

The adaptive capacity of the Tegua island community, Torres Islands, Vanuatu



This report assesses adaptive capacity in the Tegua island community in northern Vanuatu and examines the role of the 'Capacity Building for the Development of Adaptation Measures in Pacific Island Countries' (CBDAMPIC) relocation project in shaping it.

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Executive summary

Pacific island communities have been dealing with variable and extreme climates for generations. Much capacity therefore exists within communities to deal with the implications of increases and changes in current climatic variability and extremes with climate change. However, measures of adaptive capacity common in the international literature and policy community do not often reflect the social, cultural, economic and environmental resources possessed by many Pacific communities that shape resilience.

This case study illuminates the opportunities for, and barriers to, adaptive capacity in the Tegua island community in northern Vanuatu, using a Pacific-specific analysis framework developed by a collaborative effort between the University of the South Pacific (USP), the Red Cross and the Secretariat of the Pacific Community (SPC). It examines the experiences of the community in a pilot project involving relocation and water resource management as part of the regional Capacity Building for the Development of Adaptation Measures in Pacific Island Countries (CBDAMPIC) program for climate change adaptation. In particular, it examines the impacts of the CBDAMPIC pilot project in shaping adaptive capacity in this community.

The case study will contribute to a broader Pacific regional stocktake of lessons learned from completed climate change adaptation projects as part of the Australian-funded Pacific Adaptation Strategy Assistance Program (PASAP). The stocktake exercise will assist in better focusing future adaptation projects and planning in the region—in particular, by feeding local experiences into higher level planning processes.

Results from this study show that the community of Tegua island is, in many ways, highly adaptive. The factors shaping high adaptive capacity are:

- strong traditional knowledge and belief systems that enable robust food-production systems, buffered against environmental contingencies
- strong local social networks, collective action and clear leadership
- abundant land and marine resources, equitable access and a low population
- a self-sufficient and innovative cultural outlook and strong local identity.

However, Tegua experiences some potential barriers limiting adaptive capacity. These are:

- lack of regular, effective support from external organisations
- limited project development, management and financial skills
- overly complex donor assistance requirements
- some hesitancy to take on new solutions to problems based on external knowledge
- limited access to services and market opportunities
- low and irregular cash incomes.

By assisting with the costs of relocation, the CBDAMPIC pilot project greatly assisted the community in dealing with coastal flooding and inundation—a significant climate-related problem they were experiencing due to their location on the coast. It also improved their

access to safe drinking water. The project therefore successfully reduced exposure to climate-related stress. Impacts on adaptive capacity were more limited. Tegua's experiences with the CBDAMPIC program highlight that without capacity for appropriate and sustained projects and programs at a provincial level, it is difficult for community-based adaptation (CBA) to go beyond merely addressing exposure. Effective CBA cannot operate outside broader processes of rural development.

Acknowledgements

Voices from the communities directly involved in climate change adaptation projects are fundamental to improving future adaptation projects and programs. I would like to extend my sincere gratitude to the Lirak community of Tegua island for their generosity, time and cooperation with this assessment. I would like to thank them for taking time out of their busy lives to *storian* (chat, yarn, swap stories) with us and share their important knowledge and experiences with the others in the Pacific region. In particular, I would like to thank Chief Richmond, Chief Reuben and Jean-Pierre and Hamilton John as well as all participants in interviews, focus groups and household questionnaires.

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List of acronyms

CBA	community-based adaptation
CBDAMPIC	Capacity Building for the Development of Adaptation Measures in Pacific Island Countries
CIDA	Canadian International Development Agency
DoH	Department of Health
EKI	external key informant
GDP	gross domestic product
IKI	internal key informant
IUCN	International Union for the Conservation of Nature
NGO	non-government organisation
PASAP	Pacific Adaptation Strategy Assistance Program
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Program
USP	University of the South Pacific

1. Introduction

This report outlines the results of an assessment of adaptive capacity carried out with the Tegua island community in Vanuatu as part of the Pacific Adaptation Strategy Assistance Program (PASAP) regional overview. The regional overview garners 'lessons learned' from adaptation initiatives that have been completed in the last 10 years. A regional stocktake of lessons learned will assist future adaptation projects to better achieve their goals of reducing vulnerability and increasing adaptive capacity in the Pacific region.

The Vanuatu assessment examines a relocation project undertaken on Tegua island in the northern Torres group in Vanuatu. The relocation was assisted by the CBDAMPIC project, funded by the Canadian International Development Agency (CIDA). The project was carried out in close collaboration with the Secretariat of the Pacific Regional Environment Program (SPREP). The assessment examines drivers of, and barriers to, adaptive capacity in the Tegua island community and assesses the role of the CBDAMPIC project in shaping this situation.

2. Tegua island, natural hazards and climate change

The climate in the northern islands of Vanuatu is wet and tropical. The closest weather station to Tegua is at Sola, on the island of Vanua Lava in the Banks group. Data from this weather station show that the northern islands receive an annual average rainfall of 4001.1 mm with an annual mean average temperature of 27.2 °C. Generally the group is wetter than other islands in the archipelago as it is influenced by the Pacific Convergent Zone and the Intertropical Convergent Zone. Annual maximum temperatures for the area since 1973 to 1998 show an annual increase of 0.0214 °C with the warmest years recorded from 1995 to 1998 (Government of Vanuatu, 2007b).

Seasonal variation in rainfall is fairly high, with the dryer months occurring from June through September. This dry period coincides with the cooler months. Tropical cyclones usually occur in the warmer months, November through April. Vanuatu is also vulnerable respectively to anomalously long dry spells and prolonged wet conditions associated with the El Niño (warm phase) and La Niña (cool phase) of the El Niño-Southern Oscillation phenomenon. It is also highly vulnerable to other extreme climate events including storm surges, coastal, river flooding and landslides.

Tegua is a relatively high island, protected in most places by uplifted dead coral barriers. However, settlement, like most islands in the Torres, is coastal. Tropical cyclones, storm surge, coastal inundation and flooding, water shortages and associated health problems are the main climate-related stresses faced by the community living on Tegua. Also, being located in a seismically and volcanically active zone, Vanuatu is exposed to geological

hazards: earthquakes, tsunami and volcanic eruptions. The Torres Islands frequently experience earthquakes and tsunamis that threaten (mainly) coastal settlement. For example, subsidence following an earthquake in 1997 caused an entire coastal coconut plantation on the nearby island of Loh to become submerged in seawater. Another earthquake in 2003–04 uplifted the area again (Figure 1).



Figure 1 Coconut plantation on Loh, submerged and then uplifted due to seismic activity

Future climate change and sea-level rise threaten to exacerbate the risks posed from tropical cyclones, coastal and river flooding, coastal erosion, heavy rainfall events and droughts. This, matched with highly uncertain geological hazards, poses particular risks in the coastal zone of most islands in the Torres.

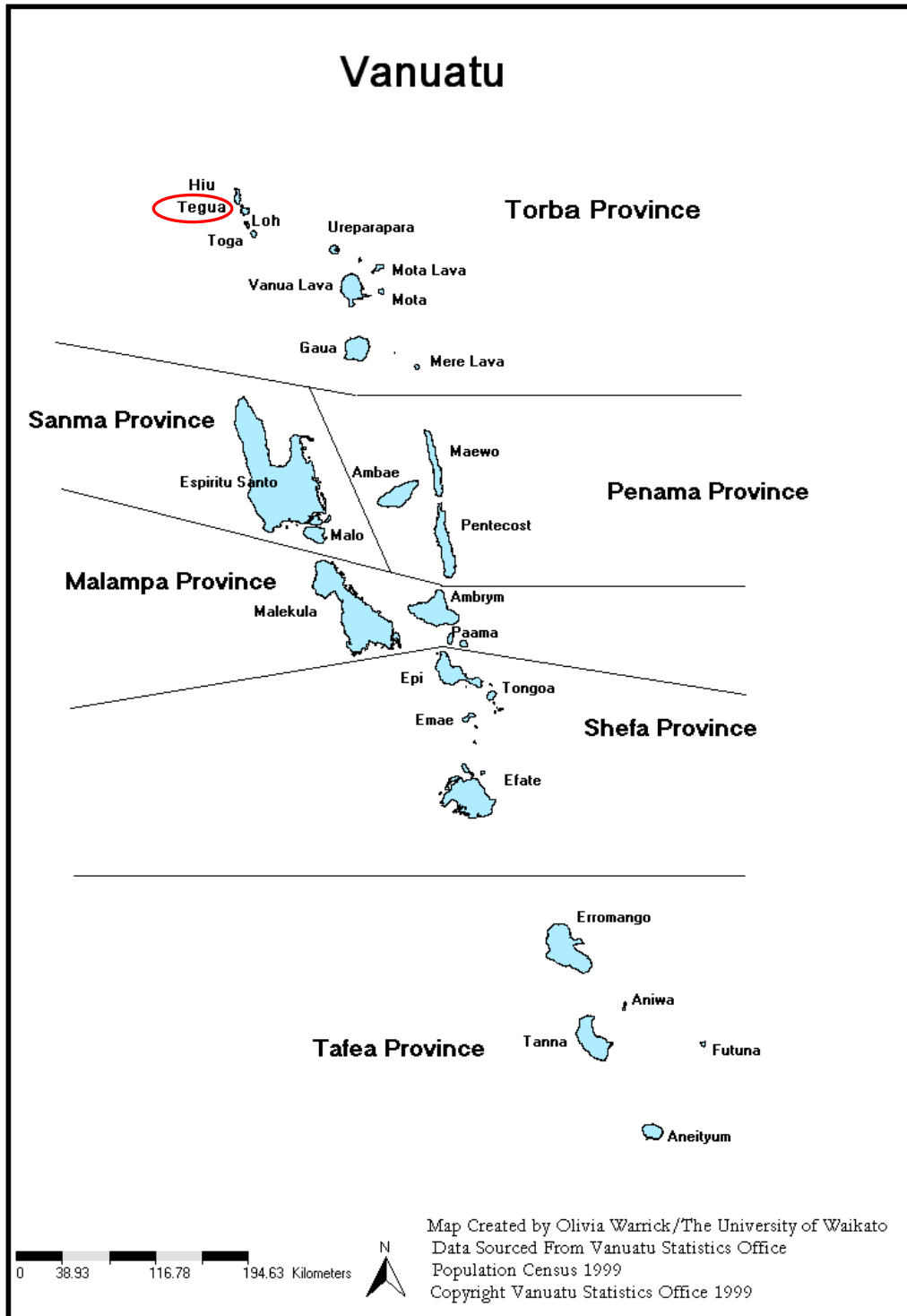


Figure 2 Map of Vanuatu showing Tegua’s location in the Torba Province

In addition to these environmental stresses, the Tegua community face a range of socio-economic stresses related to significant distance from markets, centres of power, infrastructure and services and communications. Tegua island is located in the Torba Province, Vanuatu’s northernmost province which encompasses the Banks and Torres group (Figure 2). Interaction between islands in the Torres group (Toga, Linua, Loh, Tegua,

Metoma and Hiu) is high, with outboard motorboat being the means of transport between them. However, interaction with the provincial government headquarters located in Sola, Vanua Lava, is low since it is not possible to reach Vanua Lava via motorboat. Air Vanuatu runs a bi-weekly service to the Torres and the price of flights is extremely high. The airstrip is on Linua, just off the coast of Loh. Loh island is the 'administrative headquarters' of the Torres group, where a health clinic, school and the Area Council Secretary (the mouthpiece of the Torres Islands to the Torba Provincial Government) are located.

The population of Tegua fluctuates because movement between the tightly knit communities on the islands is high. The latest census of population and housing in 2009 marked Tegua's population at 58 people (Government of Vanuatu, 2009). Local informants estimated the population to fluctuate between 40 and 100 people. The annual population growth rate is 4 per cent, significantly higher than Vanuatu as a whole (2.3 per cent). At the time of the PASAP assessment, approximately 50 people were residing on the island, in 10 households⁵. The community has a kindergarten, aid post, church and community hall, but no school.

3. Relocation and the CBDAMPIC project

The CBDAMPIC project in Vanuatu aimed to provide lessons learned for a first step towards building capacity at the institutional and community level to better understand the adverse impacts of climate change and how coping capacity could be improved (Phillips, no date). The impetus for choosing Tegua as a pilot site to take part in the CBDAMPIC project was the obvious and problematic flooding being experienced by the community. After a participatory decision-making process carried out by the multi-sector project team, relocation was identified as the preferred option by the community.

Prior to the project, the community lived at a site called 'Lateu', located less than one metre above sea level, right on the coast, less than five metres from the high water mark (Phillips, no date). At this place, they were known as the 'Lateu community'. Following relocation, they refer to themselves as the 'Lirak community' as 'Lirak' is the name of the new site. For ease, the community is referred to as the 'Tegua island community' in this report. In this report, four places on the island are important to the discussion. Table 1 outlines these.

⁵ The Tegua island community is divided into a main settlement (now residing at 'Lirak'), a smaller station of one household, residing a 30-minute walk down the coast at 'Litetra' and one household residing at 'Tenia', 15-minute walk away from Lirak. Assessment outlined in the remainder of this report relates mostly to those residing at Lirak.

Table 1 Sites on Tegua important to discussions in this report

Lateu	Location of the old village, prior to relocation
Lirak	Site of the main new village, approximately 500 m down the coast from Lateu and approximately 30 m, inland where the majority of the community now live.
Tenia	An alternative relocation site chosen prior to the relocation project where one family now lives. About 150 m inland, and 15-minute walk from Lirak.
Meregab	A site on top of the elevated area in the middle of the island where the gardens are located. This is close to where the population of Tegua use to live, prior to the early 1900s.

Since the 1990s, the community began noticeably experiencing accelerated coastal erosion, permanent pools of sitting water, generally wet and muddy living conditions, flooding during periods of rainfall and seawater inundation, particularly during spring tides, king tides, high south-east winds and cyclones. These exposures became particularly noticeable following an earthquake and tidal wave in 1997. Following the 1997 tidal wave, in which many houses were damaged, the following events transpired:

- The community met as a whole and a plan was discussed to move.
- One household shifted to Tenia.
- The majority of the community decided to move to Tenia. This site had begun to be cleared in the 1970s since Lateu was never intended to be a permanent place of settlement.
- Preliminary consultations took place between CBDAMPIC project actors and the community in 2001.
- The Chief began clearing a place for his household at Lirak in 2001.
- A site visit was made by the provincial government planner and Tenia was deemed a tsunami risk.
- A final decision was made, following a participatory assessment, to move to Lirak.
- The CBDAMPIC project assisted the relocation in 2005. It assisted with the cost and effort of relocating a number of households, the aid post and the church. It provided increased rainwater capture and storage facilities. More households moved using their own resources following the formal phase.

In this report a distinction is made between the CBDAMPIC phase of the relocation and the community phase. This is because the community were planning to move of their own accord prior to the CBDAMPIC project but were majorly constrained by time, resources and lack of access to drinking water.

In 2007 a post-relocation survey report was undertaken by SPREP and the Vanuatu Meteorological Service (Nakalevu and Phillips, no date). The survey found the adaptive capacity of the community to have increased significantly and all members of the community to be confident and happy with the decision that had been made to move to Lirak (Nakalevu

and Phillips, no date). Without doubt, the CBDAMPIC project greatly assisted in reducing exposure to coastal flooding and water shortage.

Important further points to note which were identified by local informants during the PASAP assessment are:

1. Some wet conditions and minor flooding have been experienced at Lirak following one or two days of heavy rain. The reason is that the watertable is still high at the new site. This causes occasionally unhealthy living conditions for a few households.
2. In late 2010 an earthquake appeared to have uplifted Tegua. The flooding problem previously experienced at Lateu is no longer as evident. According to local informants, the watertable appears to be lower and they don't get flooding after small rains. Swamp areas previously apparent in the coastal zone have dried out. This has helped to reduce the minor flooding problem at Lirak.

4. Methodology

Some deviations were made from the methodology originally designed by the PASAP adaptive capacity assessment team. For efficiency and to minimise impact on the community, the adaptive capacity assessment was undertaken in conjunction with an assessment of the economic benefits and costs of the CBDAMPIC phase project (by International Union for the Conservation of Nature [IUCN]). Combining the respective assessments required changes to the initial methods.

A pilot trip was made to the community from 25 to 28 March 2011 to explain the assessment and ask permission. The assessment was undertaken between 4 and 11 April 2011. The consultant worked closely with a local counterpart throughout—the Area Council Secretary for the Torres Islands. The consultant closely collaborated with IUCN staff and a local counterpart from the Vanuatu Farmers Support Association, a local non-government organisation (NGO).

Household questionnaire survey

After discussions with the Chief, it was decided that questionnaires would be conducted with each married couple in the village (nine in total, as one was not on the island at the time). This was because some small families shared the same sleeping and cooking houses. The revised questionnaire used for the assessment is shown in Appendix 2. The questionnaire was translated and conducted in Bislama, in which the consultant is fluent.

Interviews

Given the close family linkages between islands in the Torres, it makes sense to consider the situation of Tegua alongside other islands in the Torres. Site visits and interviews were conducted with key informants on Metoma, Hiu and Loh, as well as Tegua. External key

informant interviews were conducted in Sola and in Port Vila. A list is provided in Appendix 1. The majority of external key informants (EKIs) had not personally visited Tegua but were knowledgeable about the situation of communities in the Torres in general.

Likert scales

Likert scale scores for each factor (where required) were assigned by the consultant upon the completion of the entire assessment. These scores were based upon: Likert scores assigned by external key informants during interviews, qualitative data gathered from internal key informant interviews and questionnaire data. Individual Likert scale scores were not collected during interviews with internal key informants, as was originally intended. In the initial stages of the fieldwork it was found that the Likert scale method was too disruptive to interview flow and reduced participant–researcher rapport, since participants were often confused by this unfamiliar method. Where Likert scale scores were required as part of the questionnaire, these would be assigned by the interviewer, based on the interviewee’s qualitative response. It should be emphasised, therefore, that Likert scale scores outlined throughout are highly subjective and unavoidably influenced by the particular cultural perspective of the consultant and the various perspectives of the EKIs. As long as this subjectivity is recognised, they remain an effective tool for placing some measure on the different aspects of adaptive capacity outlined in the framework.

Personal observation

To place the situation of Tegua in context, the author has drawn upon previous adaptive capacity research undertaken in the Banks Islands, Efate and Santo. Comparisons are made throughout this report.

5. Results

5.1 Factor 1: Human capital

5.1.1 1(A) Skills: Traditional and modern

One of the key adaptive features of the Tegua Island community is the prevalence of traditional knowledge, skills and practices⁶ related to managing environmental uncertainty. Communities in the Torba Province (and throughout the whole of Vanuatu) have dealt with highly variable climatic conditions and geological hazards for generations. Strategies for managing this uncertainty are woven into livelihoods and social systems. In comparison to many islands and communities in Vanuatu, Torres island communities have retained an

⁶ In this report the label ‘traditional’ does not necessarily only mean ‘old’. Rather, it means knowledge, skills and practices that are embedded in local cultural knowledge, belief and value systems and that are passed from generation to generation. These are often adapted over time and ‘modernised’ by melding them with new knowledge.

abundance of their own traditional skills related to minimising vulnerability to climate and environmental stress (source: personal observation and EKI interviews). Remoteness plays an important role in this respect; many traditional skills still prevalent in the Torres have been lost from less remote nearby islands in the Banks (Warrick, 2011).

Table 2 outlines some examples of traditional skills important to adaptive capacity in different sectors. Importantly, traditional skills for managing climate variability and extremes and other aspects of environmental uncertainty are both purposeful and incidental. Purposeful practices are those consciously and specifically undertaken above and beyond 'normal' everyday and livelihood activities to minimise climate-related risks; for example, food preservation strategies. Incidental practices are those ingrained in the 'normal' systems and processes of livelihoods and social systems and culture that may not be specifically undertaken to minimise climate-related vulnerability, but that serve important adaptive functions nonetheless. An example of an incidental practice is the production and storage of a yam surplus and the culture of reciprocity and social support (Table 2). Many aspects of tradition that serve an adaptive function are not purposefully present for achieving material outcomes, but are intrinsic aspects of culture and society. This point highlights the importance of maintaining strong traditional value systems in communities like Tegua.

Table 2 Examples of traditional skills that minimise vulnerability to climate variability and extremes

Traditional skills	Description and comments	Application
Food security		
<i>Wild yam</i> ⁷ planting and storage	<i>Wild yam</i> are extremely weather resilient and will withstand tropical cyclone, drought or wet conditions with no damage. They are available all year round. Tubers are harvested and stored for up to a year inside kitchen houses and in pits dug nearby houses (Figure 3) in case of food shortage.	Purposeful Widely practiced in the Torres Not prevalent on less remote islands in the Banks
Preservation of arrowroot (<i>Maranta arundinacea</i>) ('Narava' in local vernacular) starch	Grows wild. Used to be planted in coastal bush areas and gardens. Starch can be extracted from rhizomes, dried, wrapped in leaves and hung in kitchen houses above cooking fires. Starch will keep for a year or more and is kept for consumption in times of food shortage. When consumed it is mixed with banana or greens. A lengthy process	Purposeful Knowledge of how to make it remains but it has not been made for about 20 years. People no longer plant arrowroot although it grows wild. Older community members have an idea to revive the practice. Youth indicated they had the knowledge of how to make it, but had not eaten or made it in their lifetimes. No longer practiced on less remote islands in the Banks

⁷ 'Wild yam' is the *Bislama* phrase for varieties of yam, that unlike 'soft yam' varieties (an important food and valuable *kastom* crop) are not cultivated in gardens. According to Weightman (1989), common species of 'wild yam' in Vanuatu are *Dioscorea nummularia*, *D. Bulbifera* (aerial tubers) and *D. pentaphylla*.

Traditional skills	Description and comments	Application
Extraction of sago palm (<i>Metroxylon sp.</i>) (<i>natangura</i> in <i>Bislama</i>) starch	<p>Starch is extracted from the trunk of the palm, mixed with pawpaw or banana and made into a pudding. Unlike arrowroot starch, it cannot be preserved for more than a few days.</p> <p>A lengthy process, made principally in times of food shortage although will be processed when sago palms are cut down to use for roofing material.</p>	<p>Purposeful.</p> <p>Widely practiced in the Torres</p> <p>No longer practiced on less remote islands in the Banks</p>
Planting and consumption of giant taro (<i>Alocasia macrorhiza</i>) ('wild taro' or <i>Navia</i> in <i>Bislama</i>)	<p>A weather-resilient tuber that will withstand most types of adverse weather. Tubers are large and plentiful per plant. People used to plant <i>Navia</i> in the first stage of planting gardens as an 'insurance' crop in case other crops were damaged by cyclone or other climate stress. Also will grow in the bush.</p> <p>Need to cook it for a long time to remove toxins that cause itching.</p>	<p>Purposeful and incidental</p> <p>As in less remote islands in the Banks, no longer widely practiced on Tegua.</p> <p>Some older people still plant it for general consumption and people will collect wild growing tubers if in need.</p>
Plant a large garden, multiple gardens, and diverse crops	<p>A large amount of diverse and well-looked-after crops means there is more chance of crops surviving regular, smaller cyclones (although a high-magnitude cyclone will destroy most crops apart from those outlined in the rows above).</p>	<p>Incidental. An excess of diverse crops is required for dietary, social and customary reasons.</p> <p>Still widely practiced in the Torres</p> <p>Less widely practiced in less remote islands in the Banks</p>
Agricultural seasonal calendar	<p>Planting calendar is structured around the yam (staple food source and valuable customary crop). Major planting period is September to the first week of December. This is so that yam plants are young during cyclone season—if a cyclone occurs before the tubers are formed, the crop can survive. If not, the crop will be lost.</p> <p>Planting months are closely related to seasonal changes in weather to maximise growing conditions. See Mondragon (2004) for traditional planting calendar in the Torres.</p>	<p>Purposeful and incidental</p> <p>Still widely practiced although now many are planting earlier in the year</p> <p>Following a traditional agricultural calendar is declining in less remote islands in the Banks.</p>
Surplus yam (<i>Dioscorea spp.</i>) production and storage	<p>A quantity of yams above and beyond household consumption requirements are produced. As they are harvested, yams are stored and preserved inside houses and used as needed. If gardens are damaged, yams will be safe. Remainder is used as planting stock.</p>	<p>Incidental. Yams are required for 1) food, 2) exchange, 3) ceremony, and recently 4) cash.</p> <p>Still widely practiced in the Torres</p> <p>Not prevalent on less remote islands in the Banks</p>
Water security		
Use coastal freshwater springs	<p>Before 1970s the only source of fresh water was the coastal springs. Could only use these at low tide. Two pools were dug out to collect the water—one for drinking and cooking, one for washing.</p>	<p>Incidental</p> <p>Still widely practiced. Coastal springs are an important source of fresh water when the rainwater tanks are low during the dry season.</p>

Traditional skills	Description and comments	Application
Store and transport water using bamboo	Water was transported from a spring in the bush in large lengths of bamboo. Would break the joins in the middle with a sharp stick. Could store water inside houses.	Incidental No longer practiced since there's little need The spring is still used for drinking when gardening in the bush.
Collect water in tree stumps	Rainwater was collected in the hollowed-out stumps of dead trees and in hollows carved out of leaning coconut trees.	Incidental No longer practiced since there's little need, although this is also a method of making <i>kastom</i> medicine so is still practiced for this purpose.

Housing and settlement

Cyclone-resistant building methods	Steeply angled roofs reaching the ground, low walls, rope bindings, no windows. The triangle shape of this house style was able to withstand high winds.	Purposeful and incidental No longer widely practiced although knowledge still exists
Weather-resilient house building methods	Planting and use of hardwoods for posts and beams. <i>Natora (Bislama)</i> is a common hardwood used on Tegua. Planting and use of sago palm (<i>natangura</i>) for roofing material and bamboo for walling. In the Torres, walling is lighter than in other islands in Vanuatu, possibly because of earthquake risk and because temperatures are very high. Replacing walling and roofing material about every 5–10 years reduces cyclone risk and prevents rotting.	Purposeful and incidental Still widely practiced. Modernised in some ways i.e. by using nails instead of bush rope. Planting of housing materials still widely practiced There is a trend towards less weather-resilient structures using fewer posts and beams and fewer sago palm 'tiles' for roofing.
Tie down roofs during cyclone season	Use of coconut fronds and rope to secure roofs.	Purposeful Still widely practiced
Build raised houses (Figure 4)	Some sleeping houses at Lirak are built on stilts to reduce flooding impacts.	Purposeful

Social networks

Inter-community/inter-island trading links	Crops are exchanged between islands in the Torres. This increases in times of shortage. A modern form of exchange is selling crops to people on government salaries based on Loh.	Incidental Still practiced in the Torres although less so than in the time of the grandparents
Intra-community resource sharing and exchange	Strong social support networks buffer households against resource shortages during hard times.	Incidental Still widely practiced in the Torres

Traditional skills	Description and comments	Application
Environmental knowledge		
Environmental calendar	Planting periods indicated by environmental signals such as flowering and fruiting of certain trees, the positioning of the sun in relation to certain islands and, importantly, the appearance of the Palolo worm in the Torres (Mondragon, 2004)	Incidental Knowledge of traditional calendar remains although is being lost among younger generations. The functional traditional calendar has been replaced by the Gregorian Calendar.
Traditional weather and disaster prediction	Impending storms, cyclones and other climate stresses can be predicted by environmental signals such as type and colour of clouds, wind direction, temperature, and sea birds coming to land. <i>Kastom</i> stories ensure people are aware of tidal wave signs and know when to evacuate to higher ground.	Purposeful Knowledge of traditional disaster signals remains, particularly among older generations.



Figure 3 Wild yam storage pits



Figure 4 House raised on stilts at Lirak

An abundance of traditional skills means that the Tegua island community is well able to adapt to current climate variability and extremes, and other environmental uncertainties. Climate change will increase environmental uncertainty by altering the frequency, magnitude and perhaps nature of current climate stresses faced. The maintenance of strong and diverse traditional skills for managing environmental uncertainty are an important feature of Tegua's adaptive capacity because these increase the range of choice available to adapt to future climate variability and extremes with climate change. Strong traditional skills mean that society and livelihoods are well buffered against uncertainties, surprises and contingencies. As one EKI pointed out, the Torres are like a 'bank' of traditional skills—organisations can learn a lot from them if they recognise the legitimacy of their traditional knowledge.

The Tegua community contributed their traditional skills to the relocation project. The majority of labour was undertaken by the community themselves, and family houses were rebuilt using traditional methods and mainly traditional materials. However, some buildings were constructed in a 'modern' style by a carpenter hired by the project. The framework of the aid post, kindergarten, guesthouse and community hall were constructed by the carpenter to provide rainwater catchment shelters (which were subsequently made into semi-permanent buildings by the community). Community members identified one area where their traditional knowledge could have improved the sustainability of these buildings: structural posts used for the capture shelters were soft whitewood that had been brought in on the ship by the project instead of local hardwoods. Since relocation, the community have reinforced these 'modern' buildings using local hardwood posts to increase longevity. Also, community members identified that the community hall was built using a design that was not cyclone resilient—it was damaged during Cyclone Funa in 2008 (low-magnitude) and had to be rebuilt by the community. These are instances where traditional skills could have been effectively combined with modern skills to improve project outcomes.

While traditional adaptive skills are well established, a factor that may limit some aspects of adaptive capacity is a lack of some particular 'modern' skills. Some effects of climate change may exceed the capacity of the community to effectively adapt without the assistance of external knowledge, strategies and skills to complement and build upon traditional capacity. External key informants identified three areas where modern skills are needed to improve the capacity of Torres' communities to help themselves:

- modern technical skills
- project development skills (for donor projects)
- management and financial skills.

Because of difficult access to education and training, Torres communities generally lack individuals with 'modern' technical skills such as water engineers, modern agricultural specialists, small business experts or modern builders. People who manage to get a good education or a job in Port Vila or Luganville generally do not come back to the islands. The skills required to identify and request assistance from donors are also lacking within communities. External key informants identified that low literacy and education levels and a lack of access to training restricts the ability of communities to effectively undertake the assessments, proposal development and reporting processes required to acquire donor funding for development projects. Further, a lack of basic modern financial skills limits

project management ability. Lack of accounting skills limits capacity for local project management, cooperative development and small business development.

External key informants identified that the constraints identified above make it difficult for communities to lead, control and take ownership of donor projects, particularly where these involve technologies such as water tanks or solar electricity. Expertise required for initiation and implementation comes mostly from outside. For example, the Tegua community has no comprehensive long-term management plan for the maintenance of the water tanks that were donated as part of the relocation project. Repairs would be funded on an ad-hoc basis (there has not yet been any need for repairs). The community recognises that more tanks may be required in the future with population growth, but has no plan and few ideas as to how to acquire them themselves (of course, limited access to cash restrains this). The CBDAMPIC phase did not result from a specific request for assistance by the community to external support organisations. It was only through visits by support organisations for other reasons that word of the vulnerable situation of Lateu reached government institutions. Donors approached them, rather than the other way round. As is discussed in Factor 2(D) below, a limitation of many projects in the Torres is a lack of sustained training and capacity building by external organisations to redress this situation.

The Likert score assigned for Factor 1(A) is 3 (out of 5). Lack of ‘modern’ skills may limit adaptive capacity by creating dependence on external knowledge, institutions, expertise and resources. However, it should be emphasised that the ‘modern’ skills that are lacking on Tegua are largely related to the requirements of donors, which may not always be well-aligned with the on-ground situation of communities. Further, although formal technical skills to harness new technologies may be lacking, Torres communities retain a strong culture of innovation. Community members emphasised that they will always find a way to fix problems locally (for example, problems with the water tanks), as they always have had to do this.

5.1.2 1(B): Health security

The overall opinion of key informants—both external and internal—was that despite a lack of access to government health services, people living on Tegua Island (like communities in the Torres in general) are very healthy, both physically and mentally. The major reasons given for this were a healthy, balanced diet; extensive knowledge of traditional medicine and capacity to manage health issues locally; and a strong local identity and confidence in ‘local ways of doing things’. However, some issues exist in relation to local environmental health and these have particular significance in the context of adaptation to climate change, variability and extremes.

Remoteness, a small population and an abundance of natural resources are important factors contributing to this situation of high health security. Daily diets consist of mostly locally produced foods. As is discussed in Factor 5(C) below, subsistence gardening is the ‘*stamba*’/‘main stem’ of life on Tegua. EKIs and personal observation indicated that in comparison to many other islands in Vanuatu, the consumption of imported food—especially rice, flour, tinned meat/fish and sugar—is low. As a result, people are generally strong and healthy on Tegua and able to resist disease. There are few lifestyle diseases such as diabetes or obesity. Staff at the Torres’ central health clinic on Loh Island could identify few

pervasive, persistent, unusual or highly problematic health issues in the Torres⁸. The aid-post worker on Tegua explained that although malaria, coughs and skin infections are the usual reasons that people come to the aid post, visits are fairly infrequent. Based on personal observation, children in the community display no indicators of malnourishment and have few skin infections or running noses. The availability of safe drinking water now helps to minimise waterborne disease. According to the Torba Provincial Department of Health (DoH) and the health clinic on Loh island, water and vector-borne disease are an issue on Tegua, but certainly not more so than other islands in Torba or wider Vanuatu.

The perception of external key informants was that disease incidence is far less in the Torres than on more highly populated islands because communities have retained their own ways of treating and minimising disease transmission, and treating injury. Internal key informants identified an extremely large range of *kastom* medicines and practices, emphasising that this aspect of knowledge and practice is alive and well in the Torres. The Torres have a number of specific *kastom* medicine experts and there is a great deal of confidence in and respect for *kastom* medicine within communities. Promoting the maintenance of local ways of treating and minimising disease and injury is a major component of awareness and training programs delivered by the Torba Provincial DoH in the Torres. The changes they suggest and the 'new' knowledge they promote do not aim to replace local methods, but rather to complement them.

In terms of adaptive capacity, costly and difficult access to health care is a limiting factor as it places some degree of burden on families. However, donor programs targeted at improving health and environmental health have increased in the Torba province over the past five years with a number of positive outcomes. Most recently, the Vanuatu Red Cross have instigated first-aid training and set up a volunteer network in the Torres Islands. Lirak has a Red Cross first-aid committee, although its function remains a little unclear. Between 2006 and 2010 the European Union provided water tanks to all the islands in the Torres apart from Tegua (who already had tanks because of the CBDAMPIC project). This significantly improved environmental health for many communities who, before, had faced severe shortages of safe drinking water during the dry season. The Vanuatu Ministry of Health (with support from various donors) instigated a Torres Islands' malaria eradication program in 2006, part of which involves providing diagnosis kits and prophylaxis medication to aid posts. External support to the Torba Province is increasing, with a number of NGOs and donors now targeting Torba (Shedrack Woleg Tapit, pers. comm., 2011). However, the aid-post worker on Tegua identified a need for better training programs for aid-post workers and other community members involved in health-related initiatives because lack of resources at the provincial level means training is often a one-off. The need for improved health training was echoed by the Torba Provincial DoH who identified that provincial capacity to do this effectively is constrained by lack of funding at a national scale.

The Likert scale score assigned for Factor 1(B) is 4. Despite lack of access to health services, health issues do not significantly limit the adaptive capacity of the Tegua island community. Based on responses of external and internal key informants, persistent health problems do not significantly impact labour capacity, livelihood security, or time available to initiate and implement vulnerability-reduction initiatives. However, there is room for

⁸ It is important to recognise, however, that many diseases and injuries will not be reported because of limited access to health services

improvement; as one external key informant put it, at Lirak, “the people are healthy but the *environment* isn’t healthy” [emphasis added]. Although not perceived as a major problem, the aid-post worker on Tegua linked periods of high malaria incidence, coughs, diarrhoea and skin infections (particularly among children) with rainy and wet conditions. He—and most other key informants and questionnaire respondents—believed that this situation had improved somewhat post-relocation because living conditions are no longer so wet. However, questionnaire respondents and key informants indicated that parts of Lirak village will experience minor flooding after one or two days of heavy rainfall. During the rainy season, water will sit in parts of the village for a day or two and drainage is poor; although the coastal inundation issue has been solved by the relocation to Lirak, the watertable at the new site is still close to the surface. Women noted that coughs and sores on children’s feet will increase during the rainy season because of frequently wet living conditions. External key informants identified poor sanitation as a major concern, given the high watertable, since all toilets in the village are pit toilets. Contamination of groundwater—which is used for washing and bathing during the dry season—is a concern (Figure 5).



Figure 5 Lirak’s community well

The community do not drink the groundwater. Also, since the relocation, most families have gone back to sleeping on the ground rather than on raised beds (as many had at Lateu), which increases transmission of communicable disease. The Loh health clinic identified three factors that could have improved the relocation project’s outcomes with respect to environmental health:

- a site with a lower watertable
- improved sanitation by financing above-ground compost toilets
- education and programs to encourage behaviour change.

Malaria and other health problems were cited by 80 per cent of questionnaire respondents as a major reason for moving their households from Lateu. Internal key informants noted that malaria has become less of a problem over the past six years on Tegua. The aid post worker estimated that at Lateu, he would get 10–12 cases of malaria per month, whereas at Lirak he gets 2–3 per month only. Key informants emphasised that it was difficult to say to what

extent decreases in malaria were due to the relocation project. However, because a Torres-wide malaria eradication program was instigated in 2006 even before that time, the use of bed nets was being strongly promoted by province-wide health programs with a good level of uptake. It is likely that the relocation project contributed to reducing malaria risk because Lirak has more open space than Lateu, less sitting water and local respondents believed there to be less mosquitoes.

The general impression of external key informants was that communities in the Torres are mentally as well as physically healthy. A common explanation was that communities on remote islands in the Torres are happy and satisfied to 'live in the local way'—within their own local or traditional systems. The Torba DoH estimated that people live within 70 per cent local knowledge and 30 per cent new knowledge. External key informants frequently referred to the community as being 'happy' and 'satisfied'. This agrees with my own personal observation that people in the Torba Province tend to, in general, be happy, feel secure and be comfortable with their identity, their environments, their local knowledge and their lifestyle.

5.1.3 1(C) Change agents, and 3(B) Willingness to accept change

The general opinion of community members and some EKIs was that there is no shortage of individuals who have good ideas for solving local problems. This comes from the strong culture of innovation in Torres communities; people are used to solving problems without external support, since they have always had to do this. However, taking *action* on some ideas can be difficult because 'new' ideas and knowledge are not always easily accepted by communities. This is due to a number of social capital constraints outlined in Factor 2 below.

Based on personal observation, there are two or three individuals in the Tegua community (or, individuals that interact closely with the Tegua community) who are 'community champions'—people that initiate and drive community projects. Internal and external interviewees emphasised that good ideas for change on Tegua tend to be activated at an individual-household level rather than community-wide level. Community members revealed that although many good ideas exist for solving local problems, these are often not disseminated at community meetings or within committees; people are 'too shy' to speak out at community meetings or share their ideas. This leads some EKIs to perceive Tegua as lacking effective change agents—many described Torres communities as lacking vision, since people with ideas for change usually leave the islands and do not return. However, personal observation and discussions with internal key informants (IKIs) revealed that there is no shortage of visionaries; rather, they instigate change at a household rather than collective scale. Change agents catalyse change by undertaking initiatives themselves and providing examples of success that others can then observe and follow. A good example of this is the village-driven relocation process prior to the CBDAMPIC project—various change agents had begun the process of clearing and building houses at two alternative sites in order to catalyse the process of village relocation. Change agents played a leading role during the CBDAMPIC relocation; for example, by overseeing building efforts.

However, there are some barriers to the uptake of new ideas. Internal and external interviewees and questionnaire respondents all agreed that new ideas or solutions to problems are not easily accepted by people in the Torres. Willingness to accept change therefore largely depends on whether change involves 'new' knowledge or ideas or not.

'New' knowledge is that which comes from external sources and is largely unfamiliar to the community. Community members indicated that ideas to address relatively minor day-to-day problems are more easily accepted and taken up by others than ideas about longer term issues such as getting a school, getting water tanks or identifying more avenues for making money. Many people, especially older people (which includes most Chiefs), are 'frightened' of outside knowledge, practices and solutions to problems that are not familiar. Many EKIs stated "*olgeta blong Torres oli followem rod blong olgeta nomo*" / "people in the Torres just follow their own road", meaning they have their own way of doing things. Most people living in the Torres have never left the Torres and therefore have had no chance to experience different ways of doing things. Most have low levels of education and have had little chance to attend training workshops. It therefore makes sense that many are mistrustful of new ways of doing things. They have seen no proof that new ways will provide benefits in complement to their existing ways of solving problems.

Community change agents are generally those who are more accepting of new knowledge. These individuals tend to have spent time outside the Torres Islands or have spouses who are from other provinces. They tend to have higher levels of education or have children with high levels of education. One EKI made the point that people who have left the Torres and come back have a broadened world view—they have a view of both the modern and traditional world and therefore can better see how to effectively integrate the two. They are less likely to reject new ideas because of fear that they will erode existing knowledge. Internal and external interviewees all stated that younger people are more accepting of change because they have more education. With increasing numbers of young Torres individuals attending high school, many internal and external key informants are hopeful for the future. However, younger respondents pointed out that they face problems with 'convincing' people of the value of new knowledge. For example, an educated female youth leader explained that many people—especially older people—do not want to listen to her advice because they perceive her to think of herself as 'higher' than them because of her formal education. There is an increasing communication gap between older and younger generations which inhibits the acceptance of new ideas.

What helps change to be accepted? Both EKIs and IKIs emphasised that people need to see to accept. The key to acceptance of new solutions to problems is sustained support programs from external organisations. For example, new methods of crop planting are finally being taken up by families on Mota Lava in the Banks Islands, after a number of years, because of regular visits by the provincial agricultural officer and the development of demonstration plots. It is not enough to 'do awareness' and provide planting material. Facilitating the acceptance of new solutions requires constant reinforcement and encouragement. Without this, new knowledge will not 'stick'. This is an issue in the Torres because of distance, cost and organisational capacity constraints. For example, in the health sector, the islands in Torba occasionally receive awareness training and workshops from the Torba Province DoH. These initiatives tend to be successful initially—the communities are generally accepting of messages. However, the sustainability of these initiatives varies between islands in Torba. More developed islands such as Mota Lava, Gaua and parts of Vanua Lava tend to have a better uptake of awareness programs because organisations can regularly visit and support the communities and the projects. However, in remote islands such as the Torres, initiatives will generally have an impact in the initial stages but after a few months of no contact with the organisation, the communities will 'fall back to their old

way of doing things'. The health department, for example, did an awareness in the Torres about HIV/AIDS. Reports from the village health workers indicate that although condom use may have increased in the initial months following the awareness, after that the community went back to non-use. In many instances, introducing new solutions to problems requires some degree of cultural acceptance and change—this takes a long time and requires sustained support.

The Likert score assigned for Factor 1(C) is 4. The Likert score assigned for Factor 3(B) is 2. Willingness to accept change, and the presence of effective internal change agents to assist this process, is important to adaptive capacity. Climate change may produce stresses and problems that exceed the ability of the community to deal with on their own. New solutions to old and new problems may well be needed to complement and build upon internal capability. The community has good change agents who find ways to introduce change in a locally appropriate way. However, if new solutions to climate problems are to be successfully encouraged by external organisations, a sustained process of engagement will be required in order to introduce ideas in a way that communities can accept.

5.2 Factor 2: Social capital

5.2.1 2(A): Community diversity

A very small population means that the Tegua island community is fairly 'homogenous'. The community is comprised of one family line or 'clan' only—this means that all males in the community are descended from a common ancestor. All the male heads of household are immediately related. Of the 10 households, two heads are the two Chiefs (paramount and *kastom* "customary") who are direct brothers. The majority of the remainder are sons of the *kastom* Chief (the paramount Chief has mostly daughters and one son still in his teens) and the son of the Chiefs' sister. One household head is a 'migrant' from Toga, but is married to the *kastom* Chief's daughter. Women generally marry into the community from elsewhere, although a large majority are from the other islands in the Torres. Marriage largely follows a traditional tribal system: there are two major tribes in the Torres and marriage must be between them, with a few exceptions. The marriage system is important to the system of land succession.

People in the Torres are closely related as there are only five family lines/'clans'. The two major tribes encompass these 'clans'. Therefore, the notion of 'migrants' is not as potentially problematic in terms of access to land and resources as in some other areas of Vanuatu. There are a relatively small number of individuals living in the Torres that are from other island groups (even by marriage) because of remoteness. Most 'migrants' in communities are simply from other islands in the Torres and will be closely related in some way. There is a great deal of movement between islands. Participants emphasised that wherever you go in the Torres, you always have extended family to live with and access to land if needed. For example, children from Tegua will live with family on Hiu, Loh or Toga when they need to attend school. Although people from different islands identify strongly with that particular island, there is a strong overarching 'Torres identity'. There are two major cultural identity groups that match language groups in the Torres: people from Toga (which includes people from Loh and Tegua) and people from Hiu. People on Tegua speak 'Toga' language.

The only church on the island (and in most of the Torres) is the Anglican Church of Melanesia. Household questionnaires revealed minor variation between household wealth and education levels. Some households have extended family who work in towns. Heads of households are generally not educated above class six. The major aspect of diversity in the community that was frequently discussed by participants is difference in educational attainment between younger and older generations. As is discussed in the following sections, young people are gaining increasing access to higher levels of education which causes some tensions in the community since there is some communication gap between younger and older generations.

It is important to emphasise that the Tegua island community, as it is today, is fairly new—the island was resettled by a Chief, after a long period of inhabitation in the 1970s. Prior to this, the Tegua family line lived on Toga (where Tegua has particularly close ties) although maintained copra plantations on Tegua. The factors that often create community divisions in Vanuatu—land disputes/migrants, religious tensions, inequitable hereditary access to resources—do not really apply to Tegua. According to local informants, the Tegua community has a strong central identity, social order is generally harmonious and there are few major rifts. However, this does not reflect Tegua's history. Before Christianity, Tegua was populated by more than 7000 people who lived in a highland area where the community's gardens are now located. Old house foundations and stone walls still remain. Disputes and conflict between family lines from the western and eastern sides of the island resulted in a *kastom* curse being placed on the island population and, resultantly, a mass exodus of the island to surrounding islands, where people remained until the 1970s.

5.2.2 2(B) Leadership, and 2(E) Governance

Some community members and some EKIs identified a few impediments to cohesive leadership and therefore governance processes on Tegua and other islands in the Torres. Leadership and governance issues directly affect collective action (Factor 2(C) below). However, it is important to keep Tegua's leadership issues in perspective; as the relocation project and other community-initiated projects have demonstrated, these impediments are able to be fairly easily overcome. As emphasised by EKIs and based on personal observation, the impediments faced by Torres communities are minor in comparison to those faced on some less remote islands in Torba and wider Vanuatu.

Tegua's leadership and governance system follows a predominantly traditional structure⁹. There is a Paramount Chief who is responsible primarily for village rule and who heads the island council of Chiefs. The council (all male) are responsible for making decisions about solving any community problems that may arise. There is an assistant Chief who is responsible for implementing plans and decisions made by the Paramount Chief and council. A *kastom* Chief is responsible for maintaining peace and order by deciding on customary rituals to solve disputes; for example, deciding how much kava, mats and yams must be given to compensate for a wrongdoing. Other important leaders include the church leader, women's group leader, youth group leader, the Area Council Secretary and various committee leaders. Women attend community meetings, although are not generally vocal.

⁹ Although it is likely that the current structure differs from pre-colonial leadership, which would have likely more closely followed a graded 'big-man' system rather than a system of 'Chief' in the Western understanding of the concept.

Women informants explained that community-wide decisions are made by Chiefs and that they trust the decisions that are made: they view this as a good system of decision-making. Women make major contributions to decision-making at a household scale; for example, money management.

Community opinion as to whether leaders were important to solving community problems was varied (Figure 6).



Figure 6 Importance of leaders in solving community problems. From household questionnaire survey (n=9)

Some community members had the opinion that leadership is largely ineffective in solving community problems. These participants stated that leadership and governance structures on Tegua are effective in so far as sorting out day-to-day conflicts and disputes within the community. However, decision-making about community-wide issues is more difficult because these types of issues often require cooperation between different types of leaders who often have different views on how problems should be solved. Limited information-sharing between leaders impedes progress towards community goals. The reasons given were that various leaders do not communicate well with each other, disagree with each other, and do not cooperate to solve problems. Participants identified that each type of leader—church, Chief, youth—will have their own idea and understanding of how a problem should be tackled and are unable to reach agreement. One IKI identified that governance was easier in pre-colonial times because there were only *kastom* leaders. Leadership was clearer. Now there are many different ‘mindsets’ and world views that are often contradictory. Another important point identified by community members was that because the community is so small, personal differences (that will exist in any community) infuse leadership and decision-making.

Community leaders seldom meet as a group to discuss community issues. This limits information-sharing required for cohesive community decision-making processes. Questionnaire participants estimated that community meetings occur once or twice a year only and in response to a particular need, rather than proactively. At community meetings,

leaders will often not speak out if they disagree with the majority decision—this only becomes evident afterward when they do not cooperate in implementation processes. As a result, taking action on decisions is often slow.

However, other questionnaire participants and IKIs believed that leadership was mostly effective in solving community problems and that leaders worked well together. An important reason given was that *kastom* is still the basis for solving community problems. Many EKIs identified the strong presence of *kastom* in governance to be the key to (in their perception) the relatively harmonious nature of life in the Torres—disputes or conflicts can almost always be sorted out at the community scale and hardly ever reach the governmental court system. On the whole, there is a high degree of respect for Chiefs, although some IKIs identified that this is declining among younger generations. EKIs frequently compared Tegua’s situation to more ‘developed’ and highly populated islands in Torba such as Mota Lava: in these islands, leaders are many and varied, decision-making is slower and more difficult, there are more divisions within leadership and communities tend to be more fragmented. EKIs who have experience of other provinces and communities generally perceive the impediments to leadership and governance to be minor in the Torres in comparison to other islands and areas. The small size of the community contributes to this—most are directly involved in decision-making.

All questionnaire respondents agreed that leaders cooperated well during the CBDAMPIC phase of the relocation¹⁰. The project itself was an important motivating factor—it was made clear to leaders by project implementers that the donor required leadership cooperation and a community-wide decision on location. The project provided a ‘push’, assisting leaders to cooperate. EKIs identified that this is commonly the case; when an ‘incentive’ comes from outside, leaders are often able to come together. All internal informants—male and female—were happy that the CBDAMPIC project implementers had worked through local decision-making channels and all believed that the decision-making process was cohesive and inclusive. All questionnaire respondents, IKIs and participants in focus groups were pleased with the role played by leaders before, during and after the CBDAMPIC phase. Although there was an initial split in decision about which site to move to, all were happy with the final decision to move to Lirak following the CBDAMPIC phase¹¹. All questionnaire respondents agreed that although leaders worked together well during the CBDAMPIC phase, after project completion, the old impediments to leadership and collective decision-making returned. The project left no lasting impacts on leadership and governance capacity.

The Likert score assigned for Factors 2(B) and 2(E) is 3. Although impediments exist, the relocation project demonstrated that impediments to leadership and decision-making about community wide issues can be overcome. From personal observation, the impediments to leadership and governance on Tegua are fairly minor; in some communities the consultant has experienced, divisions in leadership (mostly related to land issues) are so entrenched that communities are unable to undertake projects or attain support from external organisations.

¹⁰ Although, the split in decision regarding location prior to the CBDAMPIC phase perhaps reflects a lack of agreement between leaders. However, purposefully, this was not something that was explored by the consultant during the assessment because of the sensitive nature of this issue.

¹¹ Although, there are some in the community that have plans to move to a different site in the near future, which may reflect the initial split in decision.

5.2.3 2(C): Strength of collective action

Leadership and collective action capacity are closely linked. Many IKIs and EKIs referred to 'local politics' as impeding collective action. However, in the same way that impediments to leadership are fairly minor, so too are impediments to collective action.

Responses to the household questionnaire Question 7 *Do people in the village work together to solve problems?* were varied (Figure 7). The majority believed the community works together fairly frequently: 'often' or 'very often'. Because of relative homogeneity (see above), community identity is strong.

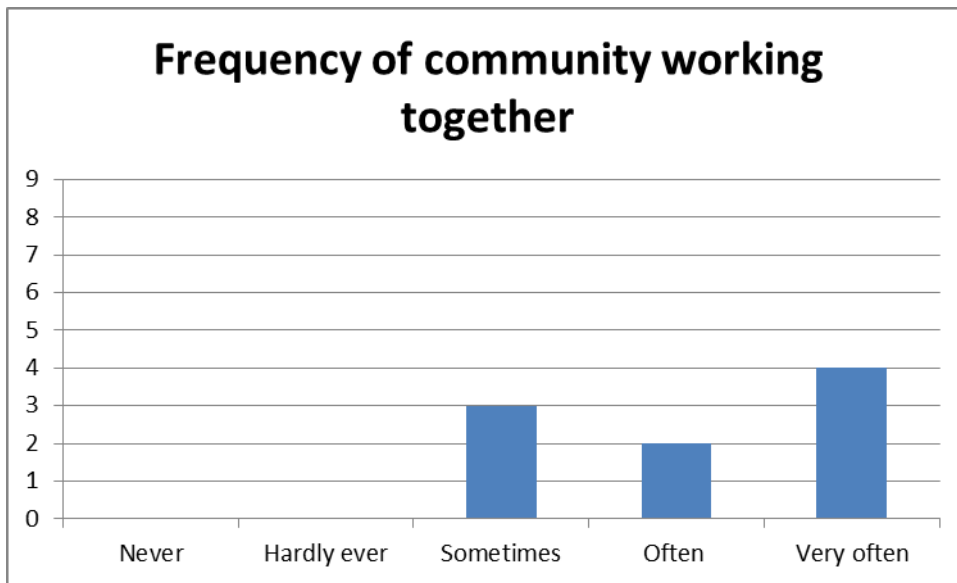


Figure 7 Frequency of people in the community working together to solve problems. From household questionnaire survey (n=9)

However, in-depth interviews with IKIs revealed impediments to collective action. Some questionnaire respondents reflected these impediments, stating that the community works together 'sometimes'. In general, those respondents who stated that leaders did not often effectively solve community problems also stated that the community does not work together particularly well. A cross-cutting theme through key informant interviews and questionnaire surveys was that cooperation can be difficult on community-wide projects for the benefit of everyone. EKIs noted that undertaking projects with communities in Torba can be problematic because although people help each other out 'on the surface', divisions impede progress. The reasons given fall into three themes:

- differences between individuals creating fragmentation, perpetuated by small community size
- leadership differences and lack of organisation
- low incentives to contribute for younger people.

Differences between individuals and leaders can 'fragment' communities. Some participants believed this inhibits the ability to work together to solve community problems. The source of community differences and 'local politics' was not something that it was appropriate to delve

into in the assessment as these are of a sensitive nature. Differences tend to be between individuals, the sources of which were divulged to the consultant in confidence. It is enough to state that differences are not directly related to the factors that normally divide communities in Vanuatu: land tensions, national politics, religion and money-making projects (source: personal observation and EKI interviews). Rather, they are of a personal nature.

Community-wide activities such as rebuilding the community hall following Cyclone Funa in 2008, fencing and cleaning the community well, or repairing the aid post can be difficult to gather community labour. Decisions and planning for solving problems will be undertaken, but when it comes to implementation, participation can be low. Those who disagree with a decision may not speak out at community meetings but then will not contribute labour. Commonly, community members stated that the Chiefs will ring the bell to signal the start of work, but few turn up. Generally, people noted, older people end up doing the majority of labour; young people contribute less. This point was emphasised by many IKIs. Many believed that younger people were 'lazy' because of less respect for *kastom* work-ethic values. Spending long periods of time away from the island at school reduces incentives to contribute to community projects. However, 'local politics' was the major reason given for not frequently working together for the common good.

Since the community is small, nearly all community members interviewed were involved in a village committee. Many are on multiple committees. Committees include: kindergarten, church, Chiefs, women, youth, aid post, Red Cross, community boat, community store, and water/climate change. The effectiveness of the various committees depends on the individuals involved—many noted that the women's committee is particularly efficient because women are less likely to become involved in 'local politics'. Most respondents were clear about the roles and responsibilities of the committees. However, most noted that the ability of committees to undertake projects to solve community problems is limited by lack of access to funding and external services. A relocation/climate change committee was set up by the CBDAMPIC project implementers. This committee is now responsible for the water tanks and iron roofing. However, the committee rarely meets.

People frequently work together to assist individual households. For example, cutting a new garden or building a new house are activities that are assisted by multiple households. During the assessment, a new house was being built for a particular family, assisted by a large proportion of the community including many young people. Prior to the CBDAMPIC phase, relocation plans were being carried out in this way; certain households were beginning to clear the bush for their houses at the two sites. However, during the CBDAMPIC phase participants noted that everyone, young and old, worked together collectively to clear the bush and build the new houses. Local informants frequently stated that the community was 'united'. Like with the leadership issue, the project provided a 'motivation' to work together for the benefit of everyone—most mentioned the water tanks as the primary motivation, since there was a dire need for these. Some EKIs believed that the experience of working together collectively during the CBDAMPIC project provided an example of what can be achieved when the community comes together. However, all local informants noted that following project completion the situation returned to its prior state—working together on community projects being a rare occurrence. However, some IKIs pointed out that the experience taught them what they need to do to work effectively with donors; working intensively together on something is not the 'normal' local way of getting

things done. This is a positive outcome for adaptive capacity, since donors often require demonstration of ‘collective action’ and ‘cohesiveness’.

The Likert score assigned for Factor 2(C) is 4. Certain factors impede collective action on activities that would benefit the whole community. However, there is no lack of ‘helping each other out’. Eventually, community-wide problems will be addressed (such as cleaning the community well), albeit slowly. When necessary, the community will unite and community identity is strong. It is important to recognise that comparatively, the community divisions are relatively minor—this was emphasised by IKIs when I explored the issue at length in the informal setting. In some communities I have personally experienced, deep divisions relating to land and religious difference have completely stalled any collective action, even when this prevents project funds from coming in. In comparison, Lirak is a cohesive community that supports each other and will work in unity when needed.

5.2.4 2(D): Support services and networks

There is a saying in the Torba Province: “*las aelan, las tingting*”, or “last island, last thinking”. This saying reflects the general view of EKIs and community members, that Torba—and especially the Torres Islands—is the ‘forgotten province’, or last province, to receive support and assistance from governmental, non-governmental and donor organisations.

All questionnaire participants responded “no” to Question 16 (Appendix 2): it is not easy to access assistance from external organisations to help the community deal with problems, climate-related and otherwise. Community members explained that this is because there are many ‘obstacles’ that impede ability to request and receive assistance. From the community’s perspective, these obstacles are:

- lack of effective communication linkages to the province and donors
- lack of response from the province to requests for assistance
- lack of regular and sustained support from external organisations
- lengthy and complicated proposal development requirements of donors.

To request support for a project, a community must develop a proposal in conjunction with the Area Council Secretary for the Torres Islands. Unlike the Banks, the Torres has only one ACS who, although very dedicated to the job, is limited in time and budget to reach all the dispersed islands. Donors generally require lengthy and complex proposals including things that are difficult to get in the Torres, such as quotes for costs of equipment and multiple letters signed by various community leaders. This can be difficult with low levels of literacy and the lack of modern skills discussed above.

Community members and the Area Council Secretary identified that, often, letters and proposals written to the province requesting assistance are not responded to. The installation of the teleradio in 2007 has improved the communications problem somewhat.

An interview with IKIs revealed that Tegua has or does receive the most significant assistance from the following organisations:

- Vanuatu Red Cross and French Red Cross (2010–11; first aid training, disaster management, disaster relief)
- European Union/Non-State Actor project (2006–10; solar cooker on Tegua and water tanks throughout other islands in the Torres)
- Vanuatu Meteorological Office/SPREP/Provincial Planning Unit (CBDAMPIC relocation project)
- World Vision (aid post during the 1990s)
- Loh health clinic (occasional health visits)
- New Zealand High Commission (funded the teleradio in 2007)
- Torba Province (Area Council Secretary assists with all projects)
- Anglican Church of Melanesia (disaster relief, church activities).

The most effective of these organisations are perceived by the community to be the Red Cross groups and the Vanuatu Meteorological Office because of their regular visits while undertaking projects with the community.

EKIs also identified a number of obstacles that severely limit the ability of external organisations to provide effective support to communities in the Torres Islands. From an external perspective, the obstacles are:

- extremely high cost of transport and freight and high number of widely dispersed and remote islands
- lack of regular and reliable transport (two flights a week on a Monday and a Friday which are frequently cancelled)
- lack of communications
- capacity and financial constraints at the provincial government level
- capacity constraints at the community and Area Council level
- lack of knowledge and understanding at a central and provincial government level about the situation of the Torres
- mentality within central government and organisations based in Port Vila that Torba is too expensive and logistically difficult to do projects in
- lack of political representation for the Torres Islands.

High transport costs, irregular transport links and difficult communications limit the ability of external organisations to provide sustained support to the Torres. These financial and logistical difficulties discourage organisations based in Port Vila from undertaking awareness or implementation projects in remote islands in the Torba Province. Projects in the Torres are viewed as 'high-risk', as it is difficult to provide the ongoing support, monitoring and evaluation necessary to ensure positive project outcomes. The DoH identified that support organisations undertaking projects in the Torres often do not budget for the high costs of working in remote islands. Projects need to budget for the multitude of unforeseen costs

associated with logistical difficulties, such as cancelled flights and fuel costs of transporting participants to the project site. The DoH estimated that the comparable costs of undertaking a project or awareness program in the Torres is roughly 10 times that of undertaking a similar project in Shefa or Sanma. It is common for projects to be only half completed as unforeseen costs end up being the responsibility of the individuals undertaking the project. However, recently some organisations are specifically targeting Torba for this reason: namely the Vanuatu and French Red Cross and the European Union Non-State Actor Project (completed in 2010).

EKIs at the Torba Province identified that they lack the finances or person-power to effectively extend their programs to the remote Torres Islands. For example, the Department of Agriculture is unable to provide support to build cooperative societies or introduce new crop varieties in the Torres as they have in some less remote islands in the Banks because their budget is too small and there is only one agricultural officer for all islands in Torba. Planting stock for new crop varieties has been sent to the Torres but there has been no follow-up visit or capacity building. The officer is unable to spend the necessary time in the Torres Islands to do the training and capacity building required for effective uptake of initiatives. Similar constraints are faced by all provincial departments interviewed. All identified that many projects and initiatives facilitated by donors, NGOs and the Torba Province commonly have short time frames with little sustained follow-up. For initiatives to be sustainably taken up at the community scale, there need to be regular follow-up visits, encouragement and reinforcement. Importantly, personal relationships and trust need to be built between communities and organisations. In the Torres this rarely occurs because of cost and logistics. However, an NGO based at the provincial headquarters pointed out that the Torres has strong local social and church networks which can be effectively used in project implementation.

The Likert score assigned for Factor 2(D) is 2. Getting effective assistance from external organisations to build upon local capacity to solve problems is difficult on Tegua. However, Tegua has what many other islands in Vanuatu increasingly lack: a wide and strong local social support network based on traditional clan and tribal systems. Members of extended families in the Torres are distributed throughout Toga, Loh, Tegua, Metoma and Hiu. Traditional marriage systems between tribes and clans are still followed. During the relocation project, Tegua was assisted by family from Toga, Loh and Hiu. During a dry period in 2008, Tegua supplied Hiu and Loh with drinking water. Resource exchange between islands is common and buffers households against times of stress and hardship. Most households have access to land on multiple islands. Children from Tegua live with family from other islands during the school terms. Tegua possesses a strong and sustainable local social network, which helps to buffers the community against times of stress and hardship. This is an extremely important resource in the context of adaptive capacity.

5.3 Factor 3: Belief systems, world views and values

5.3.1 3(A) Traditional values, systems and knowledge ('mana')/modern, Western and church value systems and knowledge

Traditional values, systems and knowledge are strong on Tegua. Traditional ni-Vanuatu culture and way of life is referred to as '*kastom*' in *Bislama*. McClancy (2002:20) defines *kastom* as:

Kastom ... is a whole way of life that dictates almost all of one's actions and provides its own particular interpretation for almost everything that happens. It is complete unto itself.

As can be seen in Figure 8, household questionnaire respondents believed that the community places high value on *kastom*.

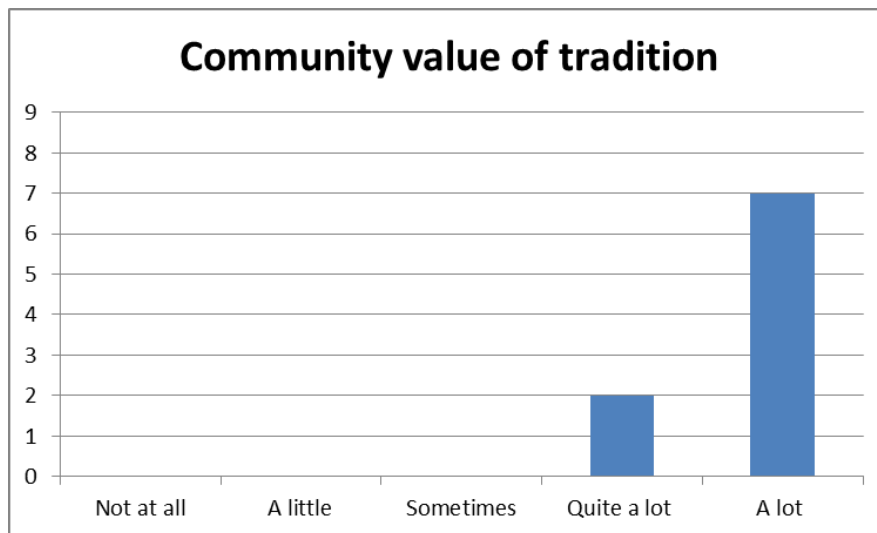


Figure 8 Community value placed on traditional knowledge and way of life. From household questionnaire survey (n=9)

Kastom remains the major framework structuring social capital on Tegua and most islands in the Torres. IKIs and EKIs indicated that *Kastom* creates the values that shape behaviour, collective identity and social organisation on Tegua. Life and livelihoods are strongly shaped by accumulated indigenous cultural knowledge and this is why a multitude of traditional skills remain that make the community highly resilient to climatic and environmental uncertainty. *Kastom* provides the socio-cultural framework holding these skills in place. For example, a strong subsistence work ethic in the community—including among younger generations—is derived from aspects of *kastom*. This ensures that crop volumes and diversity is high, increasing resilience to periods of inclement weather. The concept of '*mana*' (personal power and efficacy¹²) is central to the lives and livelihoods of Torres Islanders. *Mana* is tied up in the ability to successfully negotiate the social and environmental situation. The

¹² See Mondragon (2004) for an analysis of the concept of *mana* in relation to environmental variability in the Torres Islands.

traditional graded society—the *hukwe* (Torres vernacular)—remains an important ritual cycle in the lives of Torres islanders. Achieving status-altering grades in this system depends on personal productivity and success (tied up in *mana*), one aspect of which is in relation to healthy and productive subsistence gardens—demonstrating capacity to be a ‘provider’ and ‘nurturer’ (Mondragon, 2004).

The presence of the *hukwe* and the high importance of *mana* may sustain many of the traditional skills outlined in Factor 1(A) above. For example, the production of a significant surplus of crops (particularly yam), the seasonal planting calendar and high labour inputs to gardening maintain the resiliency of food production systems. These are largely incidental skills in that they help people deal with environmental variability, but their primary function (and incentive for continuation) is ritual. In less remote islands in the Banks where a functional graded society no longer exists (there, the graded system is called the *sukwe*), the production of a crop surplus no longer exists and labour time spent in subsistence gardening has greatly decreased—two aspects of food production systems that make communities increasingly vulnerable to weather events. Loss of *kastom* is at the core of both (Warrick, 2011).

IKI and EKIs all perceived communities in the Torres as retaining a great deal of respect for *kastom*—traditional knowledge and lifestyles are not generally viewed as ‘backward’ or inferior to Western knowledge and lifestyles as they are in many other parts of Vanuatu. Based on personal observation, *kastom* is an intangible ‘normal way of doing things’ in the Torres rather than being a reified entity to specifically protect as in many other parts of Vanuatu¹³. In many other parts of Vanuatu, *kastom* knowledge and skills are being rapidly lost and are increasingly viewed as less valuable than Western knowledge and skills (Regenvanu, 2005; Warrick, 2011).

However, like in other communities the consultant has experienced in wider Vanuatu, local informants on Tegua articulated a distinct dichotomy between ‘*kastom*’ and ‘Western’, with the latter directly threatening the former. All questionnaire respondents believed that *kastom* is valued less in the community than 20 years ago. The most prominent ‘symptoms’ of changing *kastom* identified by local informants are:

- loss of respect for some rules of social relations (e.g. not calling certain family members by name)
- loss of respect for Chiefs
- change in clothing, housing styles, some aspects of gardening system and cooking methods
- reduction of the traditional form of the graded system (*hukwe*) and ritual society organisations
- some decline in the traditional marriage system (therefore impacting land succession)
- change in work ethic and value systems among younger generations.

¹³ The ‘reification’ of *kastom* is linked to independence politics leading up to Vanuatu’s independence from the British-French condominium in 1980. Because of their remoteness, the Torres were largely isolated from these movements.

Frequently emphasised drivers of this are:

- rapidly increasing Western cultural influences
- increasing “civilisation” and “development” (in local articulation)
- church (because of some differing value sets)
- world view and value system underpinning the formal schooling system
- young people spending increasing time away from the island
- loss of home-based and community-based education.

All local informants believed that *kastom* values and skills are being lost among younger generations. Older and younger informants perceived that *kastom* values and ethics are less revered among younger generations. Like in many other parts of Vanuatu, less teaching in the home is a major driver. When children leave the island to go to school, they are not able to go to the gardens with parents, engage in story telling with family and generally partake in “*ol toktok blong laef*”/“speaking about life” which is at the root of passing on traditional knowledge. Many older participants pointed out that the oral tradition of passing knowledge is being lost with increasing formal education, which is based on the written recording of information. The formal school system is based on a Western knowledge system, which many emphasised often clashes with *kastom* values, beliefs and world views.

Despite threats, *kastom* remains strong on Tegua due largely to its remoteness. Although cash is important, the subsistence and *kastom* economy remains dominant. That the Christian denomination is Anglican in the Torres probably helps communities in the Torres to manage *kastom* alongside outside influences. Anglican missionaries have a reputation for having been more accepting of *kastom* than other denominations, although in the Banks Islands, the Anglican Church was responsible for the almost complete loss of the *sukwe* graded system. Based on EKI interviews, the contemporary Anglican Church world view is more accepting of *kastom* than many other denominations in Vanuatu. An example given by a member of the Anglican Diocese of the Banks and Torres is that while other denominations may ban the use of *kastom* medicine, the Anglican Church embraces its use because it is engaging ‘God’s work’¹⁴. The Anglican Church of Melanesia has been an important source of disaster relief following cyclones, including Cyclone Vania in early 2011. Based on interviews with members of the Anglican Diocese of the Banks and Torres, interest in climate change, acceptance of the causes and need for proactive adaptation by communities is high. The approach to disasters and climate change taken by the Anglican Church appeared to be that people are in control of managing vulnerability and that disasters and climate change are not ‘punishment by God’. Although some difference in world view between church and *kastom* leaders was noted by local informants, the general view was that Christian and *kastom* values exist together fairly harmoniously on Tegua.

The presence of *kastom* as the major value-set structuring life and livelihoods is integral to Tegua’s adaptive capacity. Importantly, *kastom* provides a socio-cultural framework that enables good local disaster management and food-production systems that are resilient to

¹⁴ This highlights an important point relating to potential clashes between worldview: Judeo-Christian beliefs separate ‘nature’ and ‘culture’ into distinct dichotomous entities while many Pacific indigenous worldviews do not separate the two. The causes of disasters and climate change may therefore be viewed differently.

environmental variability and uncertainty. Some particular threats to *kastom* are prevalent and all noted a decline in *kastom* knowledge, systems and values, particularly among younger generations as world views change. It is important that ‘development’ does not compromise the *kastom* value-set that structures livelihoods. The Likert score assigned for Factor 3(A) is 5.

5.3.2 3(C) Self-Agency vs. determinism, and 3(D) Here and now vs. future thinking

Interviews and responses to household questionnaires revealed that local people perceive themselves to be very much control of their futures. All questionnaire respondents revealed various plans and goals they have for the future of their families. It may be that the strong presence of *kastom* values in the community influences the sense of self agency that many local informants referred to. Increasing *mana* and achieving status in the *hukwe* requires proactivity to secure something in the future. This is particularly the case with the ‘hereditary’ element of the *hukwe*—men will proactively develop gardens and other ‘assets’ to pass onto sons in order to give them a ‘head start’ in the graded society¹⁵. In many ways, it is self-agency itself that enables *mana* to be harnessed¹⁶.

However, all identified that while people have a mentality of thinking about the future, collective action and leadership issues impede the development of a united community future vision. All questionnaire respondents believed that while they and their immediate households plan for the future, other households and individuals do not. All stated that people do not share their plans, goals and visions with others. The community does not meet as a whole often to develop goals and future plans—only when there is a motivation from outside such as a donor project. All households had developed some sort of plan for the future, should the need arise to move again (Factor 5(A)). However, this issue had not been discussed as a whole community—although many identified that this would be important.

Older local informants identified some decline over time in ‘future thinking’. Since their grandparent’s time, older informants noted an increase in ‘here and now’ thinking. This issue came up in IKI interviews when discussing disasters and dealing with climate stresses. Older informants noted a shift in the perceived priority of engaging in proactive, longer term preparation for periods of climate stress and unexpected events, particularly among younger people. In the past, people would invest more time and effort into buffering life and livelihoods against potential future environmental stresses. For example, giant taro would be planted in the first stage of garden planting in preparation for cyclone season. In the past, restrictions were placed on consumption of wild yam unless hard times were faced. Housing used to be stronger, which took more time and effort to build but was more resilient to cyclones (Table 2). These practices have declined today. Older informants noted that proactive preparation for hard times was like a ‘culture’—it was ingrained into the systems of life. Now the culture is more to ‘live for today’ and be more responsive rather than proactive. The reasons given for this shift in mentality are difficult to pin down but most informants cited

¹⁵ This is the system with the *sukwe* in the Banks Islands and it is assumed that a similar component exists within the *hukwe*.

¹⁶ It should be noted that this is the consultant’s interpretation and may not be accurate.

the drivers of changing *kastom* outlined in Factor 3(A) above. Also, the presence of disaster relief has played a major role, as is outlined in the next section.

Based on personal observation, although many local informants discussed a proactive mentality, taking proactive action to reduce potential future problems appears to be less prevalent. As is common in Vanuatu, a problem needs to be visible and perceived as fairly urgent for people to invest labour, time and assets into responding to it. Taking action to respond to environmental problems tends to be rather reactive. For example, although the community was aware of the risks of living at Lateu, the flooding problem had to become almost intolerable before plans to move were activated. One older local informant from a nearby island had proactively moved his village to higher ground to protect against any potential tidal waves and the threat of sea-level rise (this informant was a ‘change agent’). However, he noted that this type of initiative was unusual—most communities would not move until a destructive tidal wave or other damaging event occurred for great enough incentive to move. Many older participants noted that this ‘reactive’ mentality is not *kastom*—particularly in the context of disasters.

5.3.3 3(E) Dependence (government, aid, remittances) vs. independence

Communities in the Torres are very independent. As emphasised by EKIs, a strong mentality of innovation exists because communities are accustomed to drawing on their own resources and skills to solve problems. EKIs noted that Torres Islanders are confident in their own local way of doing things and do not often ask external organisations for assistance¹⁷. Remoteness has shaped this situation: the Torres has little interaction with government, receives few donor projects and has few community members living outside. The Torres has less of what Regenvanu (2005) refers to as a ‘psychology of dependence’ than many other areas of Vanuatu. Regenvanu (2005:4) highlights how periods of missionary influence, colonialism and, contemporarily, globalisation have disempowered ni-Vanuatu communities, creating a “dependence on what is not of or from ourselves ... making us unable to value our own capacities and, by doing so, move towards a truly sustainable national development”. Fazey et al. (2010) identify similar processes creating strong aid dependencies among communities in the Kahua region of the Solomon Islands.

However, some IKIs voiced concern that dependence on outside resources was increasing and (along with the threats to *kastom*) that this was in some ways compromising Tegua’s ‘psychological independence’. The Torres are receiving increasing attention from donors; most notably and recently, the EU donated a large number of water tanks to communities, which has had a positive impact on access to safe drinking water. One IKI discussed how donor projects can reduce the capacity of people to think about the future—he explained that projects can generate a mentality that you need to wait for help to come to you from outside, and that outside expertise is superior. People may think about the future and make plans, but they don’t action anything. When asked what they would do if they required more water tanks in the future, the immediate answer given by all internal informants was that they would need help from a donor¹⁸. One IKI believed this to be a negative side effect of the

¹⁷ Although this may be due to a lack of some modern skills necessary to request assistance and communication difficulties between the islands and the province.

¹⁸ This is not inaccurate—cost would require assistance from a donor. The point is that people showed little ownership over the process.

CBDAMPIC phase of the relocation project. Although the project solved a multitude of problems, it may have generated a mentality that donors are required for the community to take action on anything major such as relocation. The IKI pointed out that the community were moving before the donors came—they were just doing it in their own way, which was different to what the donors required or expected.

Many IKIs noted that the expectation of disaster relief assistance has impacted the self-sufficiency of dealing with disasters. This issue is widely addressed in the literature regarding disaster vulnerability in the Pacific (Paulson, 1993; Benson, 1997; Pelling and Uitto, 2001; Campbell, 2006; Warrick, 2011). Many believed that relief has reduced incentives for longer term proactive preparations of future hard times. Disaster relief was received for the first time in informants' memories following Cyclone Wendy in 1979 and then following most major and some minor cyclones after that. However, following Cyclone Funa in 2008 and Cyclone Vania in early 2011, government relief did not get sent to the Torres. This caused minor problems, but still the community was fairly self-sufficient because a multitude of traditional skills for coping with disaster remain.

The Tegua community have a few extended family members residing in Port Vila and Luganville. Estimates ranged from five to ten individuals. Unlike some less remote islands in the Torba Province, the Torres has few community members working as civil servants or in formal private-sector employment. Diaspora sometimes send packages of food (particularly following a cyclone), clothing and other household items. Money is generally not sent.

5.4 Factor 4: Resources and distribution

5.4.1 4(A): Land

The Tegua community have abundant access to fertile land for subsistence agriculture, settlement, coconut plantations, and hunting and gathering (uncultivated bush areas). Tegua has customary land ownership on the eastern side of the island. The western half of the island is customarily owned by a family line from Hiu and is uninhabited and uncultivated by the community.

A very small population and the large size of the island means that there are no shortages of land. The majority of Tegua's gardens are located on an elevated area on top of a steep hill, a 30-minute walk from Lirak. Unlike some more highly populated islands in the Banks where land is in short supply, gardens are large and multiple, and fallow periods are 10 years or more. Soil is fertile on this elevated area. Ground close to Lirak is not suitable for extensive gardening since it is a rocky, raised coral plateau. Some local informants noted that the distance to the gardens is inconvenient and that they would prefer to be located closer to their main food source.

Some local informants thought that there was a possibility that population growth might create land shortages far into the future. However, all pointed out that the population of Tegua used to be over 7000 people, who presumably were able to sustain themselves using the same basic system of slash-and-burn agriculture practiced today. Some local informants noted that expanding coconut plantations may compromise sustainability into the future, because land cannot be converted back to gardening land.

All community members and households have abundant customary access to high-quality land with which to sustain themselves. All local informants stated that everyone in the village has sufficient and equitable access to land. On Tegua, land succession is straightforward since there is only one family line. Land is passed paternally through a man's biological father. Women primarily gain access to land through marriage. The traditional tribal marriage system ensures that land gets passed equitably back and forth between the two tribes over time. All land used by the community is 'owned' by the two main Chiefs, although each household has particular rights to specific parts of the land for gardening, depending on parentage. Many have access to land on other islands in the Torres also. All local informants stated that anyone without hereditary access on an island (i.e. a man who marries a woman from an island, but decides to settle on his wife's island) can easily negotiate access with Chiefs, following *kastom* protocols.

Most local informants noted that there is better access to land for village expansion at Lirak since Lateu was located on a narrow coastal strip with a swampy area behind¹⁹. The coastline surrounding Lateu has undergone noticeable erosion since the 1990s, and particularly since an earthquake in 1997 and tidal wave (Figure 9). Coastal erosion was an incentive for the relocation since it was threatening settlement. Erosion now has little impact on livelihoods since most gardens are not located in coastal areas. No erosion has been noted on the coast near Lirak because this coastline is rocky.



Figure 9 Coastline near Lateu that has undergone noticeable erosion (Annually, 2–3 m, according to Phillips and Nakalevu, n.d.). Many coconut trees have already died and been washed away.

The relocation had little impact on distance to gardens. Lirak was not extensively used for subsistence gardening prior to the relocation, so no gardening land has been lost. Relocation had a marginal impact on distance to the reef passage (for boats) which causes mild inconvenience for off-loading cargo. Lateu was originally settled in the 1970s because it was convenient: it was a flat, clear area next to the reef passage and had a cooling breeze. This decision was strongly influenced by the (at the time) younger people in the community

¹⁹ Although all noted that expansion was more difficult since the ground is rocky and difficult to build houses on.

who, for these reasons, did not want to live further inland, despite the Chief and elders' recommendation. Before it was settled, Lateu was a common 'stop-off' point for people travelling between Toga and Hiu. Lirak is customarily owned by the paramount Chief, although like the rest of eastern Tegua, it is family-line land. There were no problems with negotiating access to this site and the decision resulted in no conflict over land. One IKI alluded that the few with more control over land have more decision-making power when it comes to relocation, thus contributing to 'local politics' that may impede effective governance. Because of the sensitive nature of this issue, this was not explored further in the assessment.

The Likert score assigned for Factor 4(A) is 5. The relocation project did not negatively affect access to land and did not change the location of gardens. Everyone has fairly equitable access to ancestral land. EKIs confirmed that unlike many parts of Vanuatu there are few land disputes in the Torres and practically none that need to go through the state court system. Clear knowledge of ancestry and the presence of few mission traders during colonial times (foreign traders who obtained land and established plantations) probably contribute to this situation.

5.4.2 4(B) Fishing

The small population means that fisheries are healthy and abundant surrounding Tegua and in the Torres in general. All community members have equal access to fishing grounds. Fishing and reef gleaning (reef gathering) is mainly undertaken in the near-shore area since there is little need nor equipment to fish in deeper water areas. Because of high swells and rough seas during the south-easterly trade winds (May to November)—among other social factors—people do not fish from canoes. Fish, other seafood and coconut crab are the main source of protein and will be eaten most days (Figure 10).



Figure 10 Youth with their catch: reef fish and octopus

Local informants believed that fishing practices were sustainable because of the small population. However, many noted that fish numbers and diversity have declined in some near-shore areas very recently and that it is now necessary to go further away to fish. The perceived reason for this was that a late-2010 earthquake lifted the reef closer to the

surface; it is now possible to walk out on the reef, whereas before it was submerged too deep. Much of the coral died as a result and the water became too shallow and warm for the fish. This is not too much of a problem.

More concerning is noticeable decreases in the coconut crab population in certain areas close to the village. As well as being important to diets, coconut crab is the main source of income for Torres islanders (see Factor 4(C) below). Vanuatu Fisheries enforce a quota-management system whereby the Torres as a whole can only export 5000 coconut crabs per year and only during November to April. Quotas do not apply to consumption. Tegua have coconut crab conservation areas enforced by local Chiefs, which operate successfully. However, outside these areas, islanders have noticed a decline in numbers over the past 10 years. Local coconut crab conservation initiatives are prominent in the Torres, largely influenced by a conservation area established on the nearby entire island of Metoma a number of years ago, which has received government and media attention as a significant success story. This is a good example of change catalysed by a local 'change agent'. There are some concerns about coconut crab sustainability into the future with population growth and lack of alternative income sources. However, most local informants believed that the local resource management strategies were strong enough to successfully manage this. The Likert score assigned for Factor 4(B) is 5.

5.4.3 4(C) Income, and 5(B) Monetary livelihood options

The healthy subsistence economy is the mainstay of wellbeing on Tegua. However, in the contemporary situation cash is required for some aspects of wellbeing and basic needs. The main expenses cited by households were:

- clothes
- basic household items such as soap or kerosene
- imported food items such as rice, sugar or tea
- school-related expenses, especially school fees²⁰, uniforms, books or transport
- transport, fuel costs and freight.

The household questionnaire asked for an estimate of how much cash was obtained in a year. It was estimated that the average annual income on Tegua is roughly VT\$30 000–50 000 (US\$344–574), although this varied depending on household size, among other factors (Figure 11).

²⁰ The current national government has abolished primary school fees which has released the biggest financial burden on most families in Vanuatu. However, high school fees still exist and these get increasingly higher with each class. Local informants and EKIs were concerned that school fees may be reinstated by successive governments, as policies frequently change in Vanuatu.

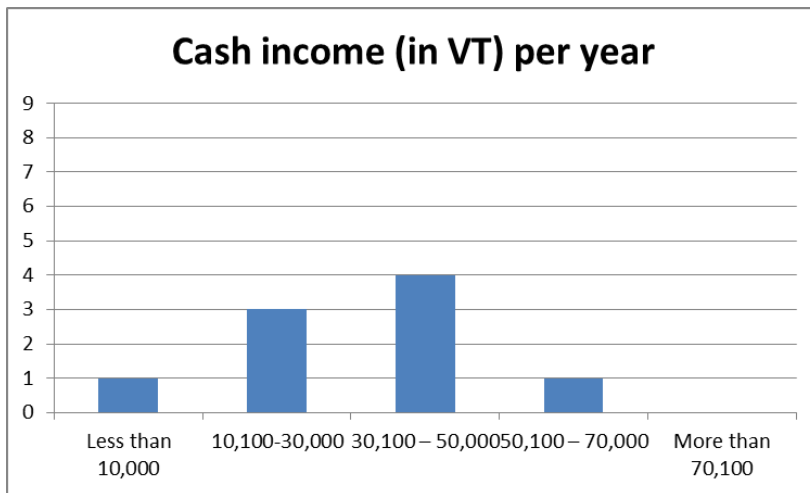


Figure 11 Estimated annual cash income per household. From household questionnaire (n=9)

All household questionnaire respondents agreed that it is not easy to obtain enough cash to meet these household expenses. Two major reasons were cited: limited livelihood opportunities and lack of financial management skills in the community. Remoteness and lack of access to markets constrains livelihood diversity. Livelihood options on Tegua are:

- coconut crab export (November to April, depending on quota)
- lobster export (less demand from buyers than for coconut crab)
- copra
- selling crops to the few government employees on Loh
- intra-community kava sale and small-scale stores (food, clothing).

Most households engage in all of the above to some degree, depending on the time of year. Coconut crab export to Port Vila and Luganville is the most important and significant income source for all households. Crabs are exported via the bi-weekly flights from Loh. However, local informants stressed many 'obstacles' associated with this source of income:

- Larger islands (Hiu, Toga) often use up the quota in the first couple of months of the season.
- Transport costs to Loh airport are high.
- Input costs are high (such as batteries, because you have to hunt them at night; or sacks).
- Freight charges are high (VT\$165 per kg/ US\$1.89).
- Lack of communications means it can be difficult to find a buyer.

Copra is exported by seven households and this has increased with the recent increase in shipping services to the Torres since 2009. Currently, households use old plantations rather than establishing new ones. Incentives to establish new plantations to produce more copra are low since the price of copra fluctuates and is extremely unreliable.

EKIs noted that although physical barriers to market access (communications, lack of reliable shipping and transport costs) are the main hindrance to livelihood diversity, communities in the Torres also lack the skills, without external assistance, to identify new market opportunities. The Torba Province Department of Agriculture has plans to introduce a local market for Torres-specific crop varieties. The idea is to sell crops to Sola, making use of the now-monthly shipping service. There are also plans for introducing small-scale business such as for pigs, chickens and bread-making. However, funding and capacity to successfully introduce these initiatives is lacking at the provincial level.

Sources of income are irregular—especially since coconut crab is the main source and has a restricted season. Many IKIs and EKIs noted that most households do not budget or save cash for future needs or contingencies. Paying for school-related costs is often a problem in this regard. In the past there was less need to budget: because ships visited the Torres once per year, there was little to spend money on. However, since the increase in shipping services, people are spending more disposable income on food and household items instead of saving money for school expenses. There is no community fund for maintenance of community assets such as water tanks.

The relocation project did not significantly affect access to disposable income or livelihood options. During the CBDAMPIC phase and in the months following, as people built their new houses, there was less time for cash-earning activities but after activities went back to normal. Some indicated that there is now a bit more time available for livelihood activities because less time is spent fixing flood and wind damage to houses. However, all local informants said that relocation did not really positively or negatively affect money availability in any significant way.

The Likert score assigned for Factor 4 (C) is 2. The Likert score assigned for Factor 5(B) is also 2. National statistics reveal that households in the Torba Province earn an average **monthly** income of VT\$17 482 (US\$192) (this excludes 'own account production'/subsistence, 'income-in-kind' and 'gifts received', which are included in measures of Vanuatu's gross domestic product (GDP) (Government of Vanuatu, 2007a). Based on estimates of yearly income (Figure 11), Tegua households' average monthly income would be drastically lower than this figure. However, it is important to emphasise that Tegua currently has less need for money than many other islands in Torba because of a strong subsistence economy and healthy resource base. According to national statistics, the percentage of average monthly household expenditure on 'own account production' in the Torba Province is 54 per cent higher than the national average for rural communities, which is 44 per cent. The percentage of subsistence expenditure would likely be significantly higher for the Torres Islands, since some less remote islands in the Banks (particularly Mota Lava, Gaua and parts of Vanua Lava) are known to dedicate less labour time to subsistence activities (DoH, pers. comm., 2011).

5.4.4 4(D) Infrastructure and services

Tegua has very limited access to infrastructure and services, although shipping and communications have improved over the past four years. The island has no electricity mains or generators. There are a few small solar lights but no large fixed solar panels. There is no waste management system, although little non-biodegradable waste is produced. Houses have no running water and share pit toilets. There are no shops, although a couple of

households have very small-scale stores selling a few specific items. Items are usually bought directly from ships when they visit Tegua.

Tegua has a kindergarten, which was established in one of the 'modern' houses constructed from the rainwater catchment roofs. An IKI interview revealed that the kindergarten is severely under-resourced, because limited communications, underfunding and lack of regular shipping services limits the availability of paper, books and pens. Tegua has no school. To access primary education, children must travel to Loh, Hiu or Toga and stay for long periods of time with extended family. It is common for children to return to the island for school holidays only. More frequent trips home are restricted by transport costs. Obtaining secondary education has been historically virtually impossible in the Torres because of distance, transport cost and school fees. The closest high school is Arep High School in Sola. No household questionnaire respondents had been to high school themselves, although some had children who had completed at least one year of secondary school. According to a teacher at Arep High School, increasing numbers of Torres children are attending the school and reaching Class 9 (at 15–16 years old).

Transport between islands in the Torres is prohibitively expensive. Fuel costs between VT\$300 and VT\$350 per litre (US\$3.30–3.80). Fuel costs have risen over the past few years. The community used to have their own boat, which was donated by a local politician. This made transport more affordable because the only cost was fuel. However, the engine broke a couple of years ago and has not been replaced because of cost and the difficulties obtaining support from external organisations. Now, to travel between islands, the community must hire transport from a local boat-owner on Hiu, which includes a boat fee.

Since 2010 shipping services to the Torres have increased to a monthly service, which has greatly improved access to imported items and export opportunities. However, irregular communications and very high freight charges mean that it is difficult to obtain things such as building materials. For example, through a small grant scheme, the community obtained funding for concrete for the new church floor. However, the concrete was dropped off at the wrong island and was subsequently lost.

Access to government health services is very poor in the Torres. Although major health problems are few in the Torres, lack of access to services is an important factor limiting health security. Each village in the Torres has an aid post or dispensary, run by a trained village health worker. Aid posts provide medication for malaria, common coughs and colds, minor diseases and injuries. More serious conditions are referred to the larger health clinic on nearby Loh or in Sola. There is also a midwife at the clinic on Loh, although many births occur on the islands, assisted by *kastom* midwives. Serious cases of illness or injury are referred to the hospital on Santo. The Torba Department of Health covers the costs of transport and treatment if patients need to go to Sola or Santo, but due to poor communications and other capacity constraints, this can be slow. If treatment is required at the health clinic on Loh, families will often have to cover the costs of boat travel themselves. The Loh health clinic has a consultation fee of VT\$100 to cover overheads because of a lack of funding from the province. It is therefore common for relatively serious injuries such as broken bones to be treated locally using *kastom* techniques, instead of on Loh or in Sola. Access to medication for the aid posts and the clinics can be erratic due to difficult communications—it is common for islands to be short of malaria medication, plasters, bandages, topical antibiotics and other frequently required medications for weeks at a time.

There is no telephone landline service or mobile phone coverage in the Torres. The Torres have had intermittent landline services over the years, but these are more often broken than not. Telephone companies do not invest in infrastructure in the north because of remoteness and cost. However, in 2007, the New Zealand High Commission installed a two-way teleradio on Tegua. This has significantly improved the ability for communication, making it easier to receive information and contact people from other islands (each island has its own teleradio). EKIs noted that is now far easier for the community to access support from external organisations since they can be in direct contact with the Area Council Secretary based on Loh, without needing to pay transport costs. A short wave radio tower was recently installed on Vanua Lava, which has improved radio reception to the Torres. Tegua has a few working radios although the cost of, and access to, batteries is a problem. Radio and teleradio is an important source of warning for natural disasters—for example, the community received warning of the recent Japanese tsunami and was therefore able to evacuate to higher ground.

As outlined in the following section, the CBDAMPIC phase improved access to infrastructure by providing water tanks, and iron roofing which was subsequently made into semi-permanent buildings. The Likert score assigned for Factor 4(D) is 2. Tegua has very poor access to infrastructure and services, although these are slowly improving with increasing attention by donors.

5.4.5 4(E) Drinking water

The Tegua community perceive themselves to have good access to safe drinking water as a result of the CBDAMPIC phase of the relocation project. The CBDAMPIC phase significantly reduced exposure to water shortages that were faced at Lateu. A major component of the project was the installation of six poly-tanks of 6000 L each—36 000 L total for the community. These tanks were installed along with five rainwater-capture sheds of about 35 m² each (Kouwenhoven and Cheatham, 2006) that were subsequently made into semi-permanent buildings by the community (Figure 12). The water tanks are for community use and everyone has equal access. The community also have a groundwater well and access to freshwater coastal springs. There is an upland freshwater spring on the elevated area close to the gardens.



Figure 12 One of the six tanks installed by the CBDAMPIC project. The rainwater-capture shelter, converted into a guesthouse, is in the background.

Access to drinking water was a prominent factor that was keeping the community at Lateu. At Lateu, the community had one concrete water tank that had been installed by the Vanuatu government. This tank was generally large enough because of the small population, although it sometimes ran dry during a long dry season such as during an El Niño year. A major reason that Lirak was initially chosen as a relocation site by the Chief was because of close proximity to the existing tank. Without external assistance, the community was unable to obtain water tanks themselves which would have better facilitated their own relocation process. A reduction in exposure to water shortage was one of the most positive outcomes of the CBDAMPIC phase. It was also a major reason why all households were happy to move to Lirak, rather than an alternative site identified prior to the CBDAMPIC phase.

All household questionnaire respondents stated 'yes', to Question 1: they now always have access to safe drinking water. Households at Lirak use the tanks for all their water needs—drinking, cooking, washing and bathing. At Lateu, the tank would only be used for drinking, and local informants noted that people would be much more frugal with water use than they are now at Lirak. Although safe water is always available, during the dry season (May to September and especially June to August) the tanks at Lirak will run low and local water-management systems will be put in place. Chiefs are in charge of water management in conjunction with the water committee (which used to be the relocation committee). When the tanks get noticeably low, the Chiefs will announce restrictions—generally that tanks can be used for drinking and cooking only. Tanks are sometimes locked. For all other purposes, households must use the community well and the coastal springs. Health staff from the Loh clinic have recommended that households boil the well water before using it for bathing, as it is open to the elements and therefore unclean. The community does not regularly clean the well—only occasionally when it is being used heavily. Also, the well is unfenced and is a recognised hazard for young children, although no plans are in place to fence it.

Some local informants voiced concern that water management is now too reactive. If management systems were put in place earlier, the water would last longer. Some mentioned that the 'culture' of water conservation has changed and there is a degree of wastage. The newly constructed church has an iron roof and therefore potential for rainwater capture and storage. However, as mentioned previously, there is no local proactive planning for obtaining new tanks or maintaining existing ones. If repairs are needed on the tanks, IKIs explained that the Chiefs would just announce it, and whoever had enough spare cash would contribute what they could.

The dimensions of the tanks installed by the CBDAMPIC project was based on current usage only, not any climate-change expectations. An economic assessment of the CBDAMPIC pilots undertaken by the International Global Change Institute concluded that the tanks and rainwater harvesting set-up is likely not sufficient in the long term and modifications should take place (Kouwenhoven and Cheatham, 2006). Assuming 100 people in the community, and an average yearly rainfall of 1500 mm, the current capture and storage allows for a little over seven litres of water per person per day, which is low (Kouwenhoven and Cheatham, 2006). Since Lirak normally has about 50 people present due to travel between islands, a more realistic figure is probably 14 L per person per day. Given this usage rate, the tanks should provide for more than seven weeks without rain, which is a long time. However, based on local discussions average water use is far higher than seven litres per person per day. Local participants themselves are concerned about the

sustainability of the current water system with population growth. The Likert score assigned for Factor 4(E) is 3.

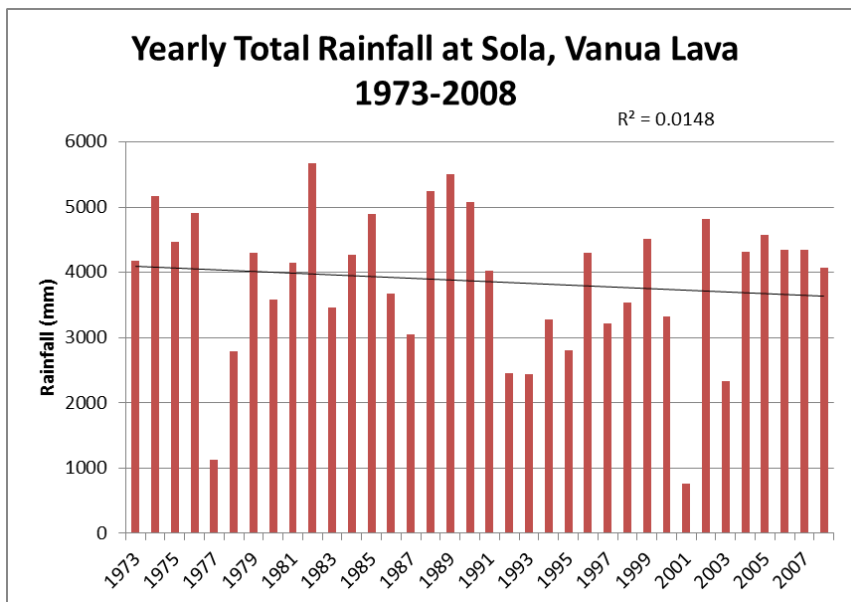


Figure 13 Annual rainfall at Sola, the closest weather station to the Torres Islands. Low values in 1977 and 2001 in the graph are due to missing data.

As can be seen in Figure 13, rainfall may be decreasing in the northern islands thus exacerbating potential water stress due to population growth.

5.5 Factor 5: Options

5.5.1 5(A) Adaptation options

Because of the capacity constraints outlined throughout the previous sections, access to adaptation-specific options that are externally conceived and/or technological is low. However, households in the Tegua community have self-identified plans for possible relocation into the future, should the need arise.

Responses to household questionnaire Questions 11 and 21 revealed that people in the community are thinking about the possibility of moving again in the future. Although all households were happy with the decision to move to Lirak and all are satisfied with life at the current site, most households interviewed had considered future relocation options. Future possible plans for relocation (or not) were split into three distinct groups in the community: 1) those that would remain in Lirak but possibly build houses further up the hill near the gardens for 'evacuation'; 2) those that would move to a site called Tenia, the site originally chosen by the majority of the community for relocation prior to the CBDAMPIC phase; and 3) those that would move to a site on top of the hill called Meregab which is near the gardens. Importantly, factors other than environmental uncertainty and risk feed into these plans (Table 3).

Table 3 Options for future relocation sites identified by household questionnaire respondents

Option	Reasons for	Reasons against
<p>1. Remain at Lirak and/or remain at Lirak and build 'evacuation houses' on top of the hill</p> <p>The 'evacuation' discourse may have come from a recent Red Cross disaster management awareness course</p>	<p>Water tanks</p> <p>Lirak is close to the sea and the 'culture' is to live next to the sea</p> <p>Easy access to fisheries</p> <p>Easy access to reef passage</p> <p>Evacuation houses could be lived in when people want to spend days at the gardens</p>	<p>Expanding village is difficult because of stony ground</p> <p>Possible landslide risk</p> <p>High watertable and wet living conditions during/after heavy rain</p> <p>Perceived tidal wave and climate-change risk since still close to coast</p>
<p>2. Tenia:</p> <p>This site was chosen by the majority of the community—especially the younger people—prior to the CBDAMPIC phase.</p>	<p>Soft ground for building houses</p> <p>Closer to fertile land for gardens than Lirak (not rocky coral ground)</p> <p>Further inland than Lirak yet sea still accessible</p> <p>Easy access to fisheries and reef passage</p> <p>Close enough to Lirak to use the water tanks</p>	<p>Still fairly low ground although much further inland—still at risk from climate change</p> <p>Tsunami risk</p> <p>No water tanks although close enough to Lirak</p> <p>More mosquitoes because close to swamp</p>
<p>3. Meregab/near the gardens</p>	<p>Safe in the long term because high elevation</p> <p>Safe from tsunamis</p> <p>Big trees protect against cyclones</p> <p>Close proximity to gardens which are main food source</p>	<p>Too far away from the sea and fisheries</p> <p>Too much hard work to clear a site because of dense bush</p> <p>Far away from water tanks</p>

Most local informants would stay at Lirak because of the water tanks unless there were significant 'push' factors such as increased flooding. However, some will encourage their sons to build at Tenia rather than Lirak. The reasons stated for this were perceived climate change risk because Tenia is much further inland than Lirak. It is likely, however, that the reasons are also social; there is one household currently living at Tenia and people that had an idea to move to Tenia were closely related. This household moved to Tenia from Lirak of their own accord following a tidal wave in 1997. There is a possibility that Tenia may be at high risk to tsunamis since it is at the end of a narrow harbour—this was **one** of the reasons that Tenia was not chosen as the relocation site for the CBDAMPIC phase. However, local

informants were largely unconcerned about the tsunami risk since the site is fairly far inland and they have strong evacuation systems in place.

All local informants stated that they would be happy to move their own household to a new site without the rest of the community; they do not perceive it as 'leaving' the community since the distances between sites are short. There were no concerns about the community becoming 'fragmented'—all perceived that the community would still operate as a whole with a central identity if they were living at different sites. The Likert score assigned for Factor 5(A) is 4, since the community has received one technological adaptation in the last decade from the CBDAMPIC project. Importantly, there are many **local** options, resources, skills and decision-making capacities available to the community for adaptation/relocation, should this become necessary.

5.5.2 5(C) Food-acquisition options

Food security is high on Tegua because of robust, sustainable and resilient traditional gardening practices and an abundance of diverse local food sources (Table 2). A high diversity of crops, marine resources and famine foods means that climate change is unlikely to significantly compromise food security **unless** these adaptive food production and acquisition practices decline because of social reasons.

The three most important food sources on Tegua are:

- subsistence gardens
- wild yam stocks
- marine resources.

Other food sources that are less important are:

- imported food
- intra-community trade
- remittances.

A strong culture of subsistence gardening remains, labour inputs to local food production are high and there is no shortage of access to land. Crop diversity in the Torres remains high in comparison to many other island groups in Vanuatu and in the Banks Islands (Peter Hoag, pers. comm., 2011; Barton Biswei, pers. comm. 2011). The major source of carbohydrate is varieties of yam, taro and sweet potato. Unlike many other islands in Vanuatu (and the Torba Province), manioc (cassava)—which has a lower nutritional value than many other root crops—is not a staple crop²¹. The Torres have an abundance of marine resources, and fishing and seafood gathering are a regular part of daily/weekly livelihood activities. In addition to gardens, wild yam is a staple food source throughout the year. Wild yam are weather-resilient varieties of yam that are planted in bush areas, as the vines require living trees and the underground tubers will grow extensively. Therefore, wild yam are not strictly 'wild', although no cultivation is necessary past initial planting. There are techniques of

²¹ Manioc has become a dominant food crop in many areas because it requires low labour inputs and low soil fertility. Changing social situations, agricultural practices and population growth have contributed to this (Warrick, 2011; Campbell, 1990).

harvest that prevent the entire plant being pulled up—these techniques are still practised for sustainability of stocks. Because of stringent planting and conservation, there is an abundance of wild yam. Wild yam is like a ‘guarantee’ crop because it will remain edible during any weather conditions—high consumption at the time of the assessment was due to damage to gardens following Cyclone Vania earlier in the year.

Local informants noted some changes to gardening practices and crops over time which makes food production somewhat less resilient to climate variability and extremes: less surplus produced, less labour inputs by younger people, some losses of crop varieties, higher consumption of wild yam in ‘normal’ times, less productive soft yam crops and changes in the seasonal planting calendar. These changes are closely linked to social changes in the community outlined through Factor 3(A) and 3(E).

People do not consume a great deal of imported food on Tegua. Irregular shipping and high food costs limit consumption for most families. IKIs estimated that imported food would be consumed in small amounts on average once or twice a week, or whenever it was available. There is not a strong ‘culture’ of consuming imported food in the Torres²² and subsistence agriculture is such that there is no need to fill deficits in local production. This contrasts with many other communities personally observed in Vanuatu (particularly on Efate, on Santo, and less remote islands in the Banks) where rice and flour have become the staple source of carbohydrate and labour inputs to gardening and fishing are decreasing (Warrick, 2011). However, imported food is becoming more available to Tegua with increased shipping since 2010. There is some concern in the community that increased availability will lead to increased consumption and a greater proportion of limited disposable income being spent on ‘unnecessary’ imported food. There is some concern that this will erode incentives for sustainable and robust subsistence agriculture, as has occurred on less remote islands in the Banks. However, at present, cost prevents imported food becoming a dietary staple in the Torres. The Likert score assigned for 5(C) is 5. Although access to imported food is somewhat limited, there is a wide array of local food options and, as such, Tegua is resilient to climate variability and extremes in terms of food security.

5.6 Factor 6: Information and awareness

5.6.1 6(A) Access to relevant information, 6(B) Ability to analyse information and 6(C) Communicated risks and importance

Because of the communications limitations outlined above, access to external weather and disaster information has been traditionally limited. Torres communities have relied upon traditional environmental knowledge to signal impending cyclones. However, since the installation of the teleradio in 2007, the community has more reliable access to disaster information and this has proven useful. Importantly, the community is now able to receive reliable information about tsunami risk. Earlier in the year, they received information about the Japanese tsunami and were able to make preparations to evacuate long before the tsunami was scheduled to hit. This has not been the case in the past and (relatively) minor tsunamis (or ‘tidal waves’ in local reference) have caused damage to belongings. Cyclone

²² However, local participants pointed out that imported food items hold a certain ‘prestige’ and are revered, particularly among younger people. Young people are thought to consume more imported food than older generations.

warnings are also received, although sometimes the warnings issued are not accurate (it is difficult to predict their path) and turn out to have a greater impact than predicted by the Vanuatu Meteorological Office.

The Tegua community—and as a result, other communities in the Torres—have a high **awareness** about the concept of climate change because of the CBDAMPIC project. An IKI explained that although the community had noticed erosion since the 1990s, they did not know the cause until the CBDAMPIC team told them about climate change. Before this, they thought that erosion was due to increasing winds and swells from the south-east. Similarly, the community did not know about the scientific causes of earthquakes and tsunamis prior to an earthquake in 1997 when a scientist from OSTROM visited to make measurements. Despite some impediments to the uptake of new knowledge, local informants in the assessment appeared fairly accepting of these scientific explanations for the environmental stressors they were experiencing.

The community are aware that outsiders have identified climate change as a specific problem for them. Many visitors including climate-change tourists, documentary makers and reporters (Figure 14) have arrived in Tegua since the CBDAMPIC project to view “one of the first communities forced to relocate because of climate change”.



Figure 14 Chief Richmond with a copy of a magazine article written about Tegua and climate change by a Swiss reporter.

As one EKI observed, climate change has certainly become a common ‘language’ on Tegua. However, whether or not people possess a thorough **understanding** of climate-change impacts that will assist in local adaptive decision-making is less clear. Local informants all recognised that the increase in flooding at Lateu after 1997 was directly linked to the earthquake. They had observed the higher watertable following the earthquake and the accelerated coastal erosion after this time. However, the ‘climate-change language’ was often mixed up in people’s explanations of this event; that is, climate change started to happen after 1997.

In the focus group, for example, when asked about observed climate and weather conditions, some participants noted the earthquake event as climate change. There may be

a risk that climate change ends up being blamed for problems that may be contributed to more by social changes. For example, local informants attributed less productive yam crops to increases in rainfall during December to March as a result of climate change. However, many had noted in other contexts that labour inputs were reducing in gardens—yam requires very high labour inputs to grow well. It is likely that yam is becoming less productive for a range of social and environmental reasons. Precipitation data from the closest weather station on Vanua Lava indicates that annual rainfall is decreasing, not increasing (Figure 13).

Personal observation indicates that climate change is often used to explain environmental stress but that, past the rhetoric, it is probably not a major factor affecting local decisions in the community. The most useful climate information awareness for communities such as Tegua is likely to be an appreciation that climate change will exacerbate environmental variability, extremes and general uncertainty. The community has a good grasp on the uncertain nature of their environment and the need to reduce risk to the community. For example, no local informants would consider moving back to Lateu, even though the earthquake in 2010 solved much of the flooding problem at the site, because they recognise the unpredictable nature of their environment: the site could easily sink again and they would not want to take the risk.

A local change agent from a neighbouring island has moved his family village to higher ground in response to the increasing environmental uncertainty that climate change adds to earthquake, tsunami and storm-surge risk. This informant had attended an environmental workshop in Port Vila in the 1990s which included a climate change component. This provides an example of proactive response to uncertainty that hopefully others will follow.

In a community meeting as part of the assessment, the community requested an explanation of climate-change causes because although they knew about the processes, they did not understand why it was happening. This information appeared to be well received, although it indicates that an understanding of climate change as a global process is lacking (this is not so important). Many EKIs from the Torba Province requested the same explanation, as they were aware that climate change is something that is increasingly important for communities in Torba but they themselves have little understanding of the causes and consequences. EKIs explained that communities in the Torba Province will hear about climate change on the radio or through various government or NGO awareness programs, but may not understand or fully grasp what is being said.

An understanding of the scale of climate-change impacts is lacking at both the provincial and community scale: for example, many IKIs and EKIs were concerned that sea-level rise will soon submerge all coastal areas and they would have to move on top of the hills. This scenario is highly unlikely. The Likert score assigned for Factor 6(A) is 3.

5.7 Factor 7: History of dealing with climate stress

5.7.1 7(A) Past experience of dealing with climate events

Living with environmental uncertainty is—and always has been—a regular part of life for people living on Tegua, in the wider Torres, and indeed in much of Vanuatu.

As Magnan (2010:7) points out:

A territory with a low risk of exposure to natural hazards could potentially struggle to resist a “new” risk, whereas a society accustomed to managing its development according to frequent and diverse natural hazards ... could appear more able to integrate the effects of climate change than the former example.

The community of Tegua Island is certainly accustomed to managing its development according to frequent and diverse natural hazards. Because of the robust traditional skills, food-production systems, social networks and strong psychological self-agency (outlined in previous sections of this report), Tegua has dealt well with major climate events and periods of climate-related stress in the past. Local strategies, mechanisms and systems for minimising vulnerability are woven into the fabric of everyday lives and livelihoods, and this equips the community well for dealing with future climate variability and extremes.

Table 4 shows the major climate events and periods of stress identified by the community during the timeline focus group. The timeline focus group began by asking people to generally identify ‘hard times’. This got off to a slow start because, as predicted, periods of climate stress are not generally perceived as particularly problematic. Focus groups identified cyclones in 1972, 1979 and 1988 to have been the most problematic climate events. These cyclones were of high magnitude and caused widespread destruction in most areas (Table 4). However, these were not perceived as particularly concerning—as observed throughout Vanuatu, participants stressed that they would always find a way to deal with cyclones and move on. The other major ‘hard time’ identified was the 1997 earthquake and exacerbated flooding that followed. Participants viewed this as somewhat more concerning because lack of access to water hindered autonomous relocation. Nonetheless, participants stressed that they were addressing the problem in their own time and in their own way—a process that was assisted by the CBDAMPIC project. Droughts were not considered to be a problem by participants. EKIs observed that the Torres Islands receive higher rainfall than much of Vanuatu although El Niño periods (1998, 2003) have caused water shortages in the past. However, timeline participants did not identify this as a ‘hard time’.

Table 4 Timeline of environmental ‘hard times’ faced by the community

Incidence	Comments
<p>1972 Cyclone Wendy</p>	<ul style="list-style-type: none"> • Biggest hurricane in living memory • Most people lived on Toga at them time—one household only living on Tegua • SSW winds. <p>Impacts</p> <p><i>Physical</i></p> <ul style="list-style-type: none"> • All coconuts fruits fell down, and 2–3 year recovery period • Everything in the garden spoiled • Big trees fell down in the bush • Every house blown down

Incidence	Comments
	<ul style="list-style-type: none"> • No deaths. <p><i>Psychological</i></p> <ul style="list-style-type: none"> • Worried during the cyclone • Not a major issue after cyclone because it was a familiar hazard/disaster. <p>Coping</p> <p><i>Safety</i></p> <p>During—hid in the cave (10-minute walk from Lirak)</p> <p><i>Food</i></p> <p>Post-cyclone period: ok for food as they had access to stored wild yam.</p> <ul style="list-style-type: none"> • Burying wild yam next to houses • Eating the perishable crops first, especially bananas • Ate arrowroot starch that had been extracted and stored by wrapping in umbrella leaves and hanging above fire (<i>narava</i>) • Sago starch (<i>natangura</i>), prepared from sago palm; keeps only for a few days—still widespread knowledge, as young girls made it during our visit • Planted short-growing-period crops such as corn, kumala, manioc, sweet yams, island cabbage—using their own planting material • Ate stored soft yam. <p><i>External assistance</i></p> <ul style="list-style-type: none"> • Government relief came—rice, sugar, tinned meat. Also included planting material (manioc, kumala and Fijian taro). First time the community experienced government relief • Before the shipment of relief, people had eaten rice and tinned meat, but only occasionally.
1979 cyclone	<p>Impacts</p> <ul style="list-style-type: none"> • As above but not as severe <p>Coping</p> <ul style="list-style-type: none"> • Post-cyclone, people built stronger houses initially • This lasted only for the first 5 years, after which people resorted to less strong houses (to save time).
1988 cyclone	<p>Impacts</p> <ul style="list-style-type: none"> • Caused by SE winds • Almost as bad as 1972 • Spoiled the gardens

Incidence	Comments
	<ul style="list-style-type: none"> • Houses blown away. <p>Coping</p> <ul style="list-style-type: none"> • Relief, coping, etc. was the same as above.
<p>1997 earthquake</p> <p>Tidal waves that followed</p>	<p>Impacts (short-term)</p> <ul style="list-style-type: none"> • Largest tidal wave in their living memory, although <i>kastom</i> stories indicated bigger tidal waves that cost many lives • Water surged about 20 m inland • Broke the walls of some houses • Destroyed many household items. <p>Coping (short-term)</p> <ul style="list-style-type: none"> • Evacuated to Lirak site after feeling the earthquake, as they were aware of tsumani risk • Repaired walling etc. using bamboo etc. from the bush • One family moved residence to Tenia.
	<p>Impacts (longer term)</p> <ul style="list-style-type: none"> • After the earthquake, watertable seemed to have risen • Small rainfall would cause village flooding and wet, muddy conditions • High rainfall would cause severe flooding and overflow of toilets • High tide would cause wet conditions • Spring tides and king tides caused more seawater inundation • New swamp areas were formed, and the existing swamp areas had more water • Malaria • Sores on feet • Conjunctivitis • Some houses were more affected than others. <p>Coping (longer term)</p> <ul style="list-style-type: none"> • Some shifted their houses further down the coast (but still near Lateu) • Built raised cooking places • Built raised beds • One family shifted their household to Tenia • Chief began clearing Lirak • Community meeting to discuss possible relocation.

When asked their opinion on ability to effectively deal with a high-magnitude cyclone today (such as in 1972), most participants agreed that it would be easier because of easier availability to rice and other imported food. On the whole, they perceived traditional skills to be robust enough to see them through (although note changes in ‘mentality’ outlined in Factor 3(C)). Many pointed to the example of Cyclone Vania—a relatively low magnitude cyclone—that had occurred earlier in 2011. Cyclone Vania caused moderate damage to food crops. Following Vania, formal government food relief did not arrive. According to local participants, government food relief has not been received since 1988. Small amounts were received from the Anglican Church and from Torba diaspora living in towns. However, because of an abundance of local coping strategies, problematic food shortages were not experienced. The Likert score assigned for Factor 7(A) is 5. The community is highly self-reliant in dealing with climate stress.

6. Discussion

6.1 Summary of adaptive-capacity factors

Figure 15 shows a radar chart of the Likert scores assigned for each adaptive capacity factor identified in the analysis framework. Table 5 reminds the reader of the topic of each factor.

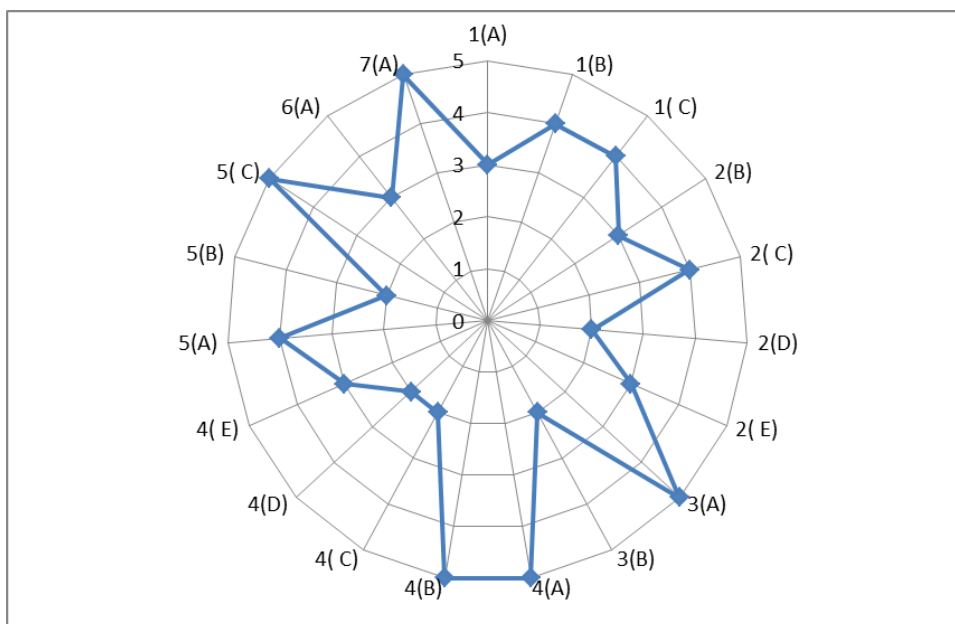


Figure 15 Summary of adaptive capacity factors for the Tegua island community

Table 5 Likert scores assigned for each adaptive capacity factor

Factor	Factor code	Likert score
Skills	1(A)	3
Health	1(B)	4
Change agents	1(C)	4
Leadership	2(B)	3
Collective action	2(C)	4
Support services and networks	2(D)	2
Governance	2(E)	3
Tradition	3(A)	5
Change acceptance	3(B)	2
Land	4(A)	5
Fisheries	4(B)	5
Income	4(C)	2
Infrastructure and services	4(D)	2
Water	4(E)	3
Adaptation options	5(A)	4
Livelihood options	5(B)	2
Food options	5(C)	5
Access to info	6(A)	3
History of dealing with climate	7(A)	5

Tegua's high adaptive capacity is shaped by excellent access to resources and substantial traditional skills enabling robust and resilient subsistence livelihoods and good health. Tegua is an innovative and self-sufficient community with comprehensive mechanisms for effectively dealing with periods of stress. Factors that potentially limit adaptive capacity relate to access to resources and services from 'outside'. Poor access to services, information and appropriate external assistance may limit their ability to engage external new knowledge and mechanisms for dealing with climate change. Limited access to markets severely constrains access to financial resources necessary for some aspects of adaptation, where this requires technology and infrastructure.

6.2 Lessons we can learn from Tegua for improving CBA pathways in the Pacific

Living with environmental uncertainty is—and always has been—a regular part of life for people living on Tegua, in the wider Torres, and indeed in much of Vanuatu. The environmental drivers of vulnerability ('exposures')—at both the old and new site—are multiple and intersecting. They are exposed to heavy rainfall, storm surge, king tides, tropical cyclones, tidal waves and earthquakes, all of which intersect to generate a situation of particular vulnerabilities.

Climate change is a problem for Tegua because it is one factor that threatens to exacerbate many of the current exposures faced. Most importantly, climate change will increase the environmental uncertainties faced by the community, increasing the priority of maintaining and improving adaptive capacity so that communities are able to continue to sustain wellbeing.

Adaptation or disaster risk management needs to holistically integrate the range of environmental stressors faced by people living on Tegua—it makes little sense to address one exposure type only without placing that in the multi-hazard situation of vulnerability. Vulnerability is a situation, rather than a product of a particular exposure. It makes little sense to separate 'adaptation' to climate-change-related stressors from disaster risk management, environmental management, food security initiatives, water security initiatives, health initiatives and so on.

From the perspective of donors, adaptation to climate change needs to maintain and increase the (well-developed) ability of the community to deal with their own environmental uncertainties. This requires initiatives that assist the community to sustain and improve their adaptive capacity, on their own terms and in their own way. Increasing the ability of communities to plan and acquire the necessary external resources themselves, and effectively liaise with external organisations on their own terms when needed, is the key to adaptive capacity in a situation such as Tegua. This is likely to require initiatives that have little to do, directly, with climate change or even climate variability and extremes. For example, Figure 15 shows that priorities for increasing adaptive capacity on Tegua are to improve:

- access to support services and networks
- the nature of external support programs to enable new knowledge/technologies to be accepted, understood and owned by communities
- access to money and monetary livelihood options
- financial skills
- access to infrastructure and services.

However, it is crucial that these improvements come in a way that does not compromise the factors that give Tegua such high adaptive capacity; for example:

- robust traditional skills and knowledge
- value and pride in traditional life systems
- robust local food production and sustainable environments
- psychology of innovation and self-sufficiency.

There is a need for donors to move towards a 'package' approach in CBA. Donors need to aim at cross-sector initiatives to address the swathe of community-identified priority stresses contributing to vulnerability. This is likely to require co-financing arrangements to make sure the range of social, cultural, economic and environmental drivers of 'threatened adaptive capacity' are addressed in communities; as it stands, dedicated 'adaptation' funding is unlikely to be sufficient due to its required direct link to climate change, or at least climate variability and extremes.

Reducing exposures—for example, by providing water tanks or by assisting with relocation—are crucial where communities are facing current or known future risks and wellbeing is compromised. However, what is lacking to date are initiatives that address adaptive capacity—initiatives that 'help communities to help themselves' come up with their own solutions to problems. A lack of these adaptive capacity initiatives alongside exposure-reducing initiatives, may risk undermining current adaptive capacity by generating dependence (particularly psychological) on outside (donor) knowledge, money and resources. The case of Tegua demonstrates a situation where dependence is still very low and self-sufficiency still very high. This level of self-sufficiency and confidence in endogenous capacity is fairly unusual in Vanuatu (Warrick, 2011; Regenvanu, 2005; Campbell, 1990) and is present because of relative isolation from mainstream 'development' in Vanuatu. However, through local eyes, the threat of psychological and physical dependence is real and impending.

An important lesson that can be learned from the experiences of Tegua is that capacity building for CBA is limited without capacity building at a higher scale. Without capacity for sustained projects and programs at a provincial level, it is difficult for CBA to go beyond merely addressing exposure. Effective CBA cannot operate outside broader processes of rural development.

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Appendix 1

External KI Interviews	Date
Lendy Joel (Area Council Secretary, Torba Provincial Council)	Multiple
Judo Silus (Police Inspector, NDMO Committee, Chairman of Red Cross, Torba)	23-Mar
Barton Biswei (Provincial Agricultural Officer)	23-Mar
Reginald (Provincial Tourism Officer)	23-Mar
Lesley Mera (Education Executive Officer, Torba Province)	24-Mar
Haines Dingley (Program coordinator, Save the Children)	24-Mar
Alber Hilton Ruddley (Geography Teacher, AREP High School, Sola)	24-Mar
Joe Tagai (Assistant Accountant, Torba Province)	
Peter Kome (Assistant Statistician, Torba Province)	22-Mar
Franklin Din (Manager, Health Department, Torba)	22-Mar
Christella Smith (Anglican Diocese of Banks and Torres, Church of Melanesia)	22-Mar
Shedrick Woleg Tapit (Secretary General of Torba Provincial Council)	4-Apr
Lenny & Zebulon Moipitvan (mid wife & Nurse for Torres); Health Clinic on Loh)	28-Apr and 08-Apr
Roger (informant from Toga)	24-Mar
Lerian Mitchell (Red Cross Sub Branch Officer)	4-Apr
Hamson Tagmenwos (Red Cross Committee, Ureparapara)	23-Mar
Willie Harold (Loh island)	28-Mar
Peter Hoag (Farmers Support Association)	30-Mar
Marcelyn Am Bong (Director, Vanuatu Kaljoral Senta)	1-Apr
Francis Hickey (Vanuatu Kaljoral Senta)	31-Mar
Brian Phillips (Vanuatu Meteorological Service)	25-May

Internal KIs and questionnaire respondents	Position	Date
Jean Piere John and Hamilton Cinderella John	Council of Chiefs	25-Mar and 26-Mar and 05-Apr and 06-Apr and 08-Apr
Chief Richmond Selwyn	Paramount Chief	26-Mar and 04-Apr
Marie Michelle Woibani and Dunstan Terogieu	Council of Chiefs	6-Apr
Titus Joel and Gladys Joel	Vanuatu cultural centre field worker	6-Apr
Bilwin Selwyn and Melani Selwyn		6-Apr
Davidson Amos		6-Apr
John Selwyn		6-Apr
Hamilton Gladys		5-Apr
Chief Ruben Selwyn + Rose Selwyn	<i>Kastom</i> Chief	5-Apr
Rose Selwyn		26-Mar and 05-Apr
Agel Dickson Selwyn	Church Pastor	7-Apr
Aiden Selwyn	Aid Post leader	25-Mar
Benjamin Brown	Red Cross committee, Litetra	8-Apr
Lyn Selwyn		5-Apr
Wilma Selwyn		5-Apr
Bettina Selwyn	Kindergarten Teacher	5-Apr
Selwyn Hubert (Hui island)	Red Cross committee Hiu, Bungalow owner	23-Mar
Richard John (Hui island)		27-Mar
Lucy John (Womens' Council, Hiu island)		27-Mar
Father Judah Moisoben (Former Pastor Hiu island)		8-Apr

Appendix 2

USP_IUCN

HOUSEHOLD QUESTIONNAIRE SURVEY

CLIMATE CHANGE ADAPTIVE CAPACITY

SECTION 1: GENERAL INFORMATION

Surveyed by: _____ Date: _____ Time: _____ Location: _____ Village: _____

Respondent's name: _____ Household clan/family: _____ No. of household members: _____

i. Please provide the following information for the interviewee. 'Interviewee' is the person appointed by the household to do most of the talking. For efficiency, this section could be filled in separately by an assistant prior to the main questionnaire interview.

Name	Sex	Year of birth	How long lived in village	Occupation (fisherman, farmer, household manager, student, small business operator, pastor, etc.)	Highest level of education	Religion	Access to traditional land/fisheries ownership? (Yes/No)

1. Interviewee:							
------------------------	--	--	--	--	--	--	--

ii.a. How many people slept in this house last night? _____

ii.b. Of these, how many are people that **normally** sleep here?

ii.c. For people that normally sleep in the house, fill in the table below:

	Sex	Age
1		
2		
3		
4		
5		
6		

iii. Are there members of your extended family who now live in Port Vila or Santo or other towns for work or study?

Yes _____ No _____

If yes, how many? Plenty _____ a few _____ none _____

iv. BRIEF DESCRIPTION OF HOUSE (interviewer to fill in by himself or herself):

TICK THE CORRECT RESPONSE

Questions	YES	NO
Is the house predominantly local materials (bamboo, thatch, wood)?		
Is the house predominantly non-local materials (iron, concrete, planks, tiles)?		
Is the house both local and non-local materials?		
Does the household own a television?		
Does the household have a radio?		
Does the household have a gas stove?		
Does the household have running water?		

SECTION 2: ACCESS TO RESOURCES

(WATER)

Is safe drinking water always available to your household?

Please write Yes _____ No _____

Comments _____

(FOOD)

2. What are the sources of food for your household at the current location and before the relocation ?
(Write X in the box that best matches answers. If “others”, describe them and rank the 3 main food sources)

		Currenet Location
	Food source?	b. What are the 3 main food sources (1=most important; 2 = second most important; 3 = third most important)
Gardens		
Tree crops		
Food planted in/collected from bush		
Fishing/ seafood collection		
Hunting		
Livestock		
Intra-community trade		
Community store/imported food		
Remittances (food sent from		

family elsewhere)		
Famine food (preserved, special gardens etc.)		

What are the three main crops that you grow in your garden?

Yam	
Island Taro	
Water Taro	
Manioc (cassava)	
Banana	
Sweet yam (<i>Wovile</i>)	
Sweet potato (<i>Kumala</i>)	

Is your system of gardening the same as your parents and grandparents? If not, how is it different?

Comments _____

(CASH INCOME)

5 What are the sources of cash income for your household? (Write X in the box that best matches answers. If “others”, describe them and rank main 3 sources of income)

		Current Location
	Income source? Tick	b. What are the 3 main income sources (1=most important; 2 = second most important; 3 = third most important)
Fishing		
Coconut crab		
Other seafood gathering		
Copra		
Agriculture		
Casual wage labour in the village		

Salary in village		
Salary in town (insert name)		
Handicraft work		
Pension		
Remittance		
Small business (community store, kava retail, cigarette retail, etc)		
Other (specify) Selling crops to other islands		

6. Which of these best describes your average yearly cash income (including remittances)? Is it.....?
(tick which one best describes answer)

1	Less than VT 10,000	
2	VT 10,100-VT30,000	
3	VT30,100 – VT50,000	
4	VT50,100 – VT70,000	
5	More than VT70,100	

SECTION 3: SOCIAL AND HUMAN CAPITAL

7. Do people in the village work together to solve problems at the current site? (tick which best describes answer)

1	Never	
2	Hardly ever	
3	Sometimes	
4	Often	
5	Very often	

7a. Has the relocation project affected the ability of the community to work together?

Yes ___ No ___ Yes and No ___ I don't know ___

Comments

8a. Do community leaders play an important role in solving community problem in general? (tick the option that best describes the answer)

1	Never	
2	Hardly ever	
3	Sometimes	
4	Often	
5	Very often	

Comments ?

8b. Has the relocation project affected community leadership?

Yes___ No___ Yes and No___ I don't know___

Comments

9a. Which village committees are you aware of? **(list)**

9b Have any new committees been formed since the village relocated to the new site?

Indicate which committees

9c. Is anyone in your household involved in a village committee?

Yes _____ No _____

If yes, go to question 9d. If no, go to question 10

9d. What is the committee responsible for? (List and note any lack of clarity)

10a. Do you think the community values traditional knowledge and ways of life? (**tick that which best describes answer**)

1	Not at all	
2	A little	
3	Sometimes	
4	Quite a lot	
5	A lot	

10b. Does the community today value traditional knowledge and ways of life more or less in comparison to 20 years ago?

More _____ Less _____ The same _____ Don't know _____

Comments _____

11. Do you think people in the community think about the future?

Comments _____

12. Do you think the community is accepting of new ways of solving problems?

Comments _____

SECTION 4: PERSONAL EXPERIENCES WITH WEATHER/ CLIMATIC CONDITIONS AND ADAPTIVE STRATEGIES

Explain that in this part of the interview you will ask the participant to describe their **own experiences** with different types of weather/ climatic conditions at their current location and at the old site (ie. before the relocation). Ask the participants the questions about each climatic condition at the current site and its frequency and then ask the same questions about the old site (ie before the relocation). If the participant volunteers an explanation, record some brief notes in the 'comments' space below each table.

How often did you personally experience bad flooding before and after relocation:

	Before or after relocation	At least once a year	1-2 times a year	Once every 2-3 years	Once every 5 years or so	Other (state)
Heavy rainfall related flooding	<i>Before</i>					
	<i>After</i>					
Flooding due to storm surges and salt water intrusion	<i>Before</i>					
	<i>After</i>					
Comments						

What effects do climate/weather related problems have on your life?

(If possible ask the respondent to give specific examples about how weather/ climatic hazards have affected different aspects of their life.)

	Property	Crop (which crops were affected)	Health (such as water borne diseases, malaria, skin diseases etc)	Other
Heavy rainfall related flooding				
Flooding due to storm surges and salinisation				

Cyclones				
Water shortages				
Other				

What do you (what did you do) to prepare and recover from the effects of various weather/ climatic problems? (note traditional and modern methods)

Hazard	Property (home and goods)	Crop (which crops were affected)	Health & sanitation (such as water borne diseases, malaria, skin diseases etc)	Other
Heavy rainfall related flooding				
Flooding due to storm surges and salinisation				
Water shortage	Na			
Cyclones				

16.. Is it easy to get assistance from external organisations to help the village deal with these problems (for each of the problems identified in 16)?

Yes _____ No _____ Sometimes _____ Don't know _____

Comments _____

17a. Has the relocation project affected your ability to access assistance from external organizations to help solve community problems?

Yes _____ No _____ Sometimes _____ Don't know _____

Comments

SECTION 5: RELOCATION PROCESS

Explain that the purpose of this next set of questions is to learn about the reasons for their decision to move, factors that affected their decision and the amount of effort (time and costs) involved in the relocation process

(REASONS)

Give three reasons why you personally decided to move your family to the new site

Did you discuss other sites before deciding to move to Lirak?

Yes _____ No _____?

Comments _____

What were the positive and negative aspects of each site?

If you were to relocate again, what would you do differently, if anything?

Appendix 3

CBDAMPIC project reports in chronological order

SPREP, 2003: *Project implementation plan: CBDAMPIC*. Apia. SPREP

NACCC, no date: *Strengthening Lateu community's resilience to climate related risks: a subproject of CBDAMPIC Vanuatu*. Port Vila. Vanuatu Meteorological Service

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