piloted the *Robusta* variety of coffee in the mountains of Guadalcanal in the 1980s. It was not as successful there, due to high rainfall and access to markets,, as on the island of Isabel where it was introduced later (Barry Evans – AusAID Strategy).

Reports have appeared in the media about farmers from upland areas of North Guadalcanal harvesting good yields of beans. The Kolomola Marketing Association is selling ground Isabel coffee and beans in Honiara, but with limited success, having encountered problems with quality and taste.

The Solomon Islands produces only a few tonnes of coffee a year. Twenty years ago, coffee might have been promoted to diversify the economy but today this is no longer the case. The only possibilities for a Solomon Island coffee industry, according to the AusAID Strategy market and marketing, are:

- import substitution, such as the sale of branded coffee to the domestic market (the model in Fiji and Samoa)
- exporting a speciality-differentiated Solomon Islands coffee (the East Timor and Tanna Coffee model).

Recommendations for coconut, cocoa, betel nut and coffee for the Isolated Areas project:

1. Liase with AusAID CSP on current plans for cocoa and links with the Weather Coast.
2. Discuss with DAL and CEMA the possibility for trainers for cocoa management and pruning.
3. Introduce techniques for production of 'cocoa Samoa' home-made raw cocoa blocks that can be used for hot chocolate and for the cooking of chocolate cakes, biscuits etc; the product has potential in the local and urban markets; KGA has links with a Samoan NGO, Women In Business, who are prepared to provide training.
4. Investigate options for low cost coconut oil production in the Avuavu area for use in the processing of banana chips.
5. Develop links with the AusAID market information project and ensure that betel prices are included; publicise this service on the Weather Coast and investigate using the HF radio network to share price information between Isolated Areas project partners and lead farmers.
6. Discover if any coffee farmers exist in the hinterland of the Weather Coast during the up-coming assessment of bush communities. If found, explore market possibilities — possibly the idea of a blended product along the import substitution model.
7. Arrange farmer-to-farmer visit for Weather Coast highland farmers to see coffee production in Isabel so that they can make a decision whether to grow the crop.

Crafts

'Bukaware' is a type of basketry produced on the Moro Coast and in bush areas. It is is sold in Tavanipupu and Honiara. Baskets, trays, mats and other products are woven.

The project will explore the possibility of improved marketing, possibly through the Farmer Fresh project in Honiara.

Developing markets for fresh fruit & nuts

Melons, pineapple, citrus fruits, root crops, bananas

Local markets for fresh produce are important to village and family economies along the Weather Coast.

Women, in particular, benefit from the markets but financial returns are quite small on the sale of fresh fruits and vegetables. What is on sale is already available to all and there is little point in increasing production without an increase in demand.

Shipping the major difficulty

Without reliable shipping, the marketing of fresh, Weather Coast produce in Honiara will continue to be difficult except for Marasa and districts close to Marau. Canoes equipped with outboard motors regularly connect these districts to Honiara and shipping is less erratic. It is only in these places that an urban market-oriented agriculture would have potential.

In these areas, providing training and support to farmer groups, particularly women's groups, could address collaboration in dealing with marketing costs but not production, which should remain on a household basis. Collaboration could encourage the pooling of resources, especially for marketing.

Farmer Fresh could benefit farmers

Linkages to the KGA Farmer Fresh programme may be possible and desirable.

Farmer Fresh is of potential benefit to other parts of the Weather Coast where less-perishable products such as ngali nut, root crops, melon, pineapple and citrus, are produced.

Individual farmer involvement in marketing

A characteristic of produce marketing in PICs is the high level of individual grower involvement in marketing. The exception is Fiji, where there is a much more substantial involvement of middlemen and traders in the marketing chain. In the Solomon Islands, it is only in the betel nut trade that there seems to be any significant involvement of middlemen and traders in produce marketing. The high involvement of individual growers in produce marketing is explained by a combination of factors:

- a perception that higher returns can be achieved by cutting out the middleman;
- poor telecommunications;
- lack of confidence in the marketing chain; and,
- farmers using produce trading to help subsidize trips to Honiara or to other provincial centers.

The adverse consequences of a high level of farmer involvement in produce marketing are:

- higher marketing costs;
- decreased returns to growers;
- poorer quality product;
- labour resources are diverted from production to marketing activities;
- inconsistency of supply flows;
- limited market outlets; and,
- increased consumer prices.

Andrew McGregor. AusAID Strategy Marketing Consultant

Bukaware basketry (this and facing page) has potential for marketing if links can be made with marketing organisations in Honiara

Recommendations for the Isolated Areas project:

1. Support the development of farmer groups, and/ or the activities of traders, on the east and west fringes of the Weather Coast, who are able to mobilise and/ or pool resources to market fresh produce and betel nut in Honiara. Training could be provided by the Sausama Farmers' Group in Western Province, based on their experiences of pooled marketing for the Gizo market.
2. Facilitate links with the Farmer Fresh program in Honiara to market less-perishable products.
3. Encourage PFNet and the CBTC network to publicise market information, particularly on betel nut prices.
4. Liase with CSP concerning ideas for new, covered local markets on the Weather Coast, particularly at secondary schools.
5. Explore the viability of off-season pineapple production through developing linkages with the Vanuatu NGO, Farm Support Association, for areas that have more regular shipping services.

Indigenous nuts

The Weather Coast has significant quantities of ngali nut and cut nut (*Barringtonia procera* and other *Barringtonia* species), with cut nut particularly abundant in villages and with most families owning a grove or more of ngali nuts on the hillsides, typical of their occurrence elsewhere in Solomon Islands.

It was not possible to estimate total production of either species, but only a very small portion is marketed.

A national cut nut germplasm collection was established in the 1980s at the then-Field Experiment Station, Avuavu. This collection is now under the management of TCBTC and represents a major resource for evaluation, propagation and eventual distribution.

Research is being done on the domestication of cut nut, with fieldwork in the Western Province (a PhD student, Richard Pauku, is undertaking the research, supervised by Dr Roger Leakey, James Cook University, Australia). The research has demonstrated enormous variation among cultivars. There appears to be potential for rapid multiplication of superior varieties with marketable characteristics.

Product development underway

The Isolated Areas project has engaged Richard Beyer to develop products that can be processed and packaged locally. Farmer Fresh is investigating the selling of unprocessed bulk nuts to new processors in Honiara. Both these initiatives appear promising.

To date, processing tested by the Isolated Areas project has involved baking the nut in traditional stone ovens, deep-frying and slow-drying in an electric fruit dehydrator.

Consumer reaction has been very positive. The packets have good market appeal and the products can be stored reasonably well for off-season supply, for at least four months.

Importantly, the price differential between rural and urban markets makes processing appear to be viable, whereas purchasing raw nuts in urban markets for processing and sale is not profitable. This has encouraged Farmer Fresh to work with a Weather Coast woman living in Honiara to develop packets of processed ngali nuts. This seems to be promising with one product already on the shelves — a mixed ngali nut, peanut and dried fruit snack.

Restraints to commercialisation

There are constraints to the small-scale commercial development of nut products, such as problems commonly associated with starting any business. There are also difficulties with the raw material itself.

The Isolated Areas project could encourage people by:

- helping them obtain the initial capital to purchase nuts from the Weather Coast
- assisting with the development of links with retailers and wholesalers in Honiara
- facilitating access to market research being carried out by an independent ACIAR project to determine the potential for indigenous nut products.

Ideally, these approaches would involve the development of partnerships with people from the Weather Coast who are living in Honiara and who retain a commitment to help their communities.

There is no tradition of processing cut nut in Solomon Islands. The nut has been dried successfully in Vanuatu and sold at the Kava Store. If cut nut from the Weather Coast are to be processed for market, research into useful products would be worthwhile.

Recommendation for the Isolated Areas project:

1. Continue trials with food technology consultant to develop non-perishable products from cut nut.
2. Continue work on processing ngali nut for people in Weather Coast villages, training centres and in Honiara. Continue to develop market linkages.
3. Carry out gross margin analyses for different processing methods and retailing approaches and compare these with other income-earning opportunities on the Weather Coast.
4. Carry out research into consumer acceptability and on linking with other initiatives such as the ACIAR project on indigenous nuts in Melanesia and the planned survey on ngali nut in Solomon Islands scheduled for August 2005.
5. Carry out trials of packaging options to develop products with a long shelf life to make possible out-of-season sales.
6. Investigate energy options for TCBTC and family-based processors if drying nuts becomes the favoured processing method.
7. Facilitate links to other programs, such as the planned World Bank energy project in Solomon Islands.

Develop chips, jam and chutney products

With support from the Isolated Areas project, TCBTC developed a number of products during a workshop at Avuavu. The potential of the products is currently being assessed.

The products include:

- chips made from *Xanthosoma*, yam and banana
- chutneys made from chilli
- marmalade made from cumquats
- jam from Barbados Cherry, an exotic tree rich in vitamin C
- a number of fruits in syrup.

Peanut is also being bulked, although it may not be an ideal crop except in river basins.

Wild mangoes are plentiful, particularly on the Keke Coast. The project will look at the diversity of germplasm that exists within the wild mango resource and select types with processing potential, such as production of chutneys and for drying.

Recommendations for the Isolated Areas project:

1. Complete gross margin analysis of products to ensure they provide sufficient returns on the investment needed.
2. Establish fruit tree nurseries with a farmer or RTC and an extension program to increase production of cumquat and Barbados Cherry, in particular, as both produce well on the Weather Coast and have unique, high quality jam potential.
3. Develop packaging options that are appropriate to Weather Coast conditions and to local incomes.
4. Develop market linkages.
5. Provide training, particularly to women, through an extension and support program based at TCBTC.
6. Trial the use of virgin coconut oil for chip production and, if effective, investigate potential for use in the Avuavu–Madakacho–Makaruka area.
7. Assess the processing potential of wild mangoes.

Develop new, best-bet products for the Weather Coast

Spices

Chillies

Chillies grow well on the Weather Coast and, according to the AusAID marketing section, there exists opportunities to enter the commercial chilli market:

- production of chilli tuna is currently constrained by limited supply of dried chilli; to increase supply the company has raised the price of chilli from SBD$8 to SBD$50 per kg.
- there is a demand for chilli from Soltai cannery at Noro and opportunity to increase production of chilli tuna by exporting to neighbouring Melanesian countries where the brand is well known and, in the longer term, to niche markets worldwide; the estimated demand for chillies for Solomon Taiyo would be at least 10, 000 kg (dried) which, based upon sales in 1990s, is achievable.

Constraints

The major constraints to chilli production identified in the AusAID marketing section are:

- a shortage of seeds
- farmer reluctance to grow chillies because they are unpleasant to handle during harvesting and drying
- weak supply linkages
- inadequate knowledge on how to dry chillies correctly
- infestations of white peach scale that could become a major constraint, unless controlled, if production increased.

Recommendations for the Isolated Areas project:

1. Obtain seeds of 'Akabare' chilli and 'birds' eye' chilli for demonstration plots at TCBTC and at other training centres.
2. Increase chilli production through a limited number of trial plots, with the aim of supplying Solomon Taiyo through their agent in Honiara and for local processing into chilli chutney developed under Isolated Areas Project, Phase I.
3. Set up a chilli drier at TCBTC and conduct trials with local farmers and students on the safe handling of chillies. Trainers from Bougainville and/ or NARI could assist.
4. Ensure the ACIAR SI plant protection project has control of white peach scale as one of its activities.
5. Identify a container with a seal capable of containing chilli paste and chutney, an issue identified in Isolated Areas Project Phase One.

Cardamom

Cardamom is a crop with good Weather Coast potential. It is easy to grow and has relatively high value, with SB$12 per kg/ dried being paid in Rabaul. A company from Isabel Province is currently selling small quantities of packaged cardamom in Honiara for SB$6 a packet. The spice might be sold in small quantities at the Honiara Bulk Store and from other retail outlets while other market are being explored.

The spice has been grown in north Malaita and at Betilonga, in the hills behind Mount Austin, Guadalcanal. It grew well in both locations, bearing fruit and producing a product of acceptable quality.

On Bougainville, the PNG province situated close to the northern Solomons, the community-based organization PEDC — a member of the Melanesian Farmer First Network (which links and provides support to organizations working in food security, community health, agriculture and livelihood creation in the region - www.terracircle.org.au) — has been successful in developing a fledgling cardamom industry for remote mountain communities at altitudes above 600m.

PEDC has developed experience in cardarmom production, drying and marketing and has developed an effective extension program to spread the skills among farmers.

Pacific Spices in Rabaul, PNG, is purchasing cardamom and the company and will explore the possibility of producing the essential oil if production in Bougainville continues to increase. It is currently at about two tonnes/ wet pods every three months.

Recommendations for the Isolated Areas project:

1. Establish cardamom nurseries with selected highland farmers.
2. Arrange for PEDC to visit and train farmers and to demonstrate the fabrication of driers.
3. Explore the possibility of:
4. reciprocal visits to Bougainville by lead farmers from bush communities so they can learn about cardamom production as part of an integrated sustainable farming systems program for highland communities
5. consider sponsoring students for the one year course at PEDC, which includes courses on alternative cash crops.
6. Carry out market research; identify export requirements; develop links with buyers; involve the Kolomola Marketing Association from Isabel in these processes and jointly develop plans for increased cardamom production and marketing.

Pepper

Pepper's requires a hot, wet climate at an altitude below 300 metres. This makes the crop suitable for the Weather Coast, unlike vanilla which requires a dry season to flower.

The labour demands of pepper are less than many other crops — about 25 days/ year for a planting of 300 vines — or 1/3ha. Marketing is easier because, once dried, the corns are less likely to perish. Capable of being grown at various spacings to allow intercropping, its shade tolerance allows it to be planted under coconut or other trees.

An internationally competitive small industry

Pepper is usually a bulk commodity dominated by large producers in Vietnam, India, Malaysia and Indonesia. Vietnam, the world's largest exporter, produces over 100, 000 tonnes of pepper a year from plantings totaling 50, 000 ha.

It may appear unlikely that a fledgling Solomon Island pepper industry could compete with these established and dominant markets, however the experience of other Pacific Island countries such as Pohnpei (Federated States of Micronesia), Vanuatu and, to a lesser extent Fiji, indicate that it is possible to establish small pepper industries for local and gourmet markets.

Case study— the industry in Vanuatu

Economic analysis of smallholder pepper production at South Santo in Vanuatu shows an annual return of Vatu 31,500 (approximately SB$2100) and Vatu 1, 200 (SB$80) per person-day of effort from 300 pepper vines.

Vanuatu farmers sell the dried, clean peppercorns to a local company for Vatu 350 (SB$23/kg). The pepper is then attractively packaged for sale. To generate this income, farmers need only to invest in a small drier — materials include iron for a ridge cap, clear plastic and wire for drying racks. The drier is used for other products such as chilies. Harvesting and processing is completed at one time for a lump sum payment.

For Vanuatu farmers, pepper is a low-labour input, low-risk, reasonable-return farming activity.

The Vanuatu model has potential in Solomon Islands where both peppers and chilies could be grown at the same time. The Honiara Bulk Store is a potential buyer for both crops providing supplies remain of good quality.

Creating links between producers and buyers is the greatest challenge to the successful development of pepper as cash crop. KGA's existing links with the Farm Support Association and Venui Vanilla — the groups which developed the Vanuatu pepper industry — could prove of value in starting commercial cropping on the Weather Coast.

Recommendations for the Isolated Areas project:

1. Continue discussions with Papua New Guinea, Vanuatu and Fiji about obtaining planting material in the form of tissue cultures through the SPCRGC, sufficient to establish four or five nurseries on the Weather Coast.
2. Develop links with the Honiara Bulk Store with the aim of starting trial sales of pepper.
3. Facilitate training by Farm Support Association, Vanuatu, in pepper production, once trial plots are established.

Kava

The main market for kava will probably be in the Pacific.

Currently, European markets do not accept the product although Germany is reconsidering its ban on imports. It remains unclear whether consumers are ready to accept the product again.

Varieties of kava are grown in Solomon Islands, Fiji and Vanuatu. There may be potential for production on the Weather Coast.

Buni tree (*Callophyllum inophyllum*)

The Buni (a Pijin name) tree grows in abundance on the Weather Coast and it has potential as a high-value, non-perishable product at local markets and as an export commodity. Advice on the product cycle may be obtainable from Venui Vanilla, Vanuatu.

In Vanuatu, a cosmetic/ medicinal oil is extracted from the seeds and sold to local and tourist markets.

Buni trees — Callophyllum inophyllum

STRATEGY 4: STRENGTHEN AN ENABLING ENVIRONMENT

Infrastructure

Guadalcanal Province has allocated funds from the current year's budget to repair the gravel road from Marau to Sukiki, which previously went as far a Kuma. AusAID CSP plans to do upgrade the section, Marau to Avuavu in 12 to 24 months time.

These repairs may face some serious obstacles as CSP is not looking at building bridges. The river crossings are always difficult, at times impassable.

Policies

The team was not able to ascertain if either the provincial or national government has any specific policy or strategy to assist with food security and livelihoods on the Weather Coast.

Isolated Areas project should share the experiences and lessons learned from the assessment and its project work with the Guadalcanal Province. There may be opportunities to become involved or to facilitate the involvement of weather coast partners in the planning process as the Province moves out of its present post-conflict roles.

It needs to be recognised that the capacity of the Province appears to be severely constrained following the ethnic tension,. NGOs can play an important role in filling the gap that has been created, now and in the future.

Gender

As illustrated inTable 6, women carry a disproportionate share of the burden of food production and family care on the Weather Coast, a pattern typical of Solomon Islands. The burden is greater on the Coast because food prduction is more difficult.

There is variation from family to family but, typically, women are producing food with occasional help from others.

Men construct houses, cut down trees, fish when the weather allows and take care of plantation crops where these can be grown.

Table 7: *A typical weekly routine for women on the Weather Coast*

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Morning	Community work day	School work day	Garden (some women in mother/ women's group)	Mother group meets or garden	Community work day	Market and go to garden	Rest day
Afternoon	Help in clinic clean up or go to garden	Garden	Walk to market or go to garden	Garden	Garden	Prepare food for Sunday	
Evening	Cook family meal	Literacy class	Cook family meal	Cook family meal	Cook family meal	Cook family meal	Cook family meal

Table 8: *Women's daily routines*

Time	Activity
6am	Go to kitchen > light fire > sweep > collect water > cook morning meal for family > clean pots, plates, clothes > feed pigs
7am	Eat > prepare food for small children who stay behind in the village > give food to students to take to school
8-10am	Walk to garden > work in garden: clean, hoe, plant, weed, harvest > cut firewood
4-6pm	Return from garden: carry food and firewood;to village > feed pigs
6-7.30pm	Cook > eat
8pm	Wash small children > put children to sleep > go to bed.

Women in the Marasa district complained that only small amounts of income from cash crops made it back to the household. Income was reported to be often spent on alcohol or on trips to town.

Men make occasional trips to Honiara or Western Province in search of work, but, again, little cash is sent home. Women have very limited opportunities to market produce in Honiara, with the exception of opportunistic marketing when travelling for a different purpose, such as to visit relatives.

Women engage in selling in local markets. This provides an important, regular, but very low source of income (SB$10-40 a month). Community obligations to church, school, clinic and other community endeavours place further demands on women's time.

It is important to involve women in all of the activities of the Isolated Areas project although, in doing so, it is necessary to consider their very limited time availability.

Susan is a village woman who cultivates wild yams within the village

Institutions

With one Department of Agriculture and Livestock officer at Avuavu and no reports of him being involved in any extension programs apart from rice, DAL is not well represented on the Weather Coast.

A rice mill has recently been installed but is not yet operational. Regrettably, none of the farmers spoken to consider the officer to be an asset to the Weather Coast. The DAL officer in the Kuma River area was recently made redundant.

Ideally, TCBTC should develop a partnership with DAL so that germplasm can be transferred into and out of the centre. DAL would like to access the germplasm that exists for the benefit of other provinces, especially the tree collections. TCBTC would prefer DAL's assistance in bringing material from other parts of Solomon Islands and from the SPCRGC. It seems sensible to develop reciprocal agreements.

Making improvements — people take over field station

DAL once operated a Field Experiment Station at Avuavu and established a collection of exotic fruit trees. A national collection of cut nut was developed.

Unfortunately, the station fell into disuse in the 1990s and, after the ethnic tension, was taken over by the landowners and converted into a community-based training centre.

The station is now a community-owned facility under local management and responding to local needs. It is a good example of what can be achieved when people realise that they have to take the initiative if they want their lives to change for the better.

Recommendations for the Isolated Areas project:

1. Assist TCBTC develop a mutually beneficial agreement to share germplasm with DAL.
2. Assist TCBTC in applying for import permits to obtain the germplasm of a range of food crops held by the SPCRGC. Cooperate in storing germplasm (taro and sweet potato) at the RGC that might otherwise be lost due to diseases and varietal decline.

Young taro (foreground) with sweet potato and bananas in subsistence bush garden.

Cooperation among institutions and training centres along the Weather Coast has the potential to assist subsistence gardeners expand production so as to earn income from small-scale cash cropping.

Turusuala Community-Based Training Centre

TCBTC will be the main partner for the Isolated Areas project programme on the Weather Coast and will coordinate project activities.

The Centre will:

- maintain and enhance the food crop and tree collections
- test new technologies
- develop outreach programs
- as much as possible, the Centre will involve students so that on their return to their villages thay are equiped to make an impact

TCBTC will develop as a food-processing centre, fostering market links to Honiara and elsewhere. These initiatives should explore the possibility of supplying fresh produce to Avuavu secondary school. This could make a significant impact on the local economy.

In order for TCBTC to take on these roles, it will need support from both the Isolated Areas project and also from its existing management committee, with community representation.

There are two other centres on the Weather Coast: the Belanimanu Training Centre and the Taro Bible School. Both have potential and will be invited to participate in the Isolated Areas project under the leadership of TCBTC. Potentially, they could function as satellite centres for Isolated Areas project activities in their areas. They will need support and training to carry out this role.

Recommendations for the Isolated Areas project:

1. Encourage farmers in the Turusuala area to bulk crops for processing and for sale to Avuavu secondary school if an agreement can be made with the school.
2. Encourage people to form farmers' networks to take advantage of developments at TCBTC.
3. Help TCBTC develop a business plan that encourages training and development activities of the Centre.
4. Assist the deputy principal in developing the training role of the Centre.
5. Assess the need for a full-time coordinator as well as processing and nursery technicians supported by the Isolated Areas project.
6. Assess the use of student graduates to develop a network of farmers to carry out the germplasm introductions (and other activities) of the Isolated Areas project.
7. Hold regular meetings with Tari and Belanimanu training centres to plan their involvement in the project.

Turusuala Community-Based Training Centre

ENERGY AND LIVELIHOODS

Electrical engineer and livelihoods advisor, Andrew Mears, accompanied the food security assessment team on the Weather Coast assessment tour. Some of his observations have been incorporated within the body of this report. Others appear below.

Developing services on the coast

Staffing of services

Staffing levels at schools are lower than national averages due to difficulty in recruiting and retaining staff for this remote location (AvuAvu had only 11 of the 20 teacher's position's filled).

The staffing levels of health facilities are below national averages as trained health workers are unwilling to live in the remote locations of the Guadalcanal Weather Coast.

The recruiting of teachers and health workers from outside the coast is made more difficult by the persistence of fears about conflict, especially for Malaitans (Malaita is a large, island east of Guadalcanal with the greatest population density in the Solomon Islands; some Malaitans were directly involved in the so-called ethnic conflict through the Malaita Eagle Force militia). This further exacerbates staff shortages at health facilities and schools.

Lack of modern energy limits development of services

There is poor access to modern forms of energy for health services, schools and enterprises. Other than a few small generators (which rarely have enough fuel to operate) and several solar panels there is no electricity. As in many remote communities in the Solomon Islands, limited access to modern energy (diesel/petrol fuels, kerosene and electricity) will limit the delivery of services and the productive utilisation of local resources.

The main energy source along the Weather Coast is wood although some households have limited and unreliable access to kerosene, which is used for lighting only.

Due to a lack of household lighting there is little activity at night. This limits the productive and social activities of households and is a factor contributing to the difficulty of attracting and retaining teachers and health workers on the coast.

Good household lighting enables students to better prepare for their studies and frees time for productive or social activities during daylight hours. This is particularly significant for girls, whose daylight hours are spent almost exclusively on family duties.

Poor transport and limited access to markets means that access to kerosene and fuel is unreliable and unaffordable. The team saw are no functioning generators and few solar panels on the Weather Coast.

Without improved access to modern energy for communications, lighting and productive uses, value-adding to local products will not be possible.

The lack of electricity is a factor in deterring teachers and health workers and reduces their ability to deliver services. It limits opportunities for preservation, processing and packaging of food for the Honiara and local markets.

Local energy sources could assist local livelihoods

Improved access to modern energy (kerosene, diesel/petrol, electricity) will improve non-subsistence activities, especially those relating to income generation and access to services. Access, however, is dependent on transport and, so, is unlikely to be directly influenced by the activities of the Isolated Areas project.

The exploitation of local sources of energy would offer potential to substitute for imported energy sources. These include hydroelectric, solar, wind and coconut oil biofuels.

Local hydro — small-scale energy

There are substantial hydro resources on the Weather Coast (Japanese Government funded 'Master Plan', 2001). However, low population densities and a lack of large-scale uses does not justify the large power system required.

Small-scale hydro schemes, which would produce energy for specific purpose, may be viable. Lacking is accurate data on the available resource. During the field trip it was noted that resources for small-scale hydroelectric schemes exist on the Keke Coast, in the AvuAvu area and on the Moro Coast.

Electricity produced by a small hydro scheme would enable a range of food processing and packaging methods at the TCBTC.

Solar prospects limited but useful

The Solomon Islands has, in general, good insolation — 5 kWh/m2/day (Solarex map, 1992) — although the weather coast, by virtue of its double wet season, has a substantially reduced solar energy potential.

Despite this, there are some effective local models for the use of solar electricity emerging in Sukiki and Makaruka. These take the form of small solar battery charging enterprises consisting of a 20 - 40 Wp solar panel which serves a number of households, each of which own a small, deep cycle battery (specifically designed for use with renewable energy systems such as solar photovoltaic) and light.

This locally-adapted model may be suited to scaling up, possibly as a component of the broader extension projects of the TCBTC. A benefit would be reduced household expenditure on kerosene, producing substantial cash savings while providing high-quality light well suited to night time activities. This offers the potential to increase the period of the day in which both productive and social activities can be practiced, especially for women and girls.

Import substitution with coconut oil biofuel

Coconut oil can be produced from coconut or copra through the use of a mechanical press. The oil can be used as a blending agent or as a direct substitute for diesel fuel in diesel generators.

The biofuel would be suited to local use at specific service centres or production sites where there is sufficient demand to justify its production. The AvuAvu health services, high school and associated staff houses may be suitable customers for electricity produced by generators fuelled by locally produced oil.

The biofuel has potential in areas where there are substantial copra resources in conjunction with a suitable end-use. A substantial end-use is required to make the production of bio-fuels viable.

Other end-uses such as refrigeration, communications and power tools for furniture production are possible and may emerge at other sites along the coast once a suitable supply of bio-fuel is available.

Recommendations for the Isolated Areas project:

- establish small-scale hydro at TCBTC for general use and to facilitate the processing and packaging of food items
- link with other suitable programs (eg. the proposed World Bank energy project) to expand village extension services to improve access to solar electricity using the low-cost battery charging service approach
- once virgin coconut oil production is establish, identify partners that could build on the established copra supply chain and expand production to produce coconut oil bio-fuel for local use
- once the Isolate Areas project has established reliable supplies of coconut/copra for the small-scale production of virgin oil, links should be identified with other programs to scale-up production.

Battery recharging enterprise made sustainable

In 1997, the US-based Solar Electric Light Fund and the Guadalcanal Rural Electrification Agency (GREA) established a credit scheme to assist 45 households in two villages (Sukiki and Makaruka) on the Guadalcanal Weather Coast acquire small solar electricity systems (40Wp solar panel with three lights plus radio).

The scheme involved the establishment of a revolving credit fund and the training of owners and local technicians.

The loans proved unaffordable and most households defaulted, resulting in the repossession of the solar panels in all but 10 households.

Several of the households which retained their panels started to recharge other households' batteries. In a few cases this earns a small fee.

Some houses, not previously in the GREA scheme, have subsequently purchased their own small, deep cycle battery (7Ah) and bulb (7W CFL) and are paying to have the battery recharged.

The battery and light setup costs less than SD$60 and recharge costs SD$2/month. Participating households have good quality electric light and no longer purchase kerosene for lighting.

SUMMARY OF RECOMMENDED INTERVENTIONS

Table 9:

Diversification of food production

Crop	Activity	Bush	Tina River	Keke Coast	Kuma Coast	Avuavu	Moro	Tractor Coast
Sweet potato	1) ID best vars. from WC, bulk and distribute. 2) 'clean up' local vars. via RGC and reintroduce. 3) introduce PNG vars. and reintroduce 'old' Solomon Island vars. (via RGC), bulk and distribute.		xx	x	x	xx	x	x
Cassava	1) Introduce vars. from RGC (Fiji and South America) and other areas of Solomon Islands (eg. North Guadalcanal).		x	x	x	xx	x	x
Yam	1) Collect best vars. from areas which have retained germ plasm (take farmers to the WC areas to make selections) and use rapid multiplication methods and distribute. 2) Introduce Kinabeyo (and Vanuatu yam) to RTCs and multiply. 3) Training/leaflets on better management of Pratylenchus nematode. 4) Introduce best vars. from Vanuatu. 5) Training on mini set multiplication method.	?	xx	xx	x	x	x	x
Pana	1) Collect in Ngella (taking WC farmers to make selections). 2) Bulk in river basins with farmers and distribute.	?	xx	xx	x	x	x	x
Banana	1) Collect banana and plant at RTCs/Bokasughu. 2) Select vars. from Manivovo collection, bulk and distribute. 3) Exchange WC vars. with Manivovo. 4) Training in descriptors (? links to FSM vitamin A project). 5) Plant demo blocks (linked to chip processing).	x	x	xx	xx	xxx	xx	x
Taro	1) Collect kaka lava (late) and kake baka (early) vars. (hold diversity fair and estab. collection at TRTC). 2) ID resistant vars. to chuaka. 3) Collect local and/or introduced vars. from Malaita, bulk and distribute. 4) Leaflets and awareness on chuaka. 5) Find out situation in bush re chuaka.	x		xx	xx	x	x	x
Breadfruit	1) Collect Reef Islands vars. (West, not Temotu), bulk at TRTC and with farmers, and distribute. 2) Introduce new vars. via RGC.	x	x	x	x	xx	x	
Wild yam	1) Tame and encourage greater planting of D. nummularia/D. pentaphylla. 2) Encourage planting of D. bulbifera for taumana.			xx	xx	x	xx	
Greens/ vegetables	1) Encourage fern cultivation plus other wild greens. 2) Promote PMN and make seed available.	x	X	x	x	x	x	x

Management

Crop	Activity	Bush	Tina River	Keke Coast	Kuma Coast	Avuavu	Moro	Tractor Coast
Livestock	1) Training on improved management of penned pigs (demos at RTCs). 2) Investigate 'cough cough'. 3) Breeding/ cross breeding TRTCs. 4) Link to ACIAR poultry feed project.			×	××	×	××	
Pest disease	1) Investigate biocontrol of scale on cassava and slippery kabis. 2) Link to ACIAR IPM project. 3) Managing of orange root diseases.	×	×	×	×	×	×	×
Soils/ production	1) Test new techniques eg. drainage, slash and mulch, legume trees and cover crops, use of animal manure. 2) Determine better options for use of land under coconuts. 3) Workshops on better management of cocoa plantations.				×	××		
Planing	1) Awareness on eg need for diversification, seasonal activities, pig management, land use planning. 2) Trials on planting sweet potatoes throughout year with record of yields.	×	×	×	×	××	×	×

Legend

× Number of 'x's indicates relevance to intervention

? Considered relevant but needs to be confirmed.

Diversification of livelihoods

Crop	Activity	Bush	Tina River	Keke Coast	Kuma Coast	Avuavu	Moro	Tractor Coast
Adding value to existing products	1) Mango processing. 2) Coconut oil (biofuel, vinegar, soap, food, livestock feed). 3) Banana chips. 4) Fruit jams, juices, drying. 5) Chilli chutney/vinegar. 6) Ngali nut and cut nut processing. 7) Cocoa processing. 8) Smoking/ drying of tilapia. 9) Timber.		(1) Cocoa processing	Mango processing; ngali/ cut nut processing.	Coconut oil; ngali processing.	Coconut oil; banana chips; fruit/ jams; chilli/ chutney; fish smoking.	Coconut oil	(2) Cocoa processing.
New products	1) Cardamom/coffee. 2) Pepper (introduction of germ plasm — the virus issue). 3) Chilli. 4) Sago starch processing. 5) Mushroom cultivation/ drying. 6) Other non-timber forest products (ethnobotanical survey including medicinal). 7) Callophyllum oil.	Cardamom; ethno-botanical survey.		Sago processing (1) Collophyllum oil.	Sago processing	Pepper; mushroom cultivation.	Chilli; sago processing; (2) Callophyllum oil.	
Market links	1) Advice on marketing garden produce for Honiara market (coordination of transport). 2) Secondary school at Avuavu; food processing at TRTC. 3) Craft marketing. 4) Organic certification of cocoa. 5) Help Honiara entrepreneurs/ outlets. 6) Information on market prices.		Market transport organization; organic certification; market price information (betel nuts)			Secondary market outlet; Tasimari trading.	Handicrafts	

Enabling environment

Crop	Activity	Bush	Tina River	Keke Coast	Kuma Coast	Avuavu	Moro	Tractor Coast
TCBTC	1) Network of active farmers/families/contact points. 2) Build a sustainable food processing support capacity. 3) Staff positions: a) coordinator (handover of TRTC Principal's role) b) nursery c) others eg. livestock. 4) Meetings: RTCs/ active farmers.					xxx		
Energy	1) Energy for the processing centre (TRTC) (need to define needs first) eg. biomass/ drying (coconut oil for cooking) and pico-hydro); 2) Energy to address labour shortages/ increase productive hours eg. battery charging (based on kerosene? looks like a viable option, but need to address entry points to community eg. extension of student outreach an d women's groups).			x	x	xx	x	x
Gender	1) Awareness on gender issues/roles. 2) general focus of the project.		x	x	x	x	x	x

Wild mango grows abundantly on the Weather Coast and is worth investigating for its market potential as a processed product.

People on the edge

Attachments

Attachment 1

The Team

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Attachment 2

Village summaries

Village: *Marasa*

Setting	▪ about 500 people occupying four scattered hamlets along the Lamnlagi River in a poorly sheltered bay (Marasa Bay). ▪ the bay has a narrow flood plain planted to food gardens and plantation crops. ▪ surrounding hillsides are covered with primary forest. ▪ a primary and a secondary school. ▪ clinic is at Babanakira, two hours walk ▪ members of the Anglican and Roman Catholic churches ▪ the village is better serviced by ships than other places along the Weather Coast and it is a three hour voyage from Honiara by outboard canoe. ▪ village lacks a radio ▪ there are five chiefs for the different clans.
History	▪ when it was located on the coast, a tidal wave destroyed the village one night; in 1952; one person died. because of this, the village divided and relocated inland in small hamlets along the banks of the river ▪ taro was the main crop, bit has now been replaced by sweet potato ▪ in 2003, followers of militia lader, Harold Keke, burned 80 houses and took the entire community hostage for three days; the militia tortured and stoned to death two men from the village because they were thought to be 'spear — agents of the government; after that most people left forHoniara or to other villages.
Livelihoods	▪ subsistence food production is dominated by sweet potato, with yam (5 vars.) taro (3 vars.) as minor crops, although they are still grown by older people ▪ other crops are cassava (5 vars.), banana and species of wild yam (lokuloku, D. nummularia) ▪ major agricultural problems: — chuaka on taro (although LA16 is present and said to have some resistance) — anthracnose on yams — a rot of sweet potato when rainfall is high ▪ in general, land is cultivated for 6 -10 crops of sweet potato and then left fallow for 5 -10 years; taro and yam are planted first, followed by multiple crops of sweet potato which are planted at any time of the year; children often like sweet potato because of the different colours ▪ the steep hillsides are not used because of damage caused by domestic and wild pigs ▪ ngali nuts groves are present in the forest ▪ people have to cross the river to get to the gardens and this is difficult in the wet season ▪ there are no problems reported on slippery kabis ▪ kasumae, pumpkin and slippery kabis are the most important greens consumed daily, usually with sweet potato

	Cash cropping ▪ the main cash crops are coconuts, betel nuts, cocoa and the marketing of local produce ▪ amelonado cocoa is the dominant variety ▪ the main constraint on cocoa production is that there are only three driers for the nine villages and this is insufficient in the main season;it is claimed that driers were destroyed during the ethnic tensions ▪ in 1998 and 1999, the community produced 50 tonnes of cocoa a month in the peak season ▪ men and women walk long distances carrying cocoa beans ▪ there is need to improve the maintenance of the plantations, which are remarkably productive for a high rainfall area — trees should be pruned, black pods removed ▪ some areas are being planted to cocoa during the present mini-boom time and the conflict over, but there is concern among women that they are losing food garden land ▪ betel nut is sold locally to middlemen for $30 - $60 a bag, and taken to Honiara for sale at $150 - $300 ▪ the problem is that there is no market information and losses can be incurred when Honiara prices are less than the buying and transport prices; the local price is two betel nuts for 10 cents; copra is bought for 30 cents a kilo and sold dry in Honiara at $1 per kilo ▪ the local market is on Saturday in Marasa and twice a week at Babanakira ▪ women complained that they have a lot of different produce but there is nowhere to sell it.
Livestock	▪ pigs are a problem as they went wild during the ethnic tension ▪ it was also said that the opening of the road to Babanakira in recent times had destroyed the fence, providing the pigs with access to the garden land.
Sea	▪ fish are eaten, but fishing is denendant upon the state of the sea ▪ there are 11 products taken from the sea and river.
Forests	▪ the forests have not been logged and they are extensive ▪ 11 products were mentioned from the forest, including five animals hunted for food ▪ there is interest to have a walk about chainsaw mill. ▪ fruit trees are plentiful around the villages, but the Honiara mangoes are not fruiting.
Gender	▪ men control transport of produce taken to Honiara and the income from sales made there ▪ youth drop out and need skills ▪ there is an issue with money wasted on alcohol in town.
Needs, aspirations	▪ driers are first priority ▪ hydro energy to process cocoa/copra, furniture manufacture and ice-making for fish ▪ mineral water ▪ walkabout sawmill ▪ textbooks for school (burnt in ethnic tension) for standard 5 and 6 pupils.
Key issues	1. continuous sweet potato planting means no alternative crop for wet times 2. youth do not have much to do 3. loss of diversity and taro knowledge 4. poor land use planning 5. opportunity to add value to cocoa (organise organic certification and processing) 6. need for women to have income generating opportunities (and access to transport) 7. pig problems.

Village: *Mbabanakira*

Setting	▪ a number of villages on a hillside close to two tributaries of the Tina River which create a wide flood plain planted to cocoa, coconuts and food gardens ▪ the surrounding hillsides are steep and forested ▪ clinic and a secondary schoo ▪ many nearby coastal villages also use the fertile sandy loam river flats for garden land.
History	▪ cyclone Namu destroyed many villages and almost all the gardens were washed away; cocoa plantations were destroyed and have since been replanted ▪ during the ethnic tension, people were displaced to Honiara and to other parts of the Weather Coast and villages were burned ▪ since the intervention of RAMSI people have been re-establishing their lives.
Livelihoods	▪ subsistence agriculture is dominated by sweet potato, with yam, taro, banana, cassava and Xanthosoma present as crops of secondary importance ▪ continuous sweet potato cultivation has become the norm ▪ other crops include peanuts, shallots, pineapple, tomato and pawpaw ▪ food shortages are experienced due to low yields from sweet potato during heavy rains and the lack of drainage in the flat topography ▪ fallow periods are short, with fertility sustained by periodic floods ▪ yam and taro have almost completely disappeared ***Cash crops*** ▪ cocoa and betel nut are the main cash crops ▪ cocoa is sold to buyers on boats at Marasa or as wet and dry beans.
Sea	▪ this is a bush area with river fishing for tilapia an important activity ▪ many local species of fish have become locally extinct, presumably by the introduction of tilapia.
Gender	There is concern about landuse planning with the expansion of cash crops at the expense at garden land.
Key issues	Similar to Marasa (above).

Village: *Duidui*

Setting	▪ Duidui has about 400 people in a single settlement area ▪ most of the dwellings are leaf houses, some in poor condition; only one or two iron roof houses; a lot of houses are just being repaired after shelling and destruction by the joint operation during the ethnic tension ▪ there are four chiefs: John Tova is the paramount chief, Patrick Eve the tribal chief, Simeon Galioni the village chief and John Vuluvula the overall chief. ▪ the village is South Seas Evalgelical Church and Anglican denominations ▪ the school is about a half to one hour walk at Kolina; the clinic further away at Viso. ▪ the village has a water supply that seems to be working well, with high pressure ▪ there is one outboard motor in the village ▪ shipping is erratic and rare with ships often bypassing the area as there is little copra and no cocoa ▪ people have returned from the bush since the arrival of RAMSI ▪ the terrain is very steep to extremely steep with many small to medium size rivers ▪ the only access is from the coast, as very high mountains and impassable terrain occupy the interior ▪ soils are rocky but seem surprisingly fertile ▪ prior to the ethnic tension there was an HF radio in the village but it was removed in 2003 by the joint operation.
History	▪ the village and food gardens were destroyed by a large earthquake and associated landslides in 1977 (reported to be 6.3 on Richter scale); after this disaster a settlement made up of people from this and other villages in the area was established at Aruligo west of Honiara and today remains a major focus of out migration from the area. ▪ the area was within the stronghold of Harold Keke militia supporters; the entire village was displaced into the bush in 2001 due to fear of attack from government forces and supporters (the joint operation); in October 2002 the village was shelled by the government patrol boat with one person killed and another injured and many homes burned and destroyed ▪ the community spent two years living in fear of attack; during this period, gardening was erratic and many food crop varieties were lost and have yet to be recovered; people subsisted on wild yams and greens from the forest and were overwhelmed by a general feeling of despair ▪ pigs were given to the joint operation and keke supporters for 'protection', a form of extortion; food gardens were also pillaged by Keke and joint operations ▪ post-RAMSI (late 2003), people have returned to living on the coast; the community is reconciled with Kolina although there remain unresolved issues with Malaheti, Koleula and Haleatu villages which are in the process of reconciliation.

Livelihoods

- the dominant activity is subsistence agriculture with very minor, local sales of produce including food, betel nut and cooked food within the village and in some small nearby markets.
- a family cultivates up to 3 gardens at a time
- no copra has been sold since the 1990's
- lack of transport is the major constraint for development and increased incomes
- livestock, pigs in particular, and to a lesser extent chickens, are one of the few sources of more-substantial income
- local production and sale of coconut oil, processing and sale of 'taumana' and betel nut are other minor sources of income for some households
- women are earning up to $10 - $20 a week in local markets, with men doing some outside labour for RAMSI or in Honiara
- some remittances come from relatives in Aruligo but this appears to have little benefit overall for the community, with cash remittances often controlled by men
- food gardens are dominated by taro (12 varieties) and yam (10 varieties) followed by sweet potato (9 var.), cassava (4 var.) and occasional bananas (16 vars.).
- many families have lost some varieties of yams but none have been lost to the whole village
- pana (5 varieties) has become rare with very few families cultivating the crop
- slippery Kabis (6 vars.) and other cultivated vegetables are rare or absent in the gardens
- the local diet includes very little store food (eg. three out seven women had eaten noodle in recent days) and there is possibly a lack of leafy greens and other vegetables although there is evidence of other wild greens around the village and in the bush
- seasonality is minor, with taro planted in a seasonal pattern early in the year and harvested from November to March; yam harvests start after the end of the taro season but at this time not many families are growing yam as they are recovering planting materials and the yam has also been effected by an unknown tuber borer.
- there is a shortage of food in May, June and July as a result of very poor sweet potato yields during this main rain season
- there appears to be a 5-10 year fallow.

Livestock

- the majority of families keep one or two pigs in large, free-range areas fenced in stone walls stone that appear to have been constructed and maintained over generations
- pigs are sold for $25 to $50 for piglets and $500 to $1000 for adults; payment can include shell money and there is high demand for pig
- pigs are almost the only way to earn money for secondary school fees ($800 at community high school)
- most families have two to three chickens with a very high diversity of breeds; they sell for $20 to $30
- eggs are rarely consumed as they are kept for hatching
- there is no housing for chickens and dogs are a problem
- fishing is an important livelihood activity done by men when the sea is calm; fish sell for $6 to $15 but there is limited ability to sell in local markets; fish is a very important food when available
- various shells and river fish (as well as eel, prawn and others) are collected and are important for food
- Asian bees appear to be present and could be a threat to honey production.

Forests

- regular use of forest greens (eg. ficus copiosa and various species of fern) which are maintained in gardens, fallows and in the bush
- firewood is collected by women when clearing new gardens; the drying of firewood can be a problem; most families use kerosene for lighting only occasionally and some families use coconut oil lamps
- the wild yam resource that is critical in times of food shortage is being depleted in the bush due to overharvesting and poor management.

Village agroforests	▪ mangoes, that fruit well every year, are plentiful in the village ▪ the mangoes along this stretch of coast and are a potentially important resource and appear to be a mix of domesticated and wild types; the origin of the variety was, reportedly, an American missionary ▪ there are 22 species of fruit and nut trees in the village groves of ngali nut are found on steep slopes adjacent to garden areas and, in some places, interplanted with sago palm ▪ stands of betel nut are found on the edges of the village ▪ there are 16 species of other food plants in the village including greens, vegetables and medicines ▪ three different species of wild yam are being cultivated in compost heaps and staked to fruit trees in the village.
Agricultural pests and diseases	▪ chuaka is a major problem on taro ▪ nissotra is a major problem on slippery kabis and has contributed to its decline in cultivation, except around homes where it appears little-affected ▪ there is a suspected beetle attack on bananas that outbreaks from time to time, leading to death of the trees ▪ a storage problem exists with yams (white grub and white ants) ▪ there is significant scale on oranges ▪ rotting of tubers during excessive rain is a major problem ▪ the plant 'Mile a Minute' was introduced after cyclone namu and is reported as a problem in gardens ▪ there is a 'bean fly' affecting long bean production.
Gender	▪ there seems to be less division over cash cropping roles than in the Tina river valley ▪ women do most agriculture and garden work.
Hopes and aspirations	A better education for their children.
Key issues	1. sweet potato yield 2. transportation and market access 3. chuaka on taro 4. nissotra on slippery kabis 5. lack of greens and vegetables in food gardens 6. communication access and isolation 7. highly vulnerable to disaster (land slide and tidal wave) 8. three to four months of heavy rain and rough sea 9. distance and access to services 10. lack of cash coming into the community.

Village: *Raeavu*

Setting

- a medium size village with about 400 people situated in a confined space at the base of a steep valley
- housing at an unusually high density
- the village is catholic with nearby SDA communities
- a good water supply in the village and an interesting appropriate technology approach to sanitation.
- this is the village of the late Father Augustine Geve who was murderer by Harold Keke / supporters during the ethnic tension
- all the houses are small leaf houses, often situated on the ground, with the exception of three permanent houses
- no school, clinic or radio
- the village is surrounded by very steep mountains and hemmed in on one side by the sea, which closes off the village during rough weather
- a noticeably large number of young children
- serious danger from landslides.

History

- in the 1977 earthquake there were landslides which destroyed gardens (but presumably not the village)
- many people have migrated out of the village and now work for companies (eg. Solomon Taiyo) and the government in Honiara, Noro and Kolombangara
- many reside in the settlement at Aruligo
- in the past the village was highly dependant on remittances; the ethnic tension saw people return home from the towns
- after the murder of father Augustine Geve, the whole village was relocated in the bush; his murder was a turning point and the community became totally opposed to Keke; the community lived in the bush for two years in fear of extortion by Keke supporters and getting caught in cross fire between the supporters of rival militia leaders, Keke and Andrew Te'e; initially people scavenged from existing gardens but eventually established new gardens further in the interior
- in the past pigs in Raeavu were communally fenced, with a large fence keeping pigs in a single designated free range area; this was a different place to where the gardens were cultivated; every 20 or so years the pigs would be moved to a different location and the forest they had been living in bought under cultivation again
- yam cultivation has declined markedly over the last 30 years and has largely been replaced by sweet potato and cassava; taro is hanging on.

Livelihoods

Agriculture

the local economy is dominated almost totally by susbsistence agriculture

gardens produce sweet potato (21 vars.), cassava (5 vars.), banana (27 vars.), taro (11 vars.), yam (8 vars.) and pana (2 vars.).

yam and pana are minor crops currently only grown by a small minority

gardens are on steep land with, generally, long fallows (20 years); the land is cleared and planted to taro and yam at the fringe and shorter fallow areas which are cleared and replanted to every five years to sweet potato and cassava; taro is planted on steep coastal hillsides with cassava planted on sandy soil at the edge of the beach; cropping sequences are typically taro, yam, kumara, kumara

there is an absence of slippery kabis and vegetables in the bush with the few kabis plants heavily infested with nissotra

minor crops are paw paw and pineapples

there are early and late varieties of all crops; the early varieties are referred to as 'baby'

many families walk to the kuma river, some hours away, to cultivate fertile alluvial plains; these gardens are very productive but are vulnerable to changes in the course of the river.

Pests and diseases

there is a major unknown insect that has caused massive decline in yam cultivation and loss of varieties

taro is effected by chuaka and people do not practice any form of control

pana has a 'rough skin' problem of unknown cause

nissotra is a major problem on slippery cabbage and leads to its decline

cassava is effected by a scale insect

wild pigs are a major problem that increased during the ethnic tensions and that now destroy bush gardens.

Livestock	▪ there are no pigs in the village, which is very unusual; a major but undiagnosed disease that which out all the pigs in the village was reported; this was probably worsened by the low pig population at the end of the displacement period due to the regular theft and extortion of pigs by militias ▪ there are no dogs in the village, so hunting of wild pigs is difficult and not done at this time ▪ very few households keep chickens.
Sea	▪ there is good fishing but it is only available during good weather and at the times of migratory fish being in the area ▪ there is no coral reef ▪ in the river, fish and prawns have been over-harvested and are now rare; these are still available deep in the bush.
Forests	▪ at least five wild bush greens are consumed regularly ▪ wild yams, including taumana, are important food sources but are becoming less common due to over-harvesting (ie. poor management) and expansion of land under cultivation ▪ processing of taumana is difficult in wet times due to silting of river ▪ Kasumae and water cress have recently been introduced to the village by an old woman and are growing well and spreading ▪ in recent times some people have learned how to process sago palm as a food ▪ there is abundant callophyllum on the coast ▪ there area 17 species of fruits and nuts in the village and at least 8 cultivated greens (including bonio, polyscias sp, 'pure' — considered the number one green); these are disease and pest resistant ▪ dieback of orange trees is common due to a number of root-rotting fungi, with very few young trees being planted; this is a threat to the orange resource.
Gender	▪ in only a few families in the villagedo men make a significant and regular contribution to gardens ▪ men help with clearing and hoeing the land. ▪ planting, weeding, harvesting and transporting produce to the village is all women's work ▪ there has been a recently revived focus on fishing by the men but it has reduced their labour availability in the gardens.
Key issues	▪ villagers want to get their yams back but cannot buy them due to customary practices ▪ increasing cultivation of taumana, wild yams and better wild yam management ▪ pig disease ▪ reintroduction of pigs and chickens ▪ replanting of orange trees and cleaning up fungi-infected stumps in the village to reduce the spread of disease ▪ chuaka management of taro ▪ nissotra on slippery kabis ▪ investigation of yam pest ▪ wild pig problem ▪ desperate need for income — currently at around $120 a year for many ▪ introduction of new beans as protein source in wet weather ▪ increased planting of banana and xanthosoma by a couple of families has reduced hunger for them; this approach should be shared and encouraged ▪ encourage wider planting of kasumae.

Village: *Madakacho*

Setting

- location: S 9.80786, E 160.23976
- 43 households spread over 5 hamlets among 4 tribe
- a mixture of catholic, SDA and a significant proportion following Moro; Moro followers are also nominal Catholics
- the clinic has been closed for four months due to a dispute over use of the clinic's outboard canoe engine; this led to an assault on someone using the boat that is still a pending case with RAMSI; as a result, the SDA church closed the clinic and plans to move it to a nearby SDA community
- no outboard motor in the community apart from the clinic boat (which is now held by RAMSI
- a community high school nearby
- no stores function in the village
- no regular shipping
- there is a bush track to Honiara which takes one to three days to traverse
- the clinic has a HF radio
- traditional housing is different to other areas; houses appear elaborately decorated in traditional fibres and vines and these skills appear well maintained, even among young people; there are two customary houses in the village
- there is a more extensive coastal plain and most gardens occupy the river delta behind the village; some occupy steep land above the plain but not all families have access to this land as bush communities are situated along the river valley
- a large river cuts off access to gardens when in flood.

History

- the four tribes of the village are divided along different belief lines:
  — those who continue to worship sharks and follow traditional practices and norms of their ancestors
  — catholic
  — two families are SDA (it was through these families that an SDA clinic was built at the village).
- the shark worshippers are linked to those in the Moro movement at Komuvaru; they wear traditional dress when working in gardens and, sometimes, in the village
- taro and yam are considered sacred and it is believed they will be lost if customary rules about them are broken; among these groups there is a very high cultural demand for taro and yam
- the village was not displaced during the ethnic tension, apart from very short periods when people would run away from visiting militants or as a result of rumours
- there were a number of shoot-outs in the village between Keke and Te'e supporters; in one incident Keke was nearly killed in a beating by village boys, but they took mercy on him and left him to recover for a number of weeks; after weeks of healing he demanded compensation, as it was his own people who had tried to beat him to death; on the day of the planned payment of compensation the government patrol boat arrived and attacked keke; after that time the local boys switched side and supported the joint operation.

Livelihoods

- there is almost total reliance on subsistence agriculture, with crops being, in order of importance: sweet potato (23 varieties), banana (no data on varieties), cassava, taro, yam (13 varieties) and pana
- gardens are cultivated in two cycles:
  — new gardens cleared from long fallow and planted to taro and yam, often with two crops
  — secondary forest is cleared after four to five years and planted to two to three crops of sweet potato or cassava.
- banana and cassava are often mixed together in gardens
- rows of bonio and bure have replaced slippery kabis in gardens
- there is some segregation of gardens, with taro and yam planted in different gardens to other crops (ie. sweet potato and cassava) and cultivated according to strict custom; this includes the maintenance of yam houses and careful protection of yam and taro for replanting
- yam and taro are seasonal; there are early and late maturing taro varieties
- according to the seasonal calendar, there are three months of sun, six months of rain and then three months of sun
- the 'time of hungry' is June, July, August and September, mainly because of failure of sweet potato planting during wet times.

	Economy ■ betel nut is grown for sale in local markets (10cents for 2 - 4) ■ there is one buyer of wet copra (50 cents/ kg) ■ there is quite a lot of copra and some cocoa in the river basins ■ there is a local market every Friday in the village with cut nut, banana, orange, kabis, bean, vegetables ttraded ■ a ship comes every two or three months to buy copra at $1.10/kg dry ■ in nearby Ngalarurua they grow cocoa and sell it for $2? kg wet to a local buyer ■ there is seasonal migration to Honiara to get work to pay for school fees.
	Pests and diseases ■ chuaka effects taro along with a tuber rot and taro beetle. ■ yam is effected by a larvae of an unknown beetle (known as matamata) and a nematode (pratlylenchus coffeae) ■ scale insect is a big problem on cassava and slippery kabis ■ nissotra has wiped out slippery kabis cultivation.
Livestock	■ most families have pigs, many with five to six each; this is the highest pig density observed on the assessment ■ piglets sell for $50 and adults for $400 - $700; demand is high ■ chickens are sold for $20 - $30 ■ wild and domestic pigs are a big problem in gardens ■ there appears to be no fencing or tethering of pigs and many pigs are living in very close proximity to humans, particularly among Moro followers.
Sea	■ most men in the village go fishing in good weather, sell bonito and earn about $10 ■ there are few fish in the river.
Forest	■ there is a shortage of sago palm for construction; villagers buy a tree for $50 from nearby villages ■ villagers have a lot of timber and other bush construction materials, including the many ropes and vines used to construct custom houses ■ there is unusual diversity in building materials in the village ■ available is konga for basket weaving and lamali for making kabilato (traditional clothing) ■ the village had 14 species of fruit trees ■ the village agroforest is much less dense, lacking understorey compared to other villages visited; presumably, the large number of pigs free-ranging in the village is part of the reason ■ there is some planting of wild yams (uvi matua) ■ many families use lemon leaf as tea.
Key issues	■ transport — very little opportunity to earn money ■ chuaka on taro ■ yam disease ■ foods to fill the hungry time ■ relationships in community ■ level of education and understanding is very slow in this village compared to some others.

Village: *Boliu*

Setting	▪ population around 100 people divided into 3 hamlets; all the community are of one clan ▪ located on a flat area on a river flood plain of the Tange river which, when it floods, can be difficult to cross ▪ housing is traditional (leaf) with two custom houses (one for men only); there are no permanent houses — the only one previously exisiting was destroyed during the ethnic tension ▪ a catholic village ▪ a water supply that is working ▪ from Avuavu there is a bush road to Honiara which takes two to three days for the journey ▪ there is an email station and radio at the NPC office at Avuavu ▪ Avuavu has a provincial secondary school, a primary school, an area health centre, a rural training centre, a centre for the catholic church.
History	▪ the village was originally by the sea side but was destroyed by a tidal wave in the 1950's; it was rebuilt inland and split into small settlements ▪ during the ethnic tension, Andrew Te'es militia demanded compensation and beat villagers following the election because they 'supported the wrong side'. (ie. they supported the current member, Johnson Koli); the community ran for a brief period and built temporary houses in the bush ▪ there is no major migration out of the village ▪ one family has migrated here from Malahete (close to Raeavu).
Livelihoods	▪ subsistence farming is the main livelihood ▪ gardens include sweet potato (16 varieties), cassava (6 varieties), banana (18 varieties), taro (7 big and 11 baby vars.) and yam (16 var.).; there is about 1/3 to 1/2 overlap between varieties in each area. ▪ sweet potato is grown on very productive alluvial river flats ▪ taro is mixed with sweet potato and there are some yam gardens on the hill sides ▪ in the village there are scattered fruit trees and food plants including bonio, pawpaw and eggplant; there is an unusual type of basket made from the bark of a tree ▪ a different site preparation method is used in which secondary bush is cleared and laid in rows across the garden as large compost heaps.'sweet potato is then planted in rows of one to three mounds between the rows of organic matter; the method provides a second harvest when sweet potato vines climb over the organic matter and produce tubers on the fertilised vines as well as in the mounds;for this reason, they prefer varieties that set tubers along the vine; there is no burning of organic matter. ▪ there are taro varieties from Malaita ▪ bananas are planted along the boundaries of gardens and along heaped organic matter 'winrows' ▪ the garden cycle is two crops of sweet potato followed by cassava, after which the garden is left in fallow for five or sx years ▪ slippery kabis grows well October to January but at other times of the year is severely effected by pests ▪ villagers use a lot of wild greens and wild yams and cultivate 'uvi kambe', 'uvi matua', 'lokuloku' and 'bukua', which are managed in a semi-wild manner in the bush ▪ little is planted in the village because of pigs and children (the wild yams have thorns) ▪ almost no vegetables were observed in the gardens, except for the odd peanut and long bean ▪ a sei wild colocasia taro is grown in swamps ▪ there has been some recent planting of kakake ▪ during periods of food shortage, people walk long distances to harvest kakake from Avuavu area.

Pests and diseases

- a historically significant decrease in taro and yam cultivation is due to pests and disease leading to a loss of varieties
- scale insect is a big concern on cassava
- there is no sale of taro and yam due to very limited supply
- the community expressed a preference to get help with pest and disease problems of taro and yam, even though sweet potato is a far more important crop and three to four pest and disease occurrances were noted
- no damage is reported from wild pigs.

Income, expenditure and cash crops

- villagers have few relatives living in Honiara and those who are there are not earning sufficient to send much home
- villagers earn money through selling a total of 22 items including garden produce, fruits, pigs, baskets, canoes
- money is spent on 60 items (rice, noodle, local food in market, pigs, local tobacco — the most expensive item)
- regularly purchased items are ranked as the most 'expensive'
- many families have copra but rots while waiting for a ship
- there is a small amount of cocoa which has similar problems with transport
- villagers sell betel nut at Honiara market for $300 bag but it too often rots waiting for a ship
- there is a local market at Avuavu that operates twice s week; here, eight villages come together to make this one of the largest markets on the Weather Coast, attracting up to1000 people; the market is held at the secondary school but neither taro or yam are sole as production is very low
- the cost of labour to build a new house is considered high at $1500 - $5000; this can be a problem for families that do not have enough labour or skills to build their own dwelling.

Livestock

- many families have between one and four pigs and free-range chickens in the village
- there is one family with six cattle
- fishing is significant, with use of nets and lines in the sea and in the large freshwater lake; the lake has abundant tilapia, eel fish, crabs, possibly barramundi, Chinese carp and mamula, and can be fished in any weather conditions; there are 'off seasons' controlled by the chief to allow fish to breed and increase again (only line fishing is allowed)
- a census of crocodiles in the 1980s disclosed a thriving population in the lake; the crocodiles generally coexists with the villagers and attacks are rare
- the lake opens periodically (evert few years), the most recent being 2004 following a long periods of especially heavy rains
- after the ethnic tension, a fishery project was started but soon failed; the generator and deep freeze now sit idle because there is no market for the fish and the costs of running the deep freeze is excessive.

Forests

- the mountains are covered by forest
- uses of forest products includes: the bark of a tree for basket weaving, harvest bush greens, tams, hunting bush meat, selling parrots.

Gender

- all the work in house and gardens is done by the women
- with the important exception of fishing, men contribute little to food production
- the main roles for men are building and fishing but this is only occasional work and it appears that men have a lot of free time; they told us "we are just waiting for the women to cook food"
- when children are sick only women take them to the clinic.; April is the time for a lot of illness.

Agriculture officer	Cornelius Bubato is a government agriculture extension officer and the only one for the entire weather coast. He advised villagers they could not grow cocoa because their soil was unsuitable. They planted it anyway and it has grown well. Mr Bubato is known for little else and has been inactive for many years. Avuavu was the site of an agriculture research station. It had been more or less abandoned since the mid 1990s and local communities report it has never provided any benefit to them. There is a ROC (Republic of China) rice mill at the Avuavu station but no threshing or polishing machine. A number of farmers in the area are experimenting with rice growing, thanks to the initiative of the extension officer at the ROC mission. Rice was tried at Boliu when it was first promoted as a crop but village farmers found it was too much work. They experienced hunger because the demands of rice cultivation slowed planting of sweet potato and other root crops.
Avuavu PSS	The school has 280 students (65 per cent boys; 35 per cent girls) in the boarding school who are from all over Guadalcanal. School fees are $500 - $1000, with the fee being reduced the more children a family has enroled. The cost of providing food and care for students is $20 per week per student., about 80% of which goes to food. Students receive a diet of rice, noodle, and Taiyo (canned tuna). A meal for 280 students consumes: 1 x 20kg bag of rice, 10 packets of noodles, two tins of taiyo mixed with fern from the river. The school has recently started a food garden — the first such attempt in recent years. There is flat, fertile land to cultivate but most is unused. The principal (who is new) had made enquiries about buying kumara (sweet potato) to supplement the diet but was told that there is not enough available. He paid $20 for 20kg of kumara, a significant saving on $120 for similar amount of rice.
Clinic — area health centre	With only three of the five staff who are supposed to be there, the health centre covers a large area of the Weather Coast. Retaining staff has proven difficult. Staff are supposed to be on four-year contracts at their posting. The World Bank is planning a new health centre close to the airfield. A doctor is supposed to visit once a month but had not visited in the first five months of this year. The main health problems are malaria and TB, with TB a problem especially among people who come from bush communities because they sleep in houses with poor ventilation and internal fires. Infant malnutrition is around 25 per cent and is typical of other provinces. There are no reported cases of diabetes at the health centre, something the nurse found very different from previous postings. Energy is derived from a solar panel which is used to recharge a small battery used to light the clinic and at least one of the staff houses. Staff housing is a problem. There is a PFNet email station
Key issues	▪ skin disease of children (common along the weather coast) ▪ indoor smoke is a major issue along the weather coast but is probably worse in bush communities ▪ limited transport ▪ limited access to markets ▪ the potential to boost local incomes throough the provision of food to the school ▪ improving the nutrition of students ▪ need to increase marketing and promotion of email station, including use of TEK for internet searches ▪ with the lake a key resource for the area, there is potential to investigate the smoking or drying of fish ▪ cassava scale is major pest problem.

Village: *Bokasughu*

Setting	▪ Bokasughu has a population of around 600 people ▪ the terrain consists of a narrow, flat plain backed by steep mountains with a river valley leading into the interior ▪ there are coconut plantations behind the village and within the gardens on the flat land ▪ three churches — Anglican, Roman Catholic and COC — serve the population ▪ there is a noticeable difference in village cleanliness between Anglican and Roman Catholic areas ▪ a primary and secondary school (a community high school) are about 20 minutes walk away in Makarukua; the school has very limited materials and, reportedl,y, no books ▪ there is no clinic, the nearest being at Naho.
History	▪ there was flooding that destroyed nearby villages associated with Cyclone Namu ▪ during the ethnic tensions there was one incident that led to two deaths, but the population stayed in the village and experienced other no major problems; the deaths were to do with a dispute between an SDA community at Sukiki and Moro movement members; Sukiki people threatened to burn down custom (customary) houses and took up arms during the tensions.
Livelihoods	▪ the main livelihood is subsistence agriculture ▪ the main crops are kumara (16 varieties), cassava (6 varieties), banana (17 varieties), pana (4 vars.), yam (24 vars.) and taro (12 vars.); yam and taro are seasona ▪ one man named 105 different taro varieties but most are no longer present ▪ in the gardens, the typical planting sequence is yam followed by two crops of sweet potato or more yam, then taro and vegetables, after which the land is left to fallow ▪ short fallows are of three to six years on the flat land; long fallow areas are being cleared on the mountain slopes by those who have access to the land; there are bush communities who are also using this land, bringing pressure on land access for coastal communities in the area ▪ the decline of yam cropping is shown through its cultivation by a total of 10 families in 1980 down to only two in 2004; taro cultivation has also collapsed ▪ there is a large range of vegetables grown in gardens, including many local cabbages.
Cash crops, markets and cash income	▪ almost everyone in the village plants tobacco, which is the largest source of income for the people; when tobacco is in short supply, growers can earn SB$100 to $200 a day; typically, they will earn $600 to $1000 from a large plot of tobacco plants ▪ copra is the other main source of income for about 50 per cent of families, although there are problems with transport ▪ pigs are very important to most families and serve as a means of saving money for payment of school fees ▪ about eight families have planted cocoa but it is not yet fruiting ▪ the ship *Atabema*, from the East Guadalcanal constituency, is supposed to stop by every fortnight but reports were mixed about how often it actually comes — it seems it is much less than this ▪ there is a market at Makaruka twice a week where the few women who sell produce can earn between $2 and $10 per market.
Livestock	▪ almost all families keep between 5 and10 chickens ▪ most families keep between one and six pigs, however three main problems are encountered: 'cough cough', which leads to the death of pigs; reduced growth of pigs that are kept in fenced pens; and an over-50 per cent death rate of piglets ▪ some women manage separate gardens to produce pig food while others feed the animals from family food gardens; in times of food shortage the pigs are fed only coconut ▪ prices for the sale of pigs range from $400 to $500 for an adult pig and, for piglets, between $50 and $100 ▪ the tuna season is from April to December but access can be limited by the weather; fish are sold in local markets and consumed by fishiing families.
Forests	▪ forest products include wild yams, taumana, canoe logs, building materials, materials for weaving and 'konga' bark for baskets ▪ fruit and nut trees are present in the village, including mandarin and pomelo, although these are not common in other villages ▪ there appear to be more vegetables in the village, including fruits such as melon.

Gender	▪ the population follows the same traditional roles as in other parts of the Weather Coast ▪ in a discussion with a group of women, only two out of nine had been to Honiara in recent years and many had not been to Honiara since their childhood — "Honiara hemi far away tumas long mi fala - mi fala hearem story hem olsem dream no moa".
Key issues	▪ loss of agricultural biodiversity ▪ lack of income opportunities ▪ tobacco ▪ pig disease.

Village: *Karivalu — Belanimanu area*

Setting	▪ the population is of mixed coastal and sea people occupying small hamlets scattered along a river ▪ there is the community-based Belanimanu Training Centre in the small village of Karivalu; the centre reopened this year and is restarting a community training program, reaching up to remote bush villages; the centre closed during the ethnic tensions after being attacked by followers of Andrew Te'e, following the election of Johnson Koli; the centre is at the base of a valley that leads to the bush villages, the furthest of which are a full days walk away ▪ from Karivalu it is possible to walk to Honiara in four days or so.
History	▪ people sought refuge in the bush at the time of the election of Johnson Koli and lived off taumana and wild yams; they returned to their villages in 2003 ▪ everything seemed to go wrong at that time — the villagers used to practice 'kake mate' (chuaka) control measures but abandoned them with the consequence that chuaka got out of control ▪ yam and taro were the main food up until 1980 ▪ the remaining yam has a problem with nematodes.
Livelihoods	▪ the main crops is kumara, followed by cassava and banana ▪ taro was grown until last year, but none remains after the last planting stock was wiped out by the disease 'kake mate' ▪ villagers believe it is very important to grow taro and yam; in a discussion group, there were young children who had never developed a taste for taro but older youth had eaten it in the past and who said it was their preferred root crop, even though they have none to eat now; they felt that taro and yam were easier to grow than sweet potato ▪ very little yam planting material is available ▪ following their return from the bush after fleeing the ethnic tensions, villlagers recovered some lost planting materials that were still growing or that were regrowing in old garden sites, but extreme weather in 2004 led to the loss of this stock ▪ there are many varieties of sweet potato but the crop has produced very poorly, growing to only marble-size tubers ▪ as in other places aong the Weather Coaast, crop pests and diseases are a challenge to growers: up to five cuttings of sweet potato are planted into a mound as a means of coping with the death of plants to fungus; scale insect is a serious problem of cassava.
Income producing activities	▪ the training centre is a source of income for those involved in providing training and who work there ▪ betel nut and bush fern are sold at the Marau market ▪ people from the inland bush areas do not fish ▪ tobacco is a good income earner ▪ coastal people produce copra and cocoa, but bush people do not have plantations ▪ ships comes as far as Belanimanu to a regualr schedule ▪ in a group discussion, a total of 15 out of 26 kept pigs with some having up to five; they sell them for SB$500 as mature animals; the disease 'cough cough' is a problem ▪ many families have free range chickens but hawks are a problem.
Gender	▪ there is poor participation by women in the management and operation of the training centre ▪ based on the experiences of KGA in bush communities in Malaita and Makira, we can reasonably assume that men take a more significant role in agriculture in bush communities than they do in coastal areas.
Key issues	▪ pigs with 'cough cough' disease ▪ the supply of taro (there is a need to manage the disease kake mate) and yam ▪ opportunities for cash income for inland communities. **Aspirations:** n villagers would like to get back taro and yam varieties that were lost during the ethnic tensions n they would buy new planting materials if they knew how to control pest and disease on taro and yam n they want to grow rice.

Village: *Kopiu*

Setting

- Kopiu is located on a point on a narrow coastal plain, with steep mountains behind
- the village consists mostly of leaf houses with many being rebuilt with sawn timber frames and roofs; this makes them different to other villages where few houses make use of sawn timber and is probably a sign of income flows from villagers working elsewhere in the Solomon Islands; many people work in Honiara and in logging operations in Western Province
- the area hasone of the few reefs on the weather coast and a small lagoon
- there are reported to be about 500 people in the village but only about 100 are at present living in the village; the rest are in Honiara and elsewhere
- the religion followed is SDA
- a clinic is currently being built and the community primary school is being extended to include a secondary school (currently standard 1 - 6; will have form 1and 2)
- there is a radio with a SB$2 fee.

History

- the village was the home of the first islander to join the SDA church in Solomon Islands in 1947 and it was in Kopiu that the first SDA primary school was built
- in colonial times the village was connected by a good road to Marau
- about 40 years ago, some families migrated from the Madakacho area after the arrival of the SDA church
- after the ceasefire that ended the conflict was signed in late-2000, people ran away to the bush after a shootout between Marau Eagle Force and Keke supporters; one person from the Marau islands was killed; militants from the Keke side occupied the area for some months; the refugees returned from the bush in 2003
- land is quite limited in availability and there is a land dispute with nearby communities who occupy most of the hill areas.

Livelihoods

- the main source of income is the selling of produce at Marau market and fishing; both men and women fish
- the main crops are kumara (13 varieties), cassava (4 vars.), banana (19 vars.), pana (5 vars.), taro (4 large and 11 baby vars.), yams (12 vars.)
- the biggest problem with food production is domestic and wild pigs destroying the gardens; domestic pigs from nearby villages are the problem on the flat land and wild pigs from the bush do the damage on mountain slopes
- many families have lost yams to disease and to the increased labour of weeding the recently introduced mile-a-minute vine
- it is too expensive for growers to buy more yam planting material although they need to produce yam for feasts and traditional purposes
- chuaka and other diseases are affecting the taro crop
- there is a major problem with nissotra on slippery kabis; it is more severe at drier times of the year
- breadfruit is popular but does fruit well
- sago is processed into sago starch, dried and stored for later use; the technology that enables this was introduced through SDA networks linking parts of Western Province, where it is a traditional practice
- the hungry period is April to August and it can last p to five months; pigs are let out to forage at this time, worsening the problem of garden damage
- when there is nothing else, villagers go back to the old, abandoned gardens to look for bananas
- the shortage of land led to an attempt to grow food under coconuts, however this was unsuccessful
- coconut oil produced in the village is used for lighting; some families use kerosene
- there are five houses with 12 volt lights running off batteries which are recharged at the radio station; a charge costs SB$3 and lasts a week
- incomes are so low that many families cannot afford soap; instead, they use pawpaw leaf and bush lime to clean plates and clothes
- villagers collect water and make their own salt.

Forests	▪ edible greens from the forest provide a substitute for slippery kabis ▪ there is regular use of taumana and wild yams, including *nummalaria* and *pentaphylla* ▪ villagers choose to eat wild yams even when there area other foods available ▪ some families are cutting timber for houses; this might indicate wealth disparity between village families with those living outside ▪ village agroforests contain 30 useful species of trees and plants. .
Gender	▪ both men and women fish — the only occurrance found during the assessment ▪ it appears that men are more involved in food preparation than elsewhere ▪ youths attending the school — it has no boaqrding facilities — are a burden on the community.
Key issues	▪ the destruction of food gardens by pigs ▪ crop pests and diseases such as chuaka on taro, scale insect on cassava, nissotra on slippery kabis, taro leaf blight, taro beetle ▪ emigration to other parts of the Solomon Islands ▪ a shortage of taro and yam planting material ▪ a lack of know-how to process crops ▪ an interested in growing breadfruit ▪ fruiting, wild mangoes as a potential resource.

Attachment 3:

Summary tables of PGR data

Legend
Numbers (1,2,3,4) indicate quanty of varieties found.

Kumara table — *PGR data*

	Village							
Variety	**Bokasughu**	**Bolin**	**Calvary**	**Duidui**	**Kopiu**	**Madacatcho**	**Reavu**	**Total**
Betewin	1	1						2
Birao				1		1		2
Bonehe					1			1
Buala		1				2	1	4
Chaele						1		1
Chavotamuri				1				1
College		1						1
Cyclone		1					1	2
Doku					1			1
Downhimliti		1			1	1	1	4
Duri Mali Papua		1					1	2
Durimali	1							1
Esi						1		1
Five Minute		1				1	1	3
Geana						1		1
Guala						1		1
Honiara	1							1
Honiara		1						1
Jiales							1	1
Kabani	1					1		2
Kaibia	1							1
Kambini				1				1
Keivonu						1		1
Kevitu							1	1
Koloboria						1		1
Kora	1						1	2
Kotina		1						1
Kudibelia	1				1	1		3
LL			1	1				2
Madori							1	1
Mailini					1		1	2

	Village							
Variety	Bokasughu	Bolin	Calvary	Duidui	Kopiu	Madacatcho	Reavu	Total
Malaita	1	1						2
Marau			1	1			1	3
Maruru						1		1
Nabo					1			1
Nambo						1		1
Ndesi						1		1
Nibi	1	1			1	1		4
Nimbi							1	1
Noro	1				1	1		3
Pegora			1	1		1		3
Poekrondo						1		1
Point Purapura	1	1		1		1	1	5
Ripi	1							1
Rorosere				1		1		2
Shortland			1					1
Sipelo			1					1
Six weeks					1			1
Sonoma					1			1
Soto							1	1
Supsup						1		1
Sweet potato	1							1
Tagiloki			1					1
Tangarara		1						1
Tevua		1						1
Three months	1							1
Tina						1	1	2
Toro Sere							1	1
Totongo		1				2	1	4
Two Month						1	1	2
Vailess					1			1
Valepai			1			1	1	3
Veramoh					1			1
Vovonokoveke				1				1
Wainoni				1				1
West	1	1			1			3
Grand Total	15	16	7	10	13	30	20	111

Banana table — *PGR data*

	Village					
Variety	**Bokasughu**	**Bolin**	**Duidui**	**Kopiu**	**Reavu**	**Total**
Bambasu	1					1
Belani		1				1
Beti kama					1	1
Brisbane				1	1	2
Broken hut					1	1
Buabua	1					1
Chuchu	1			1		2
Eatkesa			1			1
Five Minute			1	1	1	3
Gelo gelo		1				1
Golugolu	1		1		1	3
Halfua				1		1
Huehue		1			1	2
Independence	1					1
Jijina				1		1
Johe		1				1
Kakavua	1	1				2
Kalaguru	1			1	1	3
Kaloka		1			1	2
Kikiro					1	1
Komekome	1		1			2
Labehai					1	1
Lombo					1	1
Makira		1		1		2
Malaita	1					1
Mandamarao				1		1
Mesini					1	1
Miriam banana					1	1
Mota		1	1			2
Narande Molo					1	1
Niugini		1				1
Paesi			1			1
Pangalava	1					1
Pari	1	1		1	1	4
Pariko			1			1
Peresi			1			1
Pilupilu				1	1	2
Rabaul	1	1	1		1	4

	Village					
Variety	**Bokasughu**	**Bolin**	**Duidui**	**Kopiu**	**Reavu**	**Total**
Rere					1	1
Ropiana	1					1
Seisava					1	1
Selo		1		1	1	3
Sohe	1		1	1	1	4
Soleha				1		1
Suga			1	1		2
Susuluna			1			1
Toluko					1	1
Tudola			1			1
Tuilahi			1		1	2
Two Dollar		1		1		2
Valavala	1					1
Valebina	1	1			1	3
Veru		1				1
Violi green				1		1
Violi Hau					1	1
Violi white				1		1
Vuchi Babaleho			1			1
Vuchi Baka				1		1
Vuchi tui ni Gela				1		1
Vuinahau	1					1
Vula Vitu					1	1
Grand total	17	16	17	19	27	96

Cassava table — *PGR data*

	Village					
Variety	**Bokasughu**	**Bolin**	**Duidui**	**Kopiu**	**Reavu**	**Total**
Betchocho	1					1
Betisusu		1		1	1	3
Bobi	1					1
Displace		1				1
Haviti					1	1
Kari	1	1	1	1		4
Marubo	1	1	1			3
Pawa	1					1
Talimbau		1				1
Three month	1	1	1	1	1	5
Underpan				1		1
Uvihaisere			1			1
Uvihakari					1	1
Viti					1	1
Grand Tota	6	6	4	4	5	25

Yam table — *PGR data*

	Village							
Variety	**Bokasughu**	**Bolin**	**Calvary**	**Duidui**	**Kopiu**	**Madacatcho**	**Reavu**	**Total**
Afrikan yam					I			I
Bahighede	I	I			I	I		4
Bake				I				I
Bakehende (Bakekekeo)				I				I
Barahede						I		I
Bechu	I							I
Bokoa	I							I
Boruboru	I							I
Chainayam				I				I
Chemba					I	I		2
Chuvichoro			I	I				2
Doma	I	I	I	I			I	5
Foso						I		I
Haru		I	I	I		I		4
Hodo			I					I
Kakao	I							I
Kaku/Manavor		I						I
Kebeu			I					I
Kulikuliketoki					I	I		2
Lave	I						I	2
Lavinoro			I					I
Leihatiho	I							I
Lokuloku			I					I
Lovapuku			I					I
Luchalucha	I							I
Makakora	I					I		2
Mamahede		I						I
Maru					I			I
Masao							I	I
Mwiki	I	I			I	I		4
Ngoti	I	I			I	I		4
Ngotinibota	I							I
Otosi			I					I
Pareho						I		I
Posenyan					I			I
Poso		I						I

	Village							
Variety	**Bokasughu**	**Bolin**	**Calvary**	**Duidui**	**Kopiu**	**Madacatcho**	**Reavu**	**Total**
Randimolo	1							1
Rapei	1							1
Rorovohu		1						1
Sahai				1	1			2
Salusalu				1				1
Samoa					1			1
Senomu			1					1
Solozalu			1					1
Taba		1						1
Tahotaho	1	1						2
Taiwan							1	1
Takai	1	1				1	1	4
Tarabi			1	1				2
Tina		1						1
Tinabae		1						1
Toki	1	1						2
Toluko							1	1
Tongoa	1							1
Uvi kabe	1							1
Uvi ni vaka	1	1						2
Uvihohotosi				1				1
Vahato	1			1			1	3
Varahede	1							1
Voso					1			1
Vuto	1	1			1	1		4
Vuvura						1		1
Grand Total	24	16	14	10	12	13	8	97

Pana table — *PGR data*

	Village					
Variety	**Bokasughu**	**Calvary**	**Duidui**	**Kopiu**	**Reavu**	**Total**
Pana bora			1			1
Pana dova	1					1
Pana hachevo		1				1
Pana kar			1		1	2
Pana katsi			1			1
Pana komburu	1					1
Pana konga	1			1	1	3
Pana niu				1		1
Pana rabaul		1		1		2
Pana rocho				1		1
Pana susulata		1				1
Pana uvihai		1		1		2
Pana uviuvi	1					1
Pana vaghato		1				1
Grand Tota	4	5	3	5	2	19

Taro table — *PGR data*

	Village						
Variety	**Bokasughu**	**Bolin**	**Calvary**	**Duidui**	**Kopiu**	**Reavu**	**Total**
Akerekereke	1						1
Andeande	1						1
Chachia		1					1
Changana		1					1
Chiuchinge				1			1
Chuihai (soft)				1			1
Derena						1	1
Gori				1			1
Habuna Mista Belo						1	1
Haichui			1				1
Haitetebulake		1					1
Halivahatu						1	1
Haona		1					1
Hora		1					1
Ivichengi		1					1
Kabuaniu	1	1		1	4		7
Kake ni Gela					1		1
Kake ni Mala					1		1
Kake ni West					1		1
Kakeango						1	1
Kakekau		1					1
Kamboadniu						1	1
Keremakora		1					1
Kirake				1			1
Kora	1						1
Kotua	1						1
Kubona		1		1			2
Kuma		1					1
Lamuavao	1						1
Lau		1					1
Limamate					1		1
Luho	1	1		1	1	1	5
Luhumasanga	1						1
Mala		1					1
Mamuso	1						1
Mila	1		1		1	1	4

	Village						
Variety	**Bokasughu**	**Bolin**	**Calvary**	**Duidui**	**Kopiu**	**Reavu**	**Total**
Mila ni Rava					1		1
Niguni					1	1	2
Ove			1				1
Poisamu						1	1
Pulakaura	1	1	1	1	1	1	6
Puratohu		1					1
Raulava	1						1
Rope				1			1
Rudiahabusu		1					1
Shuighasi			1				1
Suiaboli		1					1
Tabalolo					1		1
Talao			1	1		1	3
Tangarare	1						1
Ulumakala	1						1
Ulupono			1	1	1		3
Grand Total	14	18	7	12	15	11	77

Attachment 4:

Livelihood analysis: part 1

Food security & livelihood region	Tina River	Cliff/ Keke Coast	Cliff/ Keke Coast
Village	**Marasa, Babanakira, Calvary**	**Dui Dui**	**Raeavu**
Vulnerability	Flooding; transport to market; managing pigs; marketing of pigs; cash crop price change; wet weather; very high kumara reliance	Landslides; earthquake; very low cash income; very steep land; unresolved reconciliation and conflict issues; extreme physical environment.	Tsunami, landslide; cut off in rough weather; very low income; no copra or cacao; extreme physical environment; wild pig problem; fire in village as houses are very close together.
Assets: Physical	Access to Honiara (ship and canoe); driers for cocoa and copra; water supplies; clinic; secondary school; primary schools; RTC (SSEC).	RAMSI, clinic.	
Human	Good leadership potential (Phillip); women's fellowship — Calvary and others.	Pig management (communal fencing); coconut oil; cultivation of wild yams by some families.	Migration to Honiara; introduction of edible fern; appropriate technology toilet system; people more open to outsiders.
Natural	River flood plan — good soil; cocoa; coconut; betel nut	Wild and domesticated mangoes; river resources (eel, fish, shells); slopes for taro production; hydro potential (abundant small and large rivers.	Abundant *collophyllum* on coast; access to Kuma River for cultivation of delta; cocoa and coconut cultivation.
Social	Local markets; buyers and middlemen processors for cocoa, copra and betel nut; church cocoa plot (Marasa)	Honiara support (Aruligo settlement as outlet for emigration); youth groups.	Open to outsiders.
Financial	Cocoa; coconut; betel nut; garden produce sold in local markets; twice-weekly market at Babanakira; village markets weekly.	Remittances from Honiara (very small amounts); very small market once a month.	Very small weekly market.
Issues	Women's income and access to markets; transport for produce; pigs; youth without a lot to do. **Agriculture:** Continuous sweet potato cropping; loss of diversity and IK; landuse planning — cash crops and food crops conflict; **Opportunity**: to add value to cacao — driers, management of plantations, organic certification.	Transport and market access; communication; vulnerable to disaster (tsunami, landslide, earthquake, flooding, rough sea and access); distance to services. **Agriculture:** Kumara yield. *Pests,diseases:* chuaka (taro); nissotra (slippery kabis); lack of greens and vegetables; beetle on banana; unidentified pest of yam.	Desperate need for income. **Agriculture:** Farmers want yams back; oranges — need to replant and manage disease better. *Pests,diseases:* Unidentified disease of pigs; chuaka on taro; yam pest; nissotra on slippery kabis in bush gardens; wild pigs. **Opportunity:** Introduce beans and vegetables.

Livelihood analysis: part 2

Food security & livelihood region	Kuma River — Forgotten River delta and coast	Avuavu	Moro Coast
Village	**Madakacho**	**Boliu**	**Boka sughu**
Vulnerability	River flooding; low educational level; community tension; divisions between churches; water supply old and in need of maintenance; clinic is closed.	Airstrip not open — makes medical evacuation from health centre very difficult; doctor does not tour frequently enough; no regular shipping service; expensive outboard motor travel to Honiara; legal issues around RTC land.	Low income; limited land for expansion in some coastal areas (bush communities occupy hill areas); no water supply; expensive and unreliable transport to Honiara; women have very little access to Honiara and education opportunities; lack of market access for handicrafts expansion.
Assets: Physical	Bush track to Honiara (1-2 day walk through mountains); water supply; community high school.	Email station (PFNet); secondary school; primary school; catholic mission; a few radios; clinic; airstrip; RAMSI; remains of old road still in reasonable condition in some areas; Turusuala RTC.	Copra driers; secondary school; use of solar power for lighting by some households.
Human	Limited use of solar power; traditional skills survive; maintenance of yam varieties even through periods of hunger.	Good leaders (eg. Celestine); good community organization between villages and within villages; knowledge of wild yams and ferns; have imported pest and disease resistant taro; management of lake resources.	KGA trainee (Leonard) starting a farmer school; imported pest and disease resistant taro, traditional craft skills; traditional and Western Province type of gnail nut processing.
Natural	River basin land.	Alluvial plain, lake with tilapia resource; swamp taro and edible fern are recent introductions; exotic fruit trees at old research station.	Fertile flat land; more vegetables than some other areas. **Crops:** watercress, yams; tobacco; pineapple; coconut; betel nut.
Social	Traditional cultural practices strong.		Community at Boka sughu has fenced pigs in individual lots — this has reducing pig damage to gardens.
Financial	Low income; some cocoa and coconut production but poor shipping; weekly local market.	Market at secondary school.	Tobacco the major income earner; handicrafts.
Issues	Irregular transport by ship (often bypassed and in between east and west routes); too expensive to travel by outboard motor to Honiara market; chuaka on taro; yam disease; community relationships and conflict; slow understanding and uptake of new ideas and change.	Skin disease affects children; indoor smoke (a general issue); transport access and cost; school food expenditure; cassava scale. **Opportunity**: Lake as key resource for food security and livelihoods; Maximising the usefullness of the mail station.	Loss of diversity; lack of income opportunities; tobacco issues; pig diseases.

Livelihood analysis: part 3

Food security & livelihood region	Tractor Coast	Bush
Village	**Kopiu**	**Belanimanu (population of bush people settled close to coast and with access to bush)**
Vulnerability	High level of migration to Honiara; not all families have copra or cacao; wild and domestic pigs eat gardens; distance to nurse and clinic; no enough teachers at school; limited land due to internal migration and disputes over come communities (kopiu) — limited land for cash crops.	Bush communities very isolated in physically demanding environment; unresolved tension issues at Belanimanu; lack of involvement of women in training centre.
Assets: Physical	Radio and batter charging for light.	Community-based training centre; radio; network of trainers and contact people in bush community; youth with interest in farming.
Human	Sago starch processing and cattle farming.	Copra, pigs.
Natural	Mangrove; alocasia; cows; pit pit; reef fish and reef resources; more protected access to sea.	Network of bush communities through CBTC.
Social	SDA network.	Donor support for CBTC through APHEDA and SIARTC.
Financial	Cocoa, coconut, solar recharging; aid.	
Issues	Migration. Agriculture: Pigs; shortage of yam and taro planting materials; interested in breadfruit; wild mango; knowhow to process sago — could share this technology. Pests and diseases: Chuaka; scale insect on cassava; papuana beetle on taro and karuvera.	Control chuaka; supply taro; yams; cough cough disease of pigs.

Battery charging enterprise — a photovoltaic panel supplies electricity to charge batteries (see energy report opposite).

Photographs

Stone walls are a feature of some Weather Coast villages.

The Buni tree provides food.

Weather Coast woman in her kitchen — gardening and food preparation are women's work all over the Solomon Islands.

Coconut husk is being used to start a cooking fire as the woman prepares root crops for cooking.