



Pacific
Community
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Mission Report:

Ship Inspection, Community Profiles
and Vanuatu Domestic Commodity
Trade Analysis

Mission Report: Ship Inspection, Community Profiles and Vanuatu Domestic Commodity Trade Analysis

**Prepared by the Transport Programme, Economic Development Division,
Pacific Community**



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Report context

This report was prepared by staff of SPC's Economic Development Division within the context of the shipping component of the *Pacific Community Recovery Support for Tropical Cyclone Pam, Phase 2: Recovery & Resilience Building Project*, which is currently being implemented in Vanuatu to address the economic dislocation caused by Tropical Cyclone Pam in 2015. The shipping component of SPC's support is designed to help address specific issues related to domestic shipping that were identified in a report by the International Finance Corporation, namely the lack of sufficient onshore and ship-based cold storage. The measures proposed in this report were the basis of a presentation to officials in Vanuatu.

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Acronyms and abbreviations

ADB	Asian Development Bank
AUSAID	Australian Agency for International Development
DARD	Department of Agriculture and Rural Development
DFAT	Department of Foreign Affairs and Trade
DMP	Department of Ports and Marine
EDF 11	Eleventh European Development Fund
EU	European Union
ENA	Electronic Navigational Aids
IFC	International Finance Corporation
KfW	KfW Development Bank
MALFFB	Ministry of Agriculture, Livestock, Forestry, Fisheries, and Biosecurity
MIPU	Ministry of Infrastructure and Public Utilities
NSC	National Shipping Council
ORCBDS	Office of the Registrar of Cooperative & Business Development Services
OSPS	Overarching Productive Sector Policy
SPC	Pacific Community
PICs	Pacific Island countries
PICTs	Pacific Island countries and territories
PIDSS	Pacific Islands Domestic Ship Safety Programme
SOLAS	Safety of Life at Sea Convention
VARC	Vanuatu Agriculture Research Centre
VCF	Vanuatu Cooperative Federation
VISSP	Vanuatu Inter-Island Shipping Support Project
VNSO	Vanuatu National Statistical Office

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The team also thanks representatives of development partners and agencies consulted during the visit to Vanuatu, including the European Union (EU); World Bank / ADB Country Office, Melanesian Spearhead Group and Representative of the New Zealand High Commission.

It is hoped that this report and the measures proposed will contribute to the sustainable implementation of the Agri-Tourism Initiative, and will offer lessons that can be replicated in other Pacific Island countries and territories.

Executive summary

Agriculture and tourism account for 28% and 33% of Vanuatu's Gross Domestic Product respectively and are the main economic sectors. However, the tourism sector is the main driver of imports. Increasing urbanisation as people leave the outer islands in search of employment opportunities is also a driver of imports. This is also a contributor to declining output in the farming sector. Development of the outer islands of Vanuatu is an important development objective for the country. Accordingly, the Government of Vanuatu is keen to improve linkages between the agriculture and tourism sectors to improve income generation and value added production in the outer islands and also reduce leakage from the economy due to imports.

The Government of Vanuatu recently commissioned a study by the International Finance Cooperation (IFC, 2015) to analyse the purchasing patterns of Vanuatu's tourism sector, in order to better understand existing linkages between the tourism and agricultural sectors, and to identify opportunities to improve these linkages. The IFC Study suggests that there are specific items within the import bill that can be produced locally but are either not being produced, or not being produced in sufficient quantities. It identified import substitution potential in excess of 400 million Vatu (USD 4.2 million), or over 50% of fresh food imports by hotels and restaurants in Port Vila which can be prioritised for local production. It also highlighted a number of factors including several related to shipping (inefficiencies of inter-island shipping, with associated high costs and post production food mishandling and absence of cold storage) which inhibits the supply chain of locally grown produce.

In response to the IFC report, the government has launched an Agri-Tourism Initiative, which is a joint collaboration between the Ministries of: Trade and Commerce; Agriculture and Tourism to address some of the issues raised in the report. A high level Agri-Tourism Steering Committee has been established to oversee and monitor this initiative. The Vanuatu Cooperative Federation is a key member of this committee.

SPC's Recovery Support for Tropical Cyclone Pam; Phase 2: Recovery & Resilience Building Project is currently being implemented to assist with recovery and building resilience in Vanuatu following economic dislocation caused by Tropical Cyclone Pam in 2015. Specifically, the Shipping Component of SPC support is designed to help address domestic shipping related issues identified in the IFC report (the absence of sufficient on-shore and on-board ship based cold storage).

This report contends that the shipping components' support to agri-tourism initiative cannot be implemented in isolation of other rural development initiatives. The report therefore assesses the institutional context within the shipping and agriculture sectors and ongoing development initiatives. It also looks at donor programs in these sectors. Detailed ship surveys were undertaken to determine their seaworthiness to accommodate cool storage, without compromising safety and increasing costs, where shipping margins are already tight. On a province by province basis, the report assess infrastructure (state of roads, ports, electrification) development, domestic shipping and commodity trade analysis, organisation of the farming sector and practices and important stakeholders to see how these affect production and marketing of produce. Given the low rate of electrification in production areas, the report also looks at the prospects for implementing renewable energy solutions.

This Report is based on surveys of domestic vessels; interviews with officials in Vanuatu; field visits to Port Vila and several islands in Vanuatu (Tanna, Espiritu Santo and Malekula); informal interviews with farmers and shipping companies and desk based reviews of literature on development issues, shipping and the agriculture sector in Vanuatu. Meetings were held with development partners active in rural development. Interviews were also held with officials in other primary sectors such as fisheries and companies active in the renewable energy sector. The key observations made by the team are summarised in this Executive Summary.

A number of measures directly related to shipping and cold storage options are proposed to support the agri-tourism thrust. A number of complementary measures are also captured in the report. These measures are grouped under the following headings: 1. Policy Context; 2. Infrastructure; 3. Shipping efficiency; 4. Structure of subsistence farming sector; 5. Sales and Marketing; 6. Technology; and 7. Data availability. The measures proposed by the Team are summarised in this Executive Summary.

Key observations

1. Policy Context

The policy context for the Agri-Tourism Initiative is clear and based on a study prepared by the International Finance Corporation in 2015 which has been accepted by the government. An inter-ministry Steering Committee has been established to oversee and monitor implementation of the Agri-Tourism Initiative. Key ministries involved include: Ministry of Commerce and Trade, Ministry of Agriculture and Ministry of Tourism. The Vanuatu Cooperation Federation which has an extensive network throughout Vanuatu is very actively involved in the Steering Committee. Based on visits throughout Vanuatu, this report notes the need for a more effective awareness of the Agri-tourism initiative amongst farmers and lower level staff in government ministries. Several sector policies such as the Agriculture Policy are in place and will facilitate achieving the objectives of the Agri-Tourism Initiative.

2. Infrastructure

Similar to other Pacific Island countries and territories (PICTs), domestic shipping is an enabler of national development in Vanuatu. Shipping is the most important mode of transport available in Vanuatu and supports important economic, health, education and social integration in the country. It is also a means of promoting equitable development, through supporting linkages between rural and urban economies. This report notes major infrastructure constraints which affects the agriculture supply chain. Most ports in production areas (outer islands) need rehabilitation. Some ports do not have access to electricity and water supply and passenger and storage sheds are not provided. The report also notes that the ongoing Vanuatu Inter-island Shipping Support Project (VISSP) will address some of the issues noted above. However, even with the successful implementation of the VISSP there will still be the need for further investments in port infrastructure over the medium to long term, as funding becomes available. The absence of electricity and water supply will make it difficult to operate cold storage; although it is noted that renewable energy solutions are possible and in use in Vanuatu. Some renewable energy measures are proposed in this report to expand cold storage in remote production areas.

Because of the topography of most of the outer islands, the best road infrastructure is concentrated along coastal areas and in commercial areas. This is understandable given funding constraints. However, farming mostly takes place at higher elevations and depends on dirt tracks or unpaved rural roads to transport produce to markets and ports. Some rural roads are subject to erosion and landslides during rainy periods. The Team also noted that most of these roads are poorly maintained. Road conditions in the outer islands add to cost of transport produce to market as well as increase post-harvest crop damage and loss. The report notes that major road improvement projects are ongoing on several islands visited by the team (Tanna and Malekula). However, these mostly involve paving coastal roads, so will not fully address the problems faced by farmers. This report however, notes an Australian funded community road improvement (maintenance) project which can have some impact on improving roads used by the farming community. This report also proposes measures to improve roads which farmers depend on such as providing them with tractors.

Given the variety of challenges faced by small farmers, the team agrees with the proposal by VCF to establish central points within a particular district where agriculture services such as cold and other storage facilities, training and road maintenance can be consolidated (*see Appendix for more information on this initiative*). The report notes that internet penetration and use of smartphones is expanding in the production areas and proposes some measures to use smartphones to expand 'just in time' transport of products from the central points to domestic vessels to reduce post-harvest loss. These measures will complement ongoing initiatives by DARD.

3. Shipping efficiency

This pattern of production influences the demand for shipping of primary sector products and the organisation of the domestic supply chain. It has resulted in Port Vila and Luganville emerging as two transport hubs, with relatively distinct activities (*See appendix to view a transport Network Map of Vanuatu*). No doubt this pattern of shipping would continue for the foreseeable time period.

The team carried out an extensive inspection of ships and met all levels of the shipping industry within which the shipping industry works. Given the dependence on shipping for most inter-island trade, it may be prudent to co-opt the Ministry of Infrastructure into the Agri-Tourism Committee. Several independent reports, including the IFC study, have noted the conditions on domestic ships and the team has noted similar issues. Whilst some ships are operated and maintained quite well the same cannot be said for the others.

It became quite clear that for the shipping industry to function effectively, there needs to be meaningful partnerships between all levels of the industry. In line with the new international maritime conventions, the global maritime community is engaging more with the industry in order to meet their various international obligations as partners. In this regard, SPC is proposing the setting up of a National Shipping Council comprising key industry stakeholders and driven by the Head of the line Ministry. This is proving quite a success in other Pacific Island Countries (PICs).

The team understands that as part of the reform of the shipping industry a new maritime administration is to be established as the national regulator. The team fully supports this reform as it will help address some of the challenges that the industry is currently facing, and if implemented

correctly will also have a positive impact on the national economy, including the agri-tourism project.

Under the Safety of Life at Sea (SOLAS) Convention, ships should have a safe ship management system suitable for their operations. In this regard, SPC has been trying to assist PICs, including Vanuatu, to implement a simplified version called the Pacific Islands Domestic Safe Ship Programme (PIDSS). This will greatly assist in addressing some of the challenges currently facing domestic vessels and this measure is supported in this report.

At the various islands visited, it became quite clear from interviews we had with passengers and shippers of cargo that they value a shipping service that is regular, timely, dependable and customer friendly. The ships should be clean and comfortable, have short travel times, be safe and ensure that cargo is secure. The interviewees admitted that they were prepared to pay extra or even re-schedule their travel so as to travel on the ship of their choice. This presents several opportunities to other shipping service providers to re-strategise and re-train their staff to meet the new demands of discerning passengers and their cargo. This report proposes measures to assist smaller shipping companies to improve their competitiveness.

Having visited some of the biggest production areas, the team noted that there is a simple system that is working quite well in the form of sealed ice boxes being sent to the shippers' representatives in Port Vila or Luganville. The quantity is not large and those involved are quite satisfied with this arrangement. It was also difficult to obtain information on quantities being shipped. Shippers have expressed their concern about putting their cargo on some ships and even more so if placed in cold storage for fear of tampering or going missing. Some fishing areas have deep freezers powered by batteries and charged by solar panels which are working quite successfully. The use of large refrigerated shipping containers may be too large to suit the current and foreseeable quantity. In several areas we have seen smaller blast freezers and coolers. These small cold storage facilities can run off the main grid without a higher demand for three phase power (A summary of suggested actions to improve sustainability in shipping is in the Appendix in Table 14, Page 69).

4. **Structure of subsistence farming sector**

Close to 80% of Vanuatu's people reside in its outer island provinces and are dependent on subsistence farming for their livelihood. The subsistence farming sector co-exists with a formal export-oriented cash crops sector. Key exports include copra, cocoa, kava, coffee and beef, which account for most of Vanuatu's exports.

This report notes that subsistence farming is usually done on communal land, using basic farming implements and is mostly rain-fed. Both males and females engage in subsistence farming, but it is understood that females are mostly responsible for selling produce at local markets or at markets in the main urban areas (Port Vila and Luganville). The Team understands limited crop rotation is used and farmers grow the same produce. This limits market development. However, this report notes that excess production could become the basis of small processing operations in the rural communities, which would also create employment opportunities and value addition.

A number of extension programs are provided to farmers in the production areas including: demonstration plots, supply of improved seeds and seedlings, tractor services, etc. Service is not

uniform across all provinces. Farmers who were interviewed during the field visits reported receiving limited extension service. However, the team notes from discussions with agricultural officials in the production areas that they faced a number of constraints such as limited staff and budgets. The Team observed that emphasis is being placed on growing vegetables for food security, to improve diets and also to develop markets. This is consistent with the objective of the Agri-Tourism Initiative. Information on vegetable production initiatives in the provinces is also captured in this report.

Farmers maintain small animals for their own household use. However the Team notes that efforts are being made by the Livestock Department and Vanuatu Cooperative Federation to encourage cattle production amongst small farmers; for example, there is a plan to distribute 400 cattle to farmers on Tanna. The team notes plans to increase poultry production. However, during the field visits it was observed that production is still very low. It is seasonal and major businesses still depend on imports. A specific issue raised during the visit was animal welfare during transportation. It was noted that regulations exist governing the transportation of animals. In the view of the team, there is need for more awareness of this regulation, and to better integrate these provisions into the training of seafarers. There is also a need to better co-ordinate the transportation of animals between government agencies, including the port administration, especially during the weekend, to limit animal hardships as the port is reported to be closed during weekends.

5. Sales and marketing

The farmers' objective is to get produce to market safely and receive timely payment, whether in cash or in the form of goods. The report notes that various means of sending and marketing produce at markets in Port Vila and Luganville exist. We encountered cases where farmers went to market themselves; farmers sent produce to relatives to be sold, and a group of farmers sent produce to representatives living in Port Vila. There are many transaction costs along the supply chain as agents and representatives have to be paid and there are handling charges involved for land transportation.

In instances where farmers actually go to market themselves, they are losing farming time. There also seems to be very limited market intelligence about surpluses or shortages of produce items. This is a key issue of the IFC Report where it was noted *'that linkage between buyer and farmers via an aggregator or wholesaler led to a gap in information exchange and effective marketing of produce'* (IFC Report, 2015).

This report recognises that effort is needed to improve packaging and labelling of produce and improve reliability of supply. The report also notes the plans by Vanuatu Cooperative Federation to improve marketing of produce from the outer islands and to construct and operate cold storage facilities (showcases) in Port Vila and Luganville. The report also noted that in the medium term VCF proposes to acquire two vessels with cold storage to facilitate the transport of produce and allow time for production to increase.

6. Appropriate Technology

The team visited several local suppliers of a range of cold storage equipment, including freezers, coolers and ice-making machines. Of interest were the widely used freezers and coolers that can be powered by batteries charged by solar energy. This type of equipment has been purchased and used widely in the education and medical sectors under donor funding with a five (5) year maintenance

contract and centrally located performance monitoring facility. The fisheries sector also uses similar equipment located in the outer islands and coastal region. An increasing number of companies and individuals also have this equipment. During the visit, the team also visited companies that make fibreglass ice-boxes or import large 'eskys'/ice-boxes. These are widely used by shippers of frozen goods and would be ideal for the purpose of the project (*A summary of the factors relating to appropriate technology is in the appendix*).

7. Data availability

The report shows that domestic commodity trade analysis is basic, but data particularly for the subsistence sector is limited. Farmers in different areas of the country have comparative advantage in producing particular crops or livestock which are sent to Port Vila and Luganville. Since most exported cash crops and beef grow better in the north of Vanuatu Luganville, it is the main export transshipment hub, while Port Vila is the centre for coffee exports and destination of vegetables, root crops and fruits for the tourism sector and the increasing urban population. There seem to be limited direct shipping between the Northern provinces and Port Vila; it is all via Luganville. In terms of domestic commodity trade analysis, (as seen in box 1) the farmers send produce to market fuel, food items, building materials and a variety of consumer durables are returned to the outer islands.

Box 1: Penama Province commodity trade analysis

Exports:

Kava to Luganville and Port Vila
Taro to Luganville and Port Vila
Beef to Luganville
Copra to Luganville
Fish- deep bottom, reef, pelagic
Small livestock (from Ambae)
Coconut crab (from Maéwo)

Imports:

Fuel
Food items
Household items
Rice, flour, sugar
Building materials
Cement
Corrugated Zinc Roofing

This report shows that excellent information is available from the Vanuatu National Statistical Office on cash crops. However, limited data is available on the subsistence sector. The last Agriculture Census took place in 2007 (9 year ago). This report notes that plans are advanced for the 2016 Agricultural Census. This report suggests that this could be a basis of improving and sustaining data collection on subsistence sector comparable to that for cash crops. In the interim, it might be advantageous to conduct a detailed analysis of reports from the shipping company record to capture volumes of subsistence cargo shipped from the islands.

Measures

Based on the analysis in this report, the team proposes the following measures to improve the impact of shipping and provision of cold storage to the success of the agri-tourism initiative. In presenting the measures, we focus on practical solutions which build on ongoing activities to encourage ease of implementation and sustainability.

1 Focal Area & Key Measures

Focal Area	Key measures	Timeframe ¹
Policy	1. Increase awareness of the agri-tourism initiative and its importance to national development in the country amongst members of the community.	Immediate
	2. Improve coordination and build synergies between the various donor projects currently being undertaken in rural areas.	Immediate
	3. Boost the role of the Ministry of Infrastructure in the Agri-Tourism Committee.	Immediate
Infrastructure	1. Improve and maintain dirt tracks and other rural roads used by farmers, with active involvement of communities and provision of appropriate machinery and equipment.	Short term
	2. Introduce community based cool storage solutions using renewable energy in central production areas/districts to service nearby farmers.	Immediate
	3. Install cold storage at ports with sheds to complement community based cold storage.	Short to medium term
	4. Co-ordinate with the Geoscience Division and National Charting agency for hydrographic work in Vanuatu.	Short to medium term
Shipping efficiency	1. Consider the establishment of the NSC.	Immediate
	2. Promote the expansion of the PIDSS programme.	
	3. Encourage the reform to separate the regulatory functions from operations.	
	4. Strengthen inter-departmental collaboration/co-ordination to improve shipping of animals especially on weekends.	Short term
	5. Arrange training for Ships' crew on proper cargo-handling, stowage on-board and the carriage of animals in accordance with existing regulations.	Short term
	6. Arrange training for Stevedores on cargo handling. <i>(detailed explanation is in the appendix)</i>	
Structure of subsistence farming sector	1. Co-ordinate with Fisheries and Department of Fisheries on fisheries and cold storage issues.	Immediate
	2. Strengthen agronomic practices such as crop rotation and planting different crops to develop domestic markets.	Short to medium term
	3. Promote small scale processing operations in rural communities.	Short term
	4. Co-ordinate with Land Resources Division/Bio-security and Ministry of Agriculture on bio-security issues.	Short to medium term
Technology	1. Determine the number of sites and distribution of the appropriate technology.	Immediate
	2. Finalise procurement plan including installation details.	
	3. Call for expressions of interest. <i>(detailed explanation is in the appendix)</i>	

¹ In this measure: immediate refers to measures which can be implemented right away; short-term is considered to be 1 to 2 years; medium term 3-5 years and long term more than 5 years.

Sales and marketing of products	<ol style="list-style-type: none"> Promote aggregator or wholesalers services to support marketing of produce. Use market intelligence to inform which produce to plant and send to markets. Develop cold storage showcases in Port Vila and Luganville to demonstrate improved display of local produce. 	Immediate
Data availability	<ol style="list-style-type: none"> Conduct a detailed analysis of reports from the shipping companies. Improve data collection on production from the subsistence farming sector. 	<p>Immediate</p> <p>Short to medium term</p>



Figure 1 Farmers with seedlings for distribution



Figure 2 Ice box from coastal fishermen bound for Malampa Market

Chapter 1 Introduction

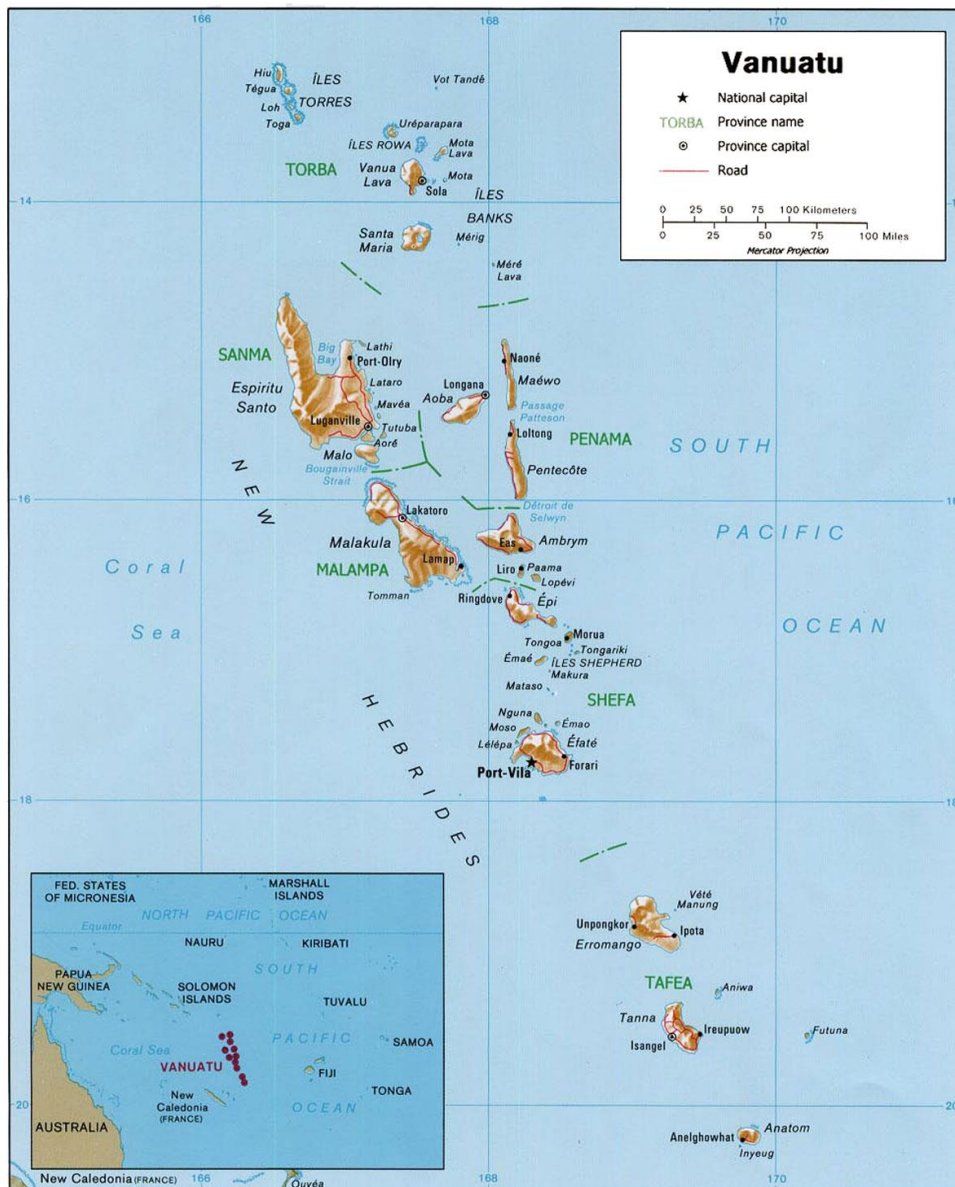


Figure 3 Map of Vanuatu (*Nations Online*)

1.1 Background

Like most PICTs, Vanuatu is a very open economy and depends heavily on external economic developments, development aid and international trade. It is also vulnerable to shocks from natural disasters. The economy depends heavily on tourism and agriculture production. The economy contracted in 2015 due to disruptions caused by tropical cyclone Pam, and droughts associated with El Niño. With major infrastructure projects and post-cyclone reconstruction gaining momentum, economic growth is rebounding.

Most of Vanuatu's population lives in rural areas where subsistence farming, fishing and production of cash crops such as kava, coconut and cocoa and root crops, vegetables and small animals for sale

in urban markets (mainly Port Vila) are the main sources of livelihood. Goods exports are dominated by agricultural products, particularly kava, coconut products, beef and cocoa.

A recent study by the IFC identified import substitution opportunities for locally grown agricultural products worth 400 million VUV in the tourism sector. This is the basis of the government's Agri-Tourism Development initiative which aims to increase linkages between the tourism and agricultural sectors, local value addition and rural development. The IFC Study also identified several constraints, including transport and logistical issues and absence of cold storage which adversely affect the domestic supply chain.

This study is part of SPC's Recovery Support for Tropical Cyclone Pam; Phase 2: Recovery & Resilience Building: Shipping Component. It assesses agriculture production, infrastructure (road condition and energy supply) and production from other primary sectors in Vanuatu and domestic shipping to make measures on the location of onshore and ship cold storage to support the Agri-tourism development thrust. The focus of the analysis is therefore on production which is for internal consumption and not production which is primarily for export. Thus, the focus is mostly on the subsistence sector.

1.2 Country Context

Vanuatu is a parliamentary democracy. The head of state is a president. Day to day administration of the country rests with a Prime Minister and Cabinet, elected from amongst the members of parliament. Government ministries are headed by Director Generals.

Administratively, Vanuatu is divided into 6 provinces (Torba, Sanma, Penama, Malampa, Shefa and Tafea) and 2 municipalities (Port Vila and Luganville). There is an established provincial council system which is overseen by the Ministry of Internal Affairs within the ambit of *the Decentralisation and Local Government Regional Act 1994*. Provincial administrations have a defined structure, wide representation from key population segments and extensive responsibilities for community health, education and other services provision and physical planning.

Vanuatu is a Y-shaped archipelagic country consisting of 83 islands. The country is relatively mountainous with a rugged terrain. The geographic characteristics of Vanuatu gives rise to both economic development opportunities and challenges. They are a basis for a growing shore-base and cruise tourism industry and a thriving agriculture sector, which are important for both domestic consumption and exports. The exploitation of linkages between both sectors is an important development imperative for Vanuatu through the Agri-Tourism initiative. Vanuatu has an exclusive economic zone (EEZ) of about 680,000 square kilometers, which provides opportunities to develop fisheries.

Vanuatu is a lower middle income developing country. The population was estimated at 277,600 in 2015, with annual growth rate of 2.6% (SPC, 2016). It is estimated that 76% of the population reside in isolated rural communities and islands (SPC, 2014). With the exception of Torba, the population is fairly evenly distributed across the provinces. Fuelled by internal migration, in search of employment opportunities, Port Vila, followed by Luganville, are the most heavily populated areas in the country.

According to the 2009 Census, the unemployment rate was 4.6%, with a labour force participation rate of 70.9%. Approximately, 33% of the labour was employed in the tourism sector. Vanuatu has

made good progress in achieving the Millennium Development Goals (Mgs). Basic needs poverty is relatively low and was 12.7% in 2009 (SPC, 2015) largely due to prevalence of own-account subsistence food production. Many rural communities have only limited access to basic healthcare, education and other social services and energy. For example, the electrification rate is less than 40%. Opportunities are limited in rural areas, which is a ‘push factor’, contributing to rural-urban migration in the country, which has an increasingly severe and adverse impact on urban infrastructure and urban services.

1.3 Recent economic performance

The main economic sectors in Vanuatu are services (including tourism and offshore financial services), and agriculture. Construction, related to tourism, plant expansion and donor related projects, is of increasing importance. Agriculture and tourism accounted for 28% and 33% of GDP in 2010, respectively. Mining and manufacturing, together accounting for about 12% of GDP, are less important economic sectors.

Vanuatu recorded modest, but positive, economic growth recently due to strong performance in the tourism sector and implementation of government funded development projects. The economy

Box 2: Recent Economic Performance



contracted in 2015 due to disruptions caused by tropical cyclone Pam, and a severe El Niño. With major infrastructure projects and post-cyclone reconstruction gaining momentum economic growth is rebounding. The ADB estimates that economic growth should increase by 2.3% in 2016 and 3.8% in 2017 (Asian Development Outlook, 2016).

Tax revenues come mainly from import duties and a 12.5% VAT on goods and services. The budget recorded a surplus equivalent to 1.4% of GDP (ADB, 2016) due to mainly to strong revenue collection. Funding for development partners reached about \$75 million (ADB, 2016). Following a spike in prices immediately after tropical cyclone Pam, as a whole prices were up by only 2.5%, during 2015, and inflation is currently being estimated at 1.9% (ADB, 2016).

1.4 Shipping and Development Issues

Transport sector development through infrastructure development and improving shipping services are integral to the economic growth and sustainable development in Vanuatu. Shipping is the most important transport system available in Vanuatu and supports important economic, health, education and social integration in the country. It is also a means of promoting equitable development, through supporting linkages between rural and urban economies. This is a major development imperative for the country. Consequently, a number of projects are ongoing or planned in the transport (maritime) sector. Major infrastructure projects in the transport sector include: Vanuatu Tourism Infrastructure Development Project, Port Vila Lappets International Multipurpose Wharf Development Project, Vanuatu Inter-Islands Shipping Support Project, and Luganville International Wharf. The resurfacing of the runway at the main international runway was

recently completed. Hydrographic surveys of important cruise ship ports in the country are also being undertaken. These projects are being funded by a mixture of loans and grants and involve several development partners. In the short run, they create important employment opportunities and aid recovery of tourism. Over the medium term, they will transform the transport sector and maximise its contribution to national development.

A development imperative which needs to be addressed is developing linkages between the tourism and agriculture sectors. Improvements in domestic shipping arrangements and provision of cold storage through the current project will help to address critical constraints identified in the IFC Study – inefficiencies of inter-island shipping with associated high cost and post production food mishandling. Over the medium term, help will reduce leakages from the tourism sector and promote rural develop and local value addition.

Report limitations: This report relies primarily on secondary data which in most instances was not collected for the primary focal unit of analysis of the study (smaller farmers). Much of the available information is data since the last agriculture census was undertaken in 2007. Much of the information on location and demographics in the report was summarised from information in Wikipedia and various tourism websites. The report benefited from field visits in three provinces (Tanna, Espiritu Santo and Malekula), so coverage in these islands would be more extensive compared to other islands/ provinces. Additionally, information on freight rates and volumes which would have enriched the report and enable forecasting of copy yields and shipping demand was simply not available. The study relied heavily on anecdotal information and informal interviews with farmers and market vendors, many of whom acknowledged that they did not maintain records of transactions on a consistent basis.



Figure 4 Coastal ferry in Luganville

Chapter 2 Institutional context

2.1. Overview of primary sectors

2.1.1 Organisation of the productive sectors

The Ministry of Agriculture, Livestock, Forestry, Fisheries, and Biosecurity (MALFFB) has oversight responsibility for development of agriculture and other primary sectors in Vanuatu. The MALFFB is divided into departments according to the primary sub-sectors. Each department is headed by a Director, who has executive responsibility for planning and management of the sub-sector. The Directors are assisted by technical and administrative staff, who are based at head office (in Port Villa) and in the provinces. The focus of this report is on agriculture production but references are also made to other primary sectors such as fisheries.

The main policy frameworks guiding management of the primary sectors is the macro-level Overarching Productive Sector Policy (OPSP). The OPSP was formulated in 2012 with an overall objective to *'improve efficiency and performance resulting in significant broad-based growth outcomes for all productive sectors.'* Consistent with OPSP, the Agriculture Sector Policy (2013) elaborates micro level policy directives and strategies of specific relevance to Agriculture. The Agriculture Policy is consistent with the National Sustainable Development Plan (2016-2030). It acknowledges agriculture as the country's engine for economic growth and employment and is also consistent with global development frameworks including the Millennium Development Goals and the new Sustainable Development Goals (SDGs).

The Agriculture Sector Policy is centred on 4 pillars: sustainable development, social development economic development and environmental issues; and thirteen (13) areas. Some key thematic areas, related to challenges in the sector, include: Research & Development, Production & Market Access, Capacity Building, and Gender & Vulnerable Groups, Investment & Employment, and Market Access Farming and Climate Variability, Climate Change & Disaster Risk Management.

Specific policies have been formulated for the other primary sector such as fisheries. These are not elaborated in this study. However, as will be seen during the analysis, it will be critical to build complementary activities and synergies with other primary sectors, since in most instances farmers are also engaged in fisheries.

Currently the Department of Agriculture and Rural Development (DARD) has 61 staff. According to DARD's 2015 Annual Report, 15 served in Central Administration at Tagabe, 9 worked in Tafea, 10 worked in Shefa, 8 in Malampa, 5 in Penama, 11 in Sanma and 3 in Torba Province. Capacity Building and skills training are key priority for DARD to upskill and enhance both farmers and staff with innovative technologies. In 2015, DARD had 33 extension officers and 9 technical officers. The extension service disseminates information on innovative services, ideas and technologies to improve the



Figure 5 Nursery on Santo

livelihood and food security of rural and urban communities throughout Vanuatu. The extension approaches DARD engages includes field demonstrations, trainings and workshops for farmers, farm visits, work attachments, field days, use of lead farmers, use of farmers cooperatives and associations, use of SMS text messages, use of NGO networks, print information (leaflets/posters/news articles) and radio broadcasts (DARD Annual Report, 2015).

2.1.2. Overview of agriculture production

Vanuatu covers a land area of 12,189 km². Only 40% of the land area is cultivable (Agriculture Policy, 2013). The primary sectors (Agriculture, Forestry, Livestock and Fishery) account for around 20% of total GDP and for almost all merchandise exports. Agriculture accounts for 75% of output from the primary sector.

According to the Agriculture Policy, Vanuatu's agriculture sector is divided into three subsectors, as follows: i) labour intensive, subsistence sector based in rural areas centred around root crops (Taro, Yam, Cassava and sweet potato) grown for consumption and domestic markets; ii) a growing urban based semi-commercial sector, with increasing linkages with the tourism sector and iii) a commercial, export subsector; growing cash crops (kava, cocoa, coffee, cattle, coconuts). Copra is still, however, Vanuatu's main agricultural product, but the sector is stagnant. The export and semi-subsistence sectors are well organised and have established domestic and international markets. However, the subsistence subsector where more than 70% of the population earn their livelihood uses rudimentary hand tools and depends on rainfall. Farmers report receiving limited extension support and difficulty accessing credit and inputs. This results in low productivity. Rural farmers also face marketing challenges due to the archipelagic nature of the country, exacerbated by high land transport costs and shipping costs and associated challenges.

According to DARD's 2015 annual report, it oversees a number of programs aimed at increasing agriculture production. These include: Tractor Hire in Tagabe, Isangel and Santo, which assist farmers in land clearing; demonstration farms and plots throughout the provinces; nurseries and seedling supply, market advisory service, research in high yielding, pest and climate resilience crop varieties such sweep potatoes, rice, pollinated corn, yam, winged beans, cucumbers and promotion of backyard gardening of vegetables for home-consumption and sale at local markets. Support for vegetable production include: farmer training, seedling supply, seed distribution, composting,



Figure 6 Noble kava community awareness meeting

disease control and crop rotation. In addition, DARD along with the Vanuatu Agriculture and Research Centre (VARC), located on Santo carry out a number of research programs aimed at the main export cash crops. These include: nursery and seedling supply, demonstration plots, quality control, packaging and marketing. Kava production is also being given specific support for domestic and export market. This centres on promotion of growing of 8 'noble' kava varieties, as opposed to the "2-day" varieties. Support for 'noble' kava production include: awareness, planting and harvesting, solar drying and packaging and labelling. Products are grown in specific regions of the country,

as shown in Table 2. This pattern of production influences the demand for shipping of primary sector products and the organisation of the domestic supply chain. It has resulted in Port Vila and Luganville emerging as two transport hubs, with relatively distinct activities. Since most exported cash crops and beef grow better in the north of Vanuatu, Luganville is the main export transshipment hub, while Port Vila is the centre for coffee exports and sources of vegetables, root crops and fruits for the tourism sector and the increasing urban population.

2 Agriculture production areas

Province	Satellite production towns	Main produce sent to market
Torba	Torres Island	Fish – deep bottom reef, pelagic, lobster, coconut crab , coco Fish, Lobster, Coconut Crab
	Vanualava	Fish – deep bottom reef, pelagic Small livestock
	Gaua	Kava Fish - deep-bottom, reef, pelagic Small livestock
Shefa	Epi	Yam, Kava, Peanuts, Bananas Small livestock
	Tongoa	cassava, Fish - deep-bottom, reef, pelagic Small livestock
	Shepherds	Small livestock
	Efate	Small livestock Fish - deep-bottom, reef, pelagic
	Efate Offshore Islands	Small livestock
Malampa	Malekula	Kava, Yams Fish – deep-bottom, reef, pelagic, freshwater prawn Small livestock
	Ambrym	Wild Yam, Yam Fish – deep bottom, Small livestock
	Paama	Fish - deep-bottom, reef, pelagic Small livestock
Penama	Ambae	Kava, Taro Fish – deep bottom, pelagic Small livestock
	Maewo	Kava, Taro Fish – deep bottom, reef, pelagic, coconut crab Small livestock
	Pentecost	Kava, Taro Fish – deep bottom, reef, pelagic Small livestock
Sanma	Santo	Green & Dried Kava/Dried coconut/Bananas/Spices Fish – deep bottom, freshwater prawns Small livestock
	Malo	Yam Fish – deep bottom, reef Small livestock
Tafea	Tanna	Irish Potato, Fresh vegetables, Spices Fish – pelagic Small livestock
	Erromango	Fish – deep bottom, reef, pelagic, coconut crab Small livestock
	Aneityum	Fish – deep bottom, pelagic Small livestock
	Futuna	Fish – pelagic
	Aniwa	Fish – pelagic

Source: Department of Agriculture

2.2. Vanuatu Cooperative Federation

The cooperative movement in Vanuatu is administered by the Registrar of Cooperative under the *Cooperative Societies Act CAP.152* (COSO ACT CAP 152). The Registrar's Office supports and regulates cooperatives which are incorporated under the Coop Act. It does by advising on incorporation, training managers and key staff in corporate government by making sure they comply with the laws and by intervening when needed (ORCBDS Website, July 2016).

The Vanuatu Cooperative Federation (VCF) has deep roots in the country, having been at the fore of the independence movement where cooperatives were the primary means of spreading the message and ideals of independence. At its peak, VCF was a leading force for rural development, Ni-Vanuatu business development and savings mobilisation throughout Vanuatu. The cooperative movement suffered some decline due to absence of political will and loss of staff and managerial expertise. At core of the new VCF, is appointment of a new management team and support at the highest political level. Emphasis is being placed on employment creation in the rural areas. Office of the Registrar of Cooperative & Business Development Services (ORCBDS) provides: Accredited Business Trainings, General Business Advisory, Business Start-up (Individual & Cooperatives), Business Plans /Cash flows, Audits, Microfinance loans (Small Business loans & Cooperative Business Loans), Promoting Women in Business and Cooperative Movement.

As of 2015, there were 340 active cooperatives throughout Vanuatu, with a membership base of 14,265 providing employment for 404 persons of which 179 were female coop managers (ORCBDS Annual Report 2015, page 5). Coops are active in all segments of the Vanuatu economy, with retail and saving and loan (140 and 169 coop respectively) being the most important areas. There were only 19 producers and 5 fisheries for coop respectively in 2015 (ORCBDS Annual Report 2015, page 10). The majority of coop are concentrated in Sanma (104) and Malampa (99) provinces; while Tafea (15) and Torba (17) have the lowest number of active coops. The cooperative movement is in a very healthy financial position. It reported a profit of 64 MVT and paid dividends of 38 MVT to its members in 2015.

Box 3: VCF Key Results 2015

VCF is also involved in distribution of cattle to farmers and marketing support. The latter initiative is critical as it fills a void identified by the IFC Study. That is, VCF buys products from farmers at a guaranteed price, which gives them timely cash flow and removes marketing risks and uncertainty. VCF assumes the risks of product sale in Port Vila allowing farmers to focus on farming without having to travel to Port Vila to sell products, which disrupts farming activity when the farmers are away selling products. In addition, this middleman role can allow VCF to develop market intelligence to determine which products are in demand

- No of active coops – 340
- New coops – 5
- Audit coops – 165
- Annual Turnover – 636 MVT
- Profit – 70 MVT
- Dividend payment – 38 MVT
- Loans disbursed to members – 70 MVT
- Coop membership – 14,265
- Business training carried out – 36
- No of women entrepreneurs – 33

Source: ORCBDS Annual Report 2015

and or in over supply so farmers can adjust planting rotation to ensure supply matches demand and also it can play a role in improving the packaging and quality of products reaching the final consumers, thereby building confidence in the quality of local products. VCF is now enjoying revival

of sorts, and because of its extensive presence throughout Vanuatu (especially in the rural areas) it is in an ideal position to provide leadership in implementing the government agri-tourism thrust.

2.3. Appropriate technology

The team visited several local suppliers of a range of cold storage facilities including freezers, coolers and ice-making machines. Of interest were the widely used freezers and coolers which can be powered by batteries and charged by the sun. This type of equipment has been purchased and used widely in the education and medical sectors under donor funding with a five (5) year maintenance contract and centrally-located performance monitoring facility. The fisheries sector also uses similar equipment located in the outer island and coastal region. An increasing number of companies and individuals also have this equipment. During the visit, the team also visited companies that make fibreglass ice-boxes and those that import large esky/ice-boxes which are widely being used by shippers of frozen goods that would be ideal for the purpose of the project.



Figure 7 Solar powered deep freezer in Malekula

2.4. Overview of rural development and import substitution initiatives

As previously noted, over 75% of Vanuatu's population is dependent in some way on the agriculture sector, which contributes 28% to GDP. Given the potential benefits to the local farmers and economy by transfer of gains, the Government of Vanuatu is keen to improve linkages between the agriculture sector and tourism sector (IFC Study, 2015). The tourism sector is the main driver of many imported products, many of which can be grown locally. The government's effort centres on import substitution and local value addition and recognises the need to strengthen the domestic supply chain.

An agri-tourism initiative has been launched as a joint undertaking of the Ministries of Commerce and Trade and Tourism. In addition, a number of studies and donor supported projects are ongoing or are being contemplated. This section of the study presents salient information on agri-tourism initiatives and other studies as a context within which the shipping component of the KfW project will be implemented.



Figure 8 Coastal produce for the market

2.4.1. Agri-tourism Initiative

The agri-tourism thrust is the centrepiece of the government's effort to strengthen linkages between the tourism and agriculture sectors. This will also foster rural development and local value addition. This is based on an International Finance Corporation Study (IFC Study) which was undertaken during 2015 to analyse the purchasing patterns of Vanuatu's tourism sector, in order to better understand

existing linkages between the tourism and agricultural sectors, and to identify opportunities to improve these linkages. Some of the results of the IFC Study are shown in box 4 below.

Box 4: Key Results of IFC Study

In 2014, the tourism sector in Port Vila (hotels and restaurants) spent 1.5 billion Vatu (USD 15.6 million) on procurement of fresh produce items. Of this amount, 54%, or more than 800 million Vatu (USD 8.5 million), is spent on imported items. Specifically:-

1. Total demand for vegetables is 190 million Vatu (USD 2 million), of which 108 million Vatu (USD 1.1 million) is spent on imports;
2. Total demand for fruits is 155 million Vatu (USD 1.6 million), of which 60 million Vatu (USD 0.6 million) is spent on imports;
3. Total demand for meat and dairy is 1.1 billion Vatu (USD 11.7 million), of which 632 million Vatu (USD 6.7 million) is spent on imports;
4. Total seafood demand is 234 million Vatu (USD 2.5 million), of which 108.7 million Vatu (USD 1.2 million) is spent on imports;
5. Total demand for herbs is 19.9 million Vatu (USD 0.2 million), of which 3.6 million Vatu (USD 0.04 million) is spent on imports.

Source: IFC Study, 2015

This report showed that there are specific items within the import bill that can be produced locally but are either not being produced, or not being produced in sufficient quantities. A number of factors were identified as contributing to the limited absorption of domestic products by the tourism sector, including:

1. Lack of linkages between the buyers (hotels and restaurants) and the farmers via an aggregator or wholesaler, leading to a gap in information exchange and effective marketing of the produce;
2. Lack of modern infrastructure and farming tools and techniques, including irrigation;
3. Inefficiencies of inter-island shipping, with associated high costs and post production food mishandling;
4. Competition from lower quality and lower priced imports, especially from South East Asian countries (rice, canned food etc.);
5. Inadequate access to high-quality training and sources of affordable capital, limiting semi-subsistence farmers' ability to scale up, along with an absence of a mainstream farmers' association leaving farmers with insufficient bargaining power.

Importantly, the IFC Study showed import substitution potential in excess of 400 million Vatu (USD 4.2 million), or over 50% of fresh food imports by hotels and restaurants in Port Vila which can be prioritised for local production, as follows:

- Vegetables: potatoes, onions, carrots and capsicums;
- Fruits: tomatoes, oranges and cantaloupes;
- Seafood items: prawns and fish; Establish primary processing and suitable packing facilities in the islands;
- Meats: pork, lamb, bacon, beef and chicken.

Consistent with the results of the IFC Study, the government's agri-tourism initiative aims to improve handling and distribution of agricultural products through the supply chain, linking rural production

areas and urban consumption areas. It is planned that a network of sorting, grading, packing and warehouse (including cold storage) facilities would be established in urban centres (Luganville and Port Vila) to link producers in nearby provinces and islands. Quality assurance system would be enhanced and improvement to inter-islands shipping management and operations are ongoing under VISSP.

2.4.2 Other rural development initiatives

During the visit to Vanuatu, the team was made aware of a number of donor related initiatives which are being programmed to come on stream in the medium term, which should have some positive implications for the agri-tourism initiative. Summary information on these is presented below.

EU Rural Development Projects

Programming is about to commence on the Eleventh European Development Fund (EDF 11). Whilst the scope of this had not been determined, it is understood that the focus would be on rural development. This, therefore, presents an opportunity to challenge significant resources toward addressing challenges facing production and sustainable livelihood in rural parts of Vanuatu.

Australian Roads

The provision of good quality roads has implications for the effectiveness of the domestic supply chain. Due to underfunding, harsh physical environment and poor road maintenance, Vanuatu's road system has significantly deteriorated. It is in need of major investment and institutional reforms to improve future management and maintenance (AusAID, 2012). Some investment is taking place in the sector with major funding under the Australian aid program. This, however, is focused on the urban areas, and only in a few of the islands (Tanna and Malekula). Roads in the outer islands where most of the production takes place are in particularly poor condition. This affects the time it takes to transport products to the market and affects the quality of products when they reach its destination.

New Zealand Value chain

The study team was made aware of a project being funded by New Zealand Aid looking at value chains in rural areas of Vanuatu. It would be worthwhile to follow up on the results of this study once it becomes available.

It would be critical to follow up and build synergies with the aforementioned initiative and no doubt others which might be in the pipeline to avoid duplication and completion for use of limited resources and capacity.

Key issues and opportunities

Based on the review of the Agriculture Policy and observations made during the field visit in June/July 2016, the sector faces a number of challenges and threats due to the way it is organised, exogenous and natural factors. The sector has great opportunity to increase production from fostering linkages with the tourism and value added sectors. These issues are summarised in the SWOT Analysis matrix.

3 Matrix - SWOT Analysis

Strengths	Weakness
<ul style="list-style-type: none"> • Priority sector for government • Sector Policy in place • Agri-tourism thrust being championed • Active cooperative federation • Extension and research services in place and active throughout the country • Promotion of vegetable production and consumption 	<ul style="list-style-type: none"> • Prevalence of poor farming practices • Limited extension service • Lack of credit • Inadequate infrastructure • Poor product handling • Limited market access • Poor market organisation • Limited production data to inform policy and planning • Inadequate coordination between public and private sector and donors in the sector
Opportunities	Threats
<ul style="list-style-type: none"> • Significant import substitution demand (based on IFC Study) • Shipping subsidy program being implemented • Several infrastructure projects being implemented • High donor interest in the sector • Several NGOs active in the sector at small farmers' level • Solar/battery powered freezers and coolers widely used for some time and support available locally 	<ul style="list-style-type: none"> • Geographical disparity • High shipping cost • Supply chain inefficiencies • Uncertain land tenure/disputes • Unattractive sector for youths • Climate Change and Climate variability • Increasing pests and diseases prevalence



Figure 9 Meat & Fish shop in Malampa



Figure 10 Copra processing in Santo

Chapter 3 Domestic maritime sector overview

Administration

The maritime sector is a key enabling sector and plays a vital role in Vanuatu's economy; it supports inter-island travel for accessing markets, provision of health and education, tourism support and social integration. It follows that challenges in the sector have far ranging implications outside the sector.

Domestic shipping and maritime infrastructure development in Vanuatu is overseen by the Department of Ports and Marine (DPM) which is located within the Ministry of Infrastructure and Public Utilities (MIPU). Of interest to this study are MIPU's Corporate Plan 2014–2016 priorities for developing and maintaining shipping infrastructure to facilitate domestic and international trade; improving port operational efficiency and safety standards through regulatory measures; and lowering transportation costs, especially for rural populations. DPM is responsible for implementing the Ports and Shipping Acts, other maritime administrative matters including infrastructure planning and maintenance, and regulating the main ports at Port Vila and Luganville. The provincial governments manage and operate designated domestic ports.

The team is of the view that a more active oversight of the shipping sector by the administration would be extremely beneficial to enable it to effectively contribute to the socio-economic development of the nation. Similarly, observations of the available vessels indicate that with more focus on ship maintenance and in some cases training on ship management and operation would prolong the effective use of these costly assets and in return obtain a better return on investment.

Domestic ports infrastructure and operations

The Municipalities of Port Vila (Lapetasi wharf) and Luganville (Simonsen wharf) are the locations of the main inter-island shipping hubs for southern and northern/ central parts of Vanuatu respectively. Port Litzlitz on Malekula Islands is also a very important centrally located port. Physical infrastructure at Lapetasi, Simonsen and Litzlitz are far from adequate to support efficient and safe passenger and cargo handling operations. The infrastructure is poorly maintained. The ports also lack ancillary facilities such as passenger terminals and cargo storage sheds. At a number of ports, the Roll-on Roll-off ferry has to run the ships bow into the seabed in order to discharge and load cargo thus, damaging the hull plating and in turn can overtime weaken the supporting structure which can lead to failure and a disaster. These vessels place their ramps on the side of the causeway and since these areas are not designed to take that added weight, the causeway sustains some damage to its surface.

Improvements to domestic port infrastructure and facilities at these inter-islands shipping hubs is proposed under the VISSP, starting later this year (2016). In the interim, however, this study notes that domestic shipping conditions at Port Vila have deteriorated, with implication handling of cargo. Due to commencement of construction of the new international terminal, domestic ship operations have been relocated and now take place on a makeshift berth which is a restricted, unpaved open area at the end of a congested road beyond the cruise ship wharf. The area is rather shallow for deeper draft vessels and is congested with other local ships including yachts at anchor. Cargo

operations are manual, except in stances where ships have cranes or where private ship owners provide equipment such as forklifts. Additionally, domestic shipping operations on Port Vila are spread over several locations, which undermine safety inspections.

The wharf infrastructure on Santo, including Simonsen wharf, seems like a patchwork of several smaller wharves owned by the public and private sector along the east coast road. The road is paved but the wharves appear to be used for a variety of purposes including inter-island shipping for copra and cacao and the export of general cargo (food stuff, building supplies, fuel, etc.) to isolated communities on the southeast-east coast of Espiritu Santo and smaller islands in neighbouring provinces (Malampa, Penama and Torba) and to a limited extent, Port Villa. The general state of repairs of these wharves appears goods and some owner-operated warehouses with adequate loading and storage equipment are essential to meet the needs of their customers. The main Simonsen wharf construction has been delayed to technical design issues.



Figure 11 Vessel loading and unloading at private wharf on Santo

Infrastructure at other locations consists of a mixture of jetties (at varying states of repair) and coastal anchorages and landings, where wharves and jetties are unavailable. It is notable that jetties at Ambae, Pentecost, Tanna and Malekula (Litzlitz and Port Sandwich) are scheduled for repair or replacement as part of the VISSP project, starting during this year and should be completed by the end of 2017 (see table 2 below). The facilities are expected to yield significant benefits including increased efficiency, lower land transport costs, speed and convenience of loading and unloading of cargo, improved safety, economic development etc.

4 Summary of projects under VISSP

Project Name	Location (Province/ Island)	Intervention
Port Vila Domestic wharf	Shefa/Efate	New wharf construction
Simonsen wharf	Sanma/Santo	Construction (existing wharf)
Loltong jetty	Penama/Pentecost	Construction (existing wharf)
Port Sandwich jetty	Malampa/Malekula	Construction (existing wharf)
Lolowai jetty	Penama/Ambae	Construction (existing wharf)
Lenakel wharf	Tafea/Tanna	Repairs (existing wharf)
Litzlitz wharf	Malampa/Malekula	Repairs (existing wharf)

Source: Vanuatu Project Management Unit

Beyond the scope of VISSP, there is need for several more jetties/bays in the outer islands that are adequately located to better shelter them from swells during adverse weather conditions and in the event of a cyclone. The study notes that a number of donors are considering other projects on other remote islands.

Domestic shipping organisation

The private sector plays a lead role in domestic shipping. There are about 24 registered domestic vessels of various size and purpose including the carriage of passengers and cargo, marine tourism, diving, etc. Service for cargo and passengers is frequent and reliable on routes which are closer to markets on Port Vila and Luganville, as they are profitable. However, service is limited to more remote provinces (Torba and Tafea). Shipping on these routes is not commercially viable due to long distances and low volume of cargo and passenger numbers. Due to profitability issues, there is concentration of ships operating on the more lucrative routes. Conversely, uneconomical routes remain largely underserved. This is the context for subsidy support on uneconomical routes included in the VISSP.

Table 5 below shows the approximate distances and steaming times between main ports, based on the average speed of vessels plying these routes.

5 Approximate distances & steaming times between main ports

Approximate Distances & steaming times (assumed speed 8-9 knots)	Port Vila to:	Distance (nm)	S/Time (hrs)	Santo to:	Distance (nm)	S/Time (hrs)
	Santo	150	18	Malekula	55	8
	Epi	85	10	Epi	95	11
	Malekula	100	12	Ambrym	70	8
	Erromango	80	10	Pentecost	60	7
	Tanna	125	14	Aoba	42	5
	Futuna	150	17	Maewo	60	7
	Aneityum	170	19	Vanua Lava	110	13

Source: SPC 2016

Ship subsidy program

Under the subsidy program, service provision on uneconomical routes has been tendered to shipping companies for the period of one (1) year. As part of the competitive tender process, shipping companies provide information on the cost (per voyage) it would take to serve a particular route, according to a set schedule, and demonstrate profitability requirements. Once a tender is accepted, they are required to keep records of revenue and costs to verify loss. A subsidy is paid, on acceptance of the records by staff of the Shipping Support Unit, MIPU, to make up between revenue and costs (the loss).

It is expected that the subsidy program would lead to a 'virtuous cycle' of reliable shipping service giving farmers or traders confidence to boost production (demand) which would increase profitability of routes, thereby lessening the need for subsidies. Awarding of service contract for one year allows flexibility: as routes show profitability, it will be easier to lower or ultimately end subsidies; and if there are challenges operating a route, changes to the schedule can be introduced without disrupting the service.

Several criteria, including: passenger and cargo demand, nature of cargo to be carried, duration of voyages, and ports of call and their accessibility, capacity of available vessels, etc. are used to determine subsidy routes. The table below illustrates the routes awarded under the VISSP during July-September 2015, Quarterly Progress Report.

6 VISSP Shipping Route, 3rd Quarter 2015

Routes	Date awarded	Region/areas served	Products	Comments
SSS2 (Tafea)	August 2014	Monthly, connects Aneityum, Futuna & Aniwa to Port Vila/ Tanna	Vegetables	SSS2 reorganised in 2015 to form SSS2A and SSS2B to reduce voyage time and perishability of products; and improve route logistics
SSS2A	September 2015	Tafea East	Timber, Fish	
SSS2B	September 2015	Tafea West	Timber, Fish	
SSS1 (Torres)	December 2014	Monthly, connecting Torres Islands via 3 Banks Islands to east coast Espiritu Santo (Luganville)	live coconut crabs	These split from original Torba contract to lessen travel times and reduce perishability of produce due to small vessel size
SSS3	May 2015	Monthly service between 16 call point in Banks Islands and Luganville	copra	
SSS4	August 2015	Monthly, connecting west coast of Espiritu Santo to Luganville	copra	

Source: VISSP, Quarterly Progress Report July – September 2015

Indeed, since the subsidy program was introduced, it was reported that subsidy payment on some routes were reduced due to increased demand. Furthermore, as shown in table 4, several new routes have been created from original routes to improve service effectiveness.

It is too early to determine the impact of the VISSP, but information from interviews with officials and especially community residents conducted during the visit suggest it is being viewed as a positive initiative and is already improving reliability of domestic shipping. A reliable shipping service will auger well for the agri-tourism project and will in turn become a catalyst for other development initiatives in the island communities that together with support a more viable shipping service. Given the reported improvements resulting from the subsidy program coupled with other suggested improvements, will add to the long term sustainability of domestic shipping in Vanuatu. Some suggested actions that can be taken to improve sustainability of shipping in Vanuatu are in the appendix.

Domestic ship safety

Regulatory ship inspections for safety and ship loading are carried out by the Department of Ports and Marine mainly in Port Vila and Luganville. Inspections in remote outer islands are virtually non-existent due to staff limitations. Due to reportedly low profit margins, the majority of ships lack maintenance which heightens safety concerns resulting in generally non-compliance with industry standards. On the other hand, the team observed that a small number of well managed and operated shipping companies have entered the market and are servicing the main routes with promises of new tonnage to provide specialised service to the mainly larger commercial production areas. The resultant effect will be an even faster erosion of the current market size. Similarly, some smaller operators have plans to bring in more ships which will have to share the less profitable routes and exacerbate the current situation. Some appropriate and effective regulatory measures would need to be implemented to address this unfortunate situation deteriorating further which will inevitably impact the fledging agri-tourism initiative.

Vanuatu participated in the Pacific Islands Domestic Ship Safety Program as of June 2015, which since 2013, has assisted three ships in Port Vila with developing safe operational plans (SOPs). The shipping component of the SPC project offers an opportunity to deepen the PIDSS program.

Summary of ship inspections

Impact of maritime sector challenges from domestic production, link back to IFC and other reports and our observations reveal that whilst the views expressed in these reports of poor conditions may be true for the majority of vessels, there are some good examples. This variance is evident on both the supposedly profitable and non-profitable routes.

Observation carried out on ships that were in port revealed that most if not all had a fair range of electronic navigational and communication equipment sufficient for the trade, including a magnetic compass. Whilst some had equipment taken ashore for repairs, some have been under repair for some time. In one case, a ship had satellite-based navigational equipment on board but no nautical chart of the area to make reference to it and thus assist ship personnel safely navigate the vessel. It was reported that this ship had sustained several damages due to groundings in the area. Despite the modern tendency to rely heavily on Electronic Navigational Aids (ENA), the magnetic compass remains an essential navigation instrument on any sea going vessel, and continues to operate independently, in the not uncommon event of an electrical failure or electronics malfunction. Over reliance on electronic navigation aids can lead to trouble. A current deviation card or certificate of adjustment is a legal requirement on all sea going vessels where the deviation must not exceed 5 degrees on any heading. The Team sighted numerous deviation cards showing as high as 17 degrees on east and west headings indicating that only a compass swing was made but no correction to reduce the deviation to zero or no more than five (5) degrees on any heading.

Information received from ship staff indicated that some ships had uninterrupted power supply throughout the voyage, whilst some did not as it depended on several factors. The power source on-board included the ship's main generators, small portable generators, cruising generators running off the main engine and batteries powered by solar panels.

It was noted that larger ships with uninterrupted power supply tended to have good freezing and cooler facilities. Others reportedly only used their domestic freezers when there was sufficient frozen cargo to ship. Two ships visited were commended for cleaning and drying out freezers to reduce bacteria build-up whilst awaiting new frozen goods to arrive. Several did not have refrigeration capacity and even the crew were fed tinned and dried food for the voyage. Some coastal boats visited were too small to have space for cold storage and if they did, it would affect the ship stability and crew/passenger access thus, carried mostly dry cargo.

Nexus between domestic infrastructure and shipping and import substitution prospects

Major inter-island port infrastructure is concentrated in the most populated areas in the provinces (Port Vila and Luganville). Domestic shipping is designed to link remote islands and production area to shipping hubs at the major population centres (Port Vila and Luganville). This nexus between infrastructure provision and domestic shipping provides a context within which improvements to improve the supply chain to reduce perishability of local produce and location of processing and other value additions initiative can be located.



Figure 12 Small feeder service to islands near Malekula



Figure 13 Passengers & shippers bringing cargo for Port Vila



Figure 14 Cargo for islands en route Port Vila - Luganville

Chapter 4 Profile of production areas and shipping service

In this section of the study, we look at organisation of agriculture production and shipping arrangements in Vanuatu's provinces, to see how these will affect the demand of shipping and organisation of cold storage to reduce post-harvest loss and damages. Information on farming condition, community information and other support services are presented within the context. In this section, we also look at ongoing plans and projects to increase agriculture, fisheries production and other production (e.g. handicraft production) at the provincial level as this will affect future demand for shipping and cold storage. The analysis is presented according to provinces and main islands. Summary information on six (6) provinces is captured in table 7.

7 Summary of population and land area of Vanuatu provinces

Province	Capital	Main Islands	Land area (km ²)	Population
Malampa	Lakatoro	Ambrym, Malekula, Paama	2,779	36,727
Penama	Longana	Pentecost Island, Ambae, Maéwo	1,198	30,819
Sanma	Luganville	Santo, Malo	4,248	45,855
Shefa	Port Vila	Efate, Shepherd Islands	1,455	78,723
Tafea	Isangel	Tanna, Aniwa, Futuna, Erromango, Anatom	1,628	32,540
Torba	Sola	Banks and Torres Islands	882	9,359

Source: Wikipedia

4.1 Malampa province

Location and demographics

Malampa province is located in the center of Vanuatu and consists of three main islands: Malekula, Ambrym and Paama, where approximately 90% of the province's population reside. The provincial capital, Lakatoro, on Malekula, is home to about 60% of the population. Malampa province also includes a number of small islands: Uripiv, Norsup, Rano, Wala, Atchin, Vao and Lopevi. The population on these smaller islands is generally below 1,000.

Infrastructure and services

The topography of the province is mostly mountainous, which has implications for the location of infrastructure in the province. Infrastructure is mostly concentrated in Lakatoro which is the main



Figure 15 South-east coast road Lakatoro, Malekula

commercial centre for the province. Lakatoro has a network of several unpaved roads, connecting government offices and other commercial buildings. The main (primary) road is located along the north-east coasts. It is also unpaved. There is also a major secondary road which cuts across the interior of the island, from Lakatoro to Port Lambubu in the south-west. This is also an unpaved road which takes about 45 minutes to complete. Fishermen

interviewed during the visit to the Island reported that it costs about 45,000 VT (USD 450) to transport a truck load of products from Lambubu to Lakatoro. The roads on Malekula generally need upgrading due to lack of preventative maintenance. The conditions of roads have negative implication for post-harvest transport of agriculture products to markets, which undermine efficiency of the supply chain. The roads are also subject to erosion during the rainy season, which can disrupt productive activity. It is noted that major road improvement works (in the township areas) are being undertaken with funding from China and due to be completed within a year's time.

Several airports are located throughout the province (Norsup, Lamap and Southwest Bay) and there is very frequent air transport service to Port Vila and Santo. The airport at Norsup is paved, the other are grass strips. Lakatoro has twenty-four hour electricity and fairly reliable internet service. The provincial hospital is located at Norsup, which also has twenty-four hour electricity and internet service. Towns and Villages are located along the coastal roads. School and clinics are also located in several of the villages.



Figure 16 Norsup Airport, Malekula

The main wharf for the province is located at Litzlitz, which is about 20 minutes to the east of Lakatoro. The wharf is in a good state with no signs of erosion and is protected by large boulders. The jetty head is 'T' shaped facilitating the manoeuvring of vehicles during cargo operation and is situated at the end of a long causeway. Since there is no landing ramp, the ro-ro ferry puts its bow ramp on the side of the causeway close to the jetty head. The wharf is sheltered by nearby mangroves. It does not have electricity or

water supply and there are no passenger terminals or storage sheds. A number of derelict vessels have sunk in the vicinity of the wharf rendering one end inoperable. All port operations are manual. The wharf face is capable of loading and offloading at least two inter-island vessels simultaneously. A number of smaller landings are located along the coast of Malekula but have no other facilities. Additionally, a number of privately owned jetties are also located along the coast and are used for transport of copra to Santo.

Economic setting



Figure 17 Market vendors Lakatoro market

The main economic activity in Malampa is farming. The farming sector is fairly stratified, consisting of well-organised major cocoa, cattle and beef farmers, alongside many small farmers who constitute the majority of farmers. The mountainous topography of Malekula limits the amount of cultivatable land. Extensive copra plantations are located on the eastern coastal plains around Norsup and Lakatoro and have good access to roads. Small farmers grow a variety of products such as: kava yam, taro, sweet potato, sugarcane, island cabbage, celery, citrus

and papaya. However, kava production is for own-consumption or sale at the local market in Lakatoro or for sale at street side stalls. Small livestock are reared by most households. Land is owned by the community and permission needs to be obtained for farming. Farming is labour intensive, using basic tools, and is dependent on rainfall. Small farmers however, farm in elevated locations and have difficulty accessing roads. Farmers at the market reported paying up to 2000 VT to transport products to the central market in Lakatoro from small farmers in the north-east of Malekula. This added to high cost of production and also post-harvest product deterioration and lost. The small farming sector employs 80% of the population as there is very little formal employment except for a few government workers. It was suggested that farming should be shared equally between males and females, with the latter doing most of the selling at the local market.

Fishing is centered mainly in the South-western section of the island. Fisherman consulted during the field visit indicated that while production cost is high due to high transport cost, it is still a very profitable sector. For instance, fisherman from South-West Bay reported costs of 45,000 VT for ice and ground transport to market on Lakatoro; but can easily cover these costs as fish sells for 300 VT per kilogram or 35 VT per fish (and they typically sell 4,000 fish per voyage).

Farmers also have limited access to extension service. Farmers have no cold storage facilities. A butchery/fish market is located adjacent to the central farmers market in Lakatoro. The butchery/fish market was constructed with Japanese Aid in 2008 and is very functional and sanitary and efficiently operated. The butchery has twenty-four hour electricity. It has chip-ice marking machines, blast freezer and standard freezers which do not need special power supply. It was reported that 4-5 cattle are slaughtered per week to meet local consumption demand, although some are sent to Santo. Pigs and goats are also slaughtered at the facility. A tariff is published at the butchery and fishing gear and other suppliers (including ice) are also available for sale to fishermen.



Figure 18 Lakatoro Fish & Meat market

The basic pattern of agriculture production in Malampa has remained the same over the years. However, declining prospects of copra along with the increasing export potential for kava can usher in structural change to the pattern of production. This could result in more value added copra production to produce virgin coconut oil or biodiesel; while marketing of 'noble' kava varieties can be a game changer for the sector resulting in increased production and income for farmers.

Domestic shipping

Several domestic vessels serve Litzlitz from Luganville, on Santo, which is the main inter-island shipping hub for the province. The weekly service is reliable and profitable. The main items exported to Santo include kava, cocoa, peanuts, beef and copra. Some copra is also shipped directly from Litzlitz to the Philippines. During the field visit, the team was able to observe several domestic vessels being

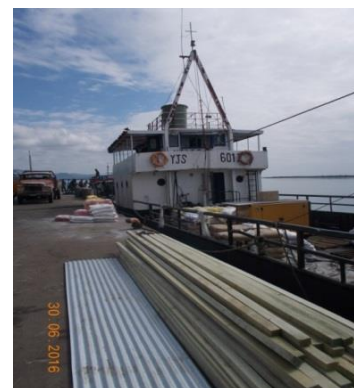


Figure 19 Ship loading & unloading at Litzlitz

offloaded at Litzlitz (*MV Martza* and *MV Lara Star*). These vessels carry passengers and cargo (mostly copra, cocoa and kava) between the islands in Malampa province and Santo. Passengers pay about 2000 VT for the trip. It costs about 200 VT to transport a package (50 kg package). The main items imported included: fuel in 55 gallon drums, building materials, flour, rice, sugar, cooking oil, a variety of biscuits from Fiji, cements, tyre and milk and other household cleaning items. Service to Port Vila is less frequent from Malekula: *MV Urata*, *MV Big Sista*, and *MV Lara Star* provide monthly service from South-West Bay to Port Vila. Fish and kava are the main items exported to Port Vila using this service and a variety of food stuff, fuel and household items are imported from Port Vila. Larger vessels also make calls at key ports along the coast and larger islands in the province whilst smaller feeder vessels transport cargo from Litzlitz to nearby small islands.

Table 8 below shows information on domestic production, main import and exports from Malampa province.

8 Summary of agriculture production, imports & shipping in Malampa province

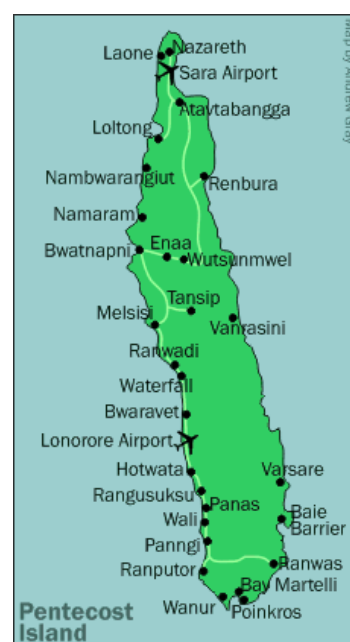
Island	Main Products	Production/ exports	Imports	shipping
Malekula	Kava, Yams , Citrus, Papaya, Copra, Cocoa, Island Cabbage Fish – deep-bottom, reef, pelagic, freshwater prawn Small livestock	Production take places in small holdings across the island Limited handicraft production for sale on Santo and Vila Fishing in South-West Bay	food, fuel, water, beer, building materials	economic route served by several vessels main market: Santo Limited shipping to Port Vila Tariff: 2000 VT per passengers; 200 VT for 50 kg package
Ambrym	Copra, Wild Yam, Yam Fish – deep bottom Small livestock	Subsistence product take places in small holdings across the island	food, fuel, building materials, beer, water	Regular shipping service, at least weekly to Luganville
Paama	Fish - deep-bottom, reef, pelagic Small livestock	Subsistence product take places in small holdings across the island	food, fuel, building materials, beer, water	Regular shipping service, at least weekly to Luganville

Source: Ministry of Agriculture, supplemented by field interviews

4.2 Penama province

Location and demographics

Penama province is located in the northeast of Vanuatu and consists of three major islands: Ambae, Maewo and Pentecost. Pentecost with a population of about 16,800 is the most populated island in the province. Longana, on the island of Pentecost, is the provincial capital. Most regular employment is in the public sector, as teachers and in public works. Otherwise, most people engage in subsistence farming to earn their livelihood. Remittances from employed relatives in the towns of Santo or Port Vila also contribute cash to the local economy. Tourism is also a very important economic activity in the province.



Infrastructure and services

Pentecost Island is a lush, mountainous island which stretches north to south over some 60 kilometres. It has an area of 490 km² with dense vegetation at the centre of the islands. The coastline is exposed on their eastern coasts. Because of this, most small towns and villages are located in the west coastal areas, with few villages elsewhere. Major infrastructure is also concentrated along the west coasts. There are good road networks in the west coastal areas, which are in varying states of repair due to limited preventative maintenance. Roads are also subject to erosion during the rainy season, which disrupts farming and other commercial activity. Generally, most villages are accessible only by steep mountain footpaths, which increases the cost of transportation of agricultural products.

Pentecost Island's domestic airport is located at Lonorore and is approximately 190 km from Port Vila. Pentecost Island has two airports: a paved one at Lonorore in the south-west and another at Arongbwaratu in the far north. Airport infrastructure is basic, but the strip at Lonorore is paved and is capable of receiving aircraft during poor weather conditions. Air Vanuatu offers 2-3 flights per week, connecting Pentecost to Port Vila and Luganville, which also includes a stop on Ambae. Weekly air service supports the embryonic tourism sector on the island, which is famous for land diving. The topography on Ambae and Maewo is similar to that on Pentecost and the settlement patterns and infrastructure development are also concentrated on the west coasts of these islands. Ambae has an airport and receives limited air service each week. Maewo has one airstrip and receives two flights per week from Santo via Ambae. Electricity coverage is limited in the Province. Schools and health facilities have limited supply and are located along the west coastal road. Telecommunication service is limited outside of Pentecost. Roads on the province are generally unpaved and undergo periodic up-keep as part of the community based contracting road program.

The main wharf for the province is also located in Loltong on the north-west Coast of Pentecost Island. It consists mainly of a jetty. It does not have electricity and water supply. Passenger and storage sheds are also not provided. According to anecdotal information, the wharf channel needs dredging and access by larger vessels is a challenge during low tide when the depth becomes only about 3.5 metres. A number of government buildings and villages are located in close proximity to Loltong

Box 5: Penama Province commodity trade analysis

Exports:

- Kava to Luganville and Port Vila
- Taro to Luganville and Port Vila
- Beef to Luganville
- Copra to Luganville
- Fish – deep-bottom, reef, pelagic
- Small livestock (from Ambae)
- Coconut crab (from Maéwo)

Imports:

- Fuel
- Food items
- Household items
- Rice, flour, sugar
- Building materials
- Cement
- Corrugated Zinc



Figure 20 Land diving, (Internet photo)

jetty. A number of coastal anchorages and villages are located along the coast at Laone, Abwatuntora and Nambwarangiut. The jetty for Ambae is located at Lolowai Bay and is in need of dredging as well. Both the Loltong Wharf and the Lolowai Bay jetty have been earmarked for improvements under the VISSP.

Domestic shipping

Given the location of Penama province to Sanma province, Luganville has emerged as the main inter-island trans-shipment hub for the province. Most domestic vessels travel between the west coast of the island to Luganville, although few ships visit the east coast, where sea conditions are rough and the population is sparse. Service is reported to be very reliable with a few vessels sailing each week. Vessels carry passengers and cargo and some have limited cold storage for transporting of fish. It was difficult to obtain information on freight rates and the volume of imports and exports however, information on major exports and imports from Penama province is presented in Box 3. Most vessels call at Loltong and also at anchorages along the west coast. Service is also provided by smaller vessels between Loltong and smaller villages along the coast. Service to the neighbouring islands of Ambae and Maewo is provided as part of the voyages from Luganville, with the return voyage taking about two weeks. Service to Port Vila is less frequent and consists mainly of Kava exports. There is very limited service between Penama province and Malampa province. The introduction of such a service between Pentecost and Malekula is being considered under the VISSP (VISSP Quarterly Report, September 2015).

Economic setting

Penama province is described as a mecca for eco-tourism due to its rugged topography and many natural attractions such as waterfalls and volcanic perks. Pentecost Island also receives regular visits from yachts, which anchor at the villages of Loltong, Waterfall and Panngi. Panngi also has a jetty capable of receiving cruise ships, which make occasional visits during the land-diving season. There are no large resorts on the island and tourists reside in bungalow-styled accommodations.



Figure 21 Farmers demonstration training (Internet photo)

Agriculture is the main economic sector in the province. The main cash crops marketed are kava, cocoa and taro which are suited to the wet climate in the province. Penama Province, specifically Pentecost Island, is considered to produce green and dried kava of the highest quality in Vanuatu. A large proportion of the kava exported to Vila, Santo and beyond is grown here in northern Pentecost. Copra is still a very important traded commodity for the province and the south-west of Pentecost is dominated by strips of old coconut plantations. A wide range of vegetables and fruits including cassava, yams, sweet potato, island cabbage, papaya, citrus, mangoes and pineapples are grown for local consumption. Cattle are reared on Pentecost for export to the meat-processing factory at Luganville and are increasingly slaughtered at the local abattoir for local consumption. Most households rear small livestock, particularly, pigs (which are a traditional item of value during marriage ceremonies or as compensation for transgression).

DARD's has a few extension officers based in the province who operate with support from the northern division office on Santo. A number of efforts are being made to improve prospects for commercial agriculture production. To support the main cash crops, coconut and cocoa nurseries have been established and seedlings distributed to farmers. Additionally, training programs have been extended to farmers to improve farming practices. New varieties of climate and drought resistant sweet potatoes,



Figure 22 Shipping cattle, courtesy Vanuatu Daily Post

cassava and peanuts are being trialed with the assistance of the VARC (DARD Annual Report 2015). A major emphasis is being placed on vegetable production for home consumption, to improve diets, and for sale at the local market. According to DARA, other efforts to increase vegetable production in the Penama province included: facilitation and distribution of vegetable seeds to farmers, and establishment of vegetable plots in schools and farmers plots around Ambae. The intention for growing vegetables in schools was to assist them financially and in farms for food security purposes and surplus sold to the market. Efforts are also being made to re-stock livestock on the province and this year the Department of Livestock commenced the shipment of cattle to the province.

Fishing is also a very important primary production activity on the small islands in the province.

4.3. Sanma province

Location and demographics

Sanma is a province located in the Northern part of the nation of Vanuatu. It consists of Espiritu Santo, the largest island in the country and the islands of Ases, Aoro, Araki, Bokissa, Malo, Malakilikili, Marae, Tangoa, Tutuba and Urelapo. Sanma has a population of 45,860. Most of the population (about 40,000 or 90%) reside on Espiritu Santo. With the exception of Malo, less than 1,000 people reside on the other islands – in fact, some islands (Ases and Urelapo) are uninhabited. The capital of the province is Luganville, which is also located on Espiritu Santo. It is the second largest town in Vanuatu. Luganville has a population of about 13,000. Other population centers in the province include Champagne Beach Hog Harbour, Port Olry and Aseviah. Tourism, agriculture and the public sector provide good employment opportunities for most people. Many people from the provincial islands have moved to Luganville to work.

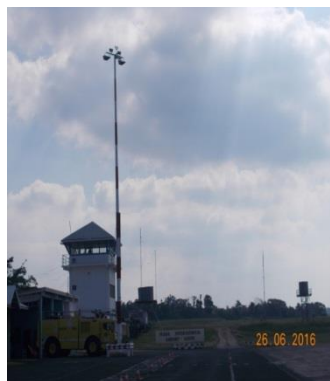


Figure 23 Control Tower & fire service, Santo Airport

Infrastructure

The majority of the infrastructure is concentrated on Espiritu Santo. Luganville has good paved road network on the east/central coastal areas connecting the airport to the port and market and municipal buildings, extending into residential areas and tourism zones. Most

commercial buildings are located along the main road. Luganville has good (unpaved) road connections along the south coast to rural parts of Espiritu Santo, where several small villages are located. The hospital for the northern district of the country is located on Espiritu Santo. The island has twenty-four hour electricity service and good broadband internet access in the main township area. Rural and high land areas in the centre, south and western sections of the country do not have paved roads and access to electricity. There is increasing penetration of renewable energy in these areas.

The Terminal was recently constructed (circa, 2008) and has a control tower, fire service, and good weather and aircraft communications systems. It is capable of operation on a 24-hour basis and receives international flights from as far as Brisbane, Australia. There is good air transport access between the province and rest of Vanuatu, with Santo-Pekoa International Airport emerging as a hub for air transport between Port Vila and the northern parts of the country.

Port of Luganville serves as an important trans-shipment point for most of Vanuatu's exports: copra, cocoa, beef and kava. It is also used by visiting cruise ships. However, the port infrastructure: access roads, lighting, wharves and storage sheds have been allowed to deteriorate over the years. They are currently being upgraded with a USD 93.4 million soft loan from China (SPC, 2015). Simonsen Wharf located at Port of Luganville is a domestic hub for the northern and central islands. This wharf is to be upgraded as part of the VISSP and should include passenger and cargo storage facilities. It is noted that work on the upgrading project has been delayed due to design issues, but it should be completed by the end of 2017.



Figure 24 Unloading copra & loading food items at CSA wharf

A number of privately owned wharfs and warehouses are located along the east/central coast road. They are owned by shipping companies such as CSA Shipping and Brisk Shipping. These private owned facilities are mostly involved in the transport of copra and trading of fuel, food stuff and building materials with nearby provinces (Malampa and Penama). They appear to be very efficient and profitable operations. Infrastructure owned by these companies has generally a good state of repair and up-keep. In addition, a number of provincial owned wharves are located along the east/coastal area and are used by smaller private vessels such as *MV Lara Star* and *MV Urata*. The condition of infrastructure at these wharves is also quite good. The general impression, however, is that shipping along the east/central coast is unregulated, which could pose concerns for passenger safety. Several anchorage and jetties are located around the east coast of Espiritu Santo and receive visiting yachts and domestic ships under the VISSP. Shipping between Santo and neighbouring islands is responsive to demand as the case study on Brisk Shipping company shows.

Domestic Shipping

Luganville has evolved into the domestic shipping hub for the northern and central islands of Vanuatu. Profitable and



Figure 25 Operations at provincial wharf

uneconomic shipping (support by VISSP) service to connect the northern and central provinces with Luganville and Port Vila (via Luganville). About 6 shipping companies provide service between Luganville and neighbouring provinces. Summary information on the service provided is shown in Table 9.

Box 6: The Case of Brisk Shipping Co

Brisk Shipping Co. operates two landing craft type vessels on a profitable basis. The company provides schedule services between Luganville and Port Vila along the east coast of Espiritu Santo. A second vessel services islands in nearby provinces (Ambae, Pentecost and Ambrym). The vessel sailing to Port Vila departs every Tuesday afternoon and arrives in Port Vila on Friday mornings. The vessels usually leave Luganville with a variety of food items (rice, sugar, flour) and building material. Over twenty stops are made at jetties and anchorage based on cell phone calls or smoke signals to drop off cargo and pick up agricultural produce (taro, kava, cassava, fruits and small animals) for transport to Port Vila. The company has capability to transport refrigerated cargo such as fish. In this way, shops and households in remote locations are outfitted with supplies and agricultural products that reach markets in a less perishable state. On the return voyage, coffee and other products from the south of the country are dropped along the way to Luganville. Service is based on cash payments. The company operate warehouses in both Luganville and Port Vila to ensure safe handling and security of cargo.

9 Shipping between Santo & nearby provinces (and Port Vila)

Vessel/Company	Islands/Province served	Exported to Santo	Imported from Santo	Frequency	Comment
CSA Shipping Co	Banks Islands, Ambae, Ambrym	Copra limited fish, lobster and coconut crabs from Banks Islands	General food items, building materials, fuel, water, beer, milk, eggs	Weekly to Ambae & Ambrym 2 trips to Banks per month	Not part of VISSP No fish market on Santo
MV Lara Star	Malampa/ East Coast Santo	copra, kava, cocoa	General items, fuel	Weekly	
MW Marata	Malekula	Copra	General items, fuel	Weekly	Freight: VT350 per 50 Kg
MV Big Sista,	South West Bay, Malekula	Fish and Kava Vila, via Santo	General items, fuel	Monthly	
MV Brisk	Pentecost, Mavea, Ambae	Beef, Copra, Taro (to Vila)	General items, fuel	Weekly	
Vanuatu Ferry	Malekula, Port Vila	Kava, Beef, General cargo	To Port Vila: Kava, vegetable, yam, papaya, taro, beef	Weekly	Freight: VT 500 per 50 kg Reefer capacity
LCM Shipping	Torres Islands via 3 Banks Islands to east coast Espiritu Santo (Luganville)	live coconut crabs	General items, fuel	Monthly	VISSP (SSS1, Torres route)
LCM Shipping	16 call point in Banks Islands and Luganville	Copra	General items, fuel	Monthly	VISSP (SSS3 Bank route)
C-Corp Vanuatu	West Coast of Espiritu Santo to Luganville	Fish, vegetable, kava, fruits	General items, fuel	Monthly	VISSP (SSS4, Santo route)

Source: VISSP 2015 Quarterly Report, Interviews and port observations

Service quality and reliability vary between shipping companies. In some instances, the ships provide a lifeline to the community, since there is a limit to the amount of air freight which is possible and



Figure 27 Cargo storage bin and crate on Vanuatu ferry

costs are higher. One potential game changer in domestic shipping in Vanuatu has been the introduction of a roll-on roll-off cargo and passenger service by Vanuatu Ferry. This company seems to be well capitalised and currently operates a fairly well maintained vehicular vessel, with reefer capacity to transport beef as well as containers and tanks to transport bio-diesel. The service is fairly mechanised and segregation and storage bins are used to improve cargo handling, security and reduce damage to cargo. Service is not subsidised, charges higher fares and freight rates, is reliable, efficient and its schedules are published by SMS message to improve ship turnaround time. Whilst freight charges are slightly higher than other vessels, clients interviewed during the field visit indicated they have no problem paying the higher freight rates since their cargo arrives faster, the service is regular, safe and loss is minimal. If other shipping companies can improve service delivery to better compete with Vanuatu Ferry, as opposed to nationalistic posturing, this should result in improved customer satisfaction all around and a profitable service will result.



Figure 26 Cattle under coconut, Santo

Economic setting

Tourism and agriculture are the main economic sectors in Sanma province. The province has many tourism attractions for divers/long stay and cruise passengers; many wrecks, reefs, caves, blue holes and pink sand beach at Champagne Beach. The agriculture sector is divided between growing cash crops for export and subsistence farming. The main cash crops are farming, mostly copra, coconuts and kava. Santo is home to a number of cattle farms and exports beef to Japan, Australia and other Pacific Island countries (most notably Papua New Guinea).

Cash crop farming is much organised and is the dominant activity in the central low-land area leading from Luganville towards Shark Bay where the roads are paved and in a very good state of repair. In some instances, cattle are reared under coconuts to improve the food share for the animals as well as replenish soil nutrients. With the decline in world copra prices and the aging of coconut trees, this

sector is being challenged with finding alternative uses for copra. This could include planting dwarf varieties and introduction of value added products such as virgin coconut oil and coconut timber.

The subsistence sector is divided between farming and fishing. The team was also told that anything can grow on Santo, without the application of chemical fertilizers and introduction of irrigation systems. Accordingly, householders in all locations of the province are involved in subsistence farming and are mostly self-sufficient with their own vegetable gardens, chickens and pigs and are also involved in fishing. A summary of main products grown on Santo according to production region is presented in Box 7. Subsistence farms on Santo are located at high elevations in the center and south, west and eastern parts of the islands, where feeder roads, electricity and other support systems are absent. This adds to high costs of production and sale of final product as well as post-harvest crop deterioration and loss. The team was advised, for instance, that it costs about VT 45,000 to transport a truck load of farm production from the West coast (Big Bay) to the central market at Luganville (via road and small boats). Given that farmers grow the same products, a fair amount of exports to Port Vila takes place. Root crops (taro, yam), island cabbage, pineapple, and mangoes are cultivated and sold at the local market or sent to Port Vila.

Box 7: Agricultural production according to location on Santo

West: cocoa, copra, water taro, kava, vegetables, mango, citrus, papaya

South: water taro, cocoa, taro, vegetables, sweet potato, yams

Central: root crops, vegetable, peanuts, citrus, kava, papaya

North: (Big Bay): livestock, cocoa, kava, copra, peanuts

East: copra

Source: Interviews with Provincial Agricultural Office



Figure 28 Vegetable demonstration plot at Provincial Agriculture Station, Santo

A number of agriculture support institutions, which have nationwide impact, are located on Santo. These include the national agriculture college and VARC. The agriculture college offers training programs for extension officers as well as training for farmers in conjunction with DARD. VARC undertakes a number of research programs on disease and climate resistant crop varieties to improve market competitiveness and food security. It also produces seedlings for sale to farmers and undertake research on improve farming methods which can be disseminated by the DARD through the college or training programs for farmers. DARD's office for the northern district of Vanuatu is located in Santo and undertakes a number of farmer development programs for farmers in Sanma and other northern provinces (Penama, Malampa and Torba). The provincial agriculture

office is placing particular emphasis on vegetable production to improve diets and for security purposes. According to DARD's 2015 Annual Report, the following results were achieved during the year:

1. Established 19 plots of backyards home gardening growing vegetable.
2. Established 11 home gardening nurseries to support households involved in backyard or home gardens.
3. Organised 3 field days and training on control of pest and disease for farmers involved in backyard home gardening to improve knowledge of using natural pest and disease control methods.
4. Conducted 3 food security awareness meetings on Santo.
5. Promoted composting in 5 locations on Luganville for backyard farmers.

Coconut crabs are also sold at the market. However, there is no organised fish market on Santo (apart from sales that take place outside of the central market). The team was advised that most fish is sold on a door to door basis or hotels buy fish as needed from preferred fishermen. It was also suggested that the construction of a fish market would assist in increasing fish consumption on Santo. The team was made to understand that plans are being advanced to construct a fish market nearby the main farmers market. Both men and women are involved in household farming. Most land is owned by traditional communities and permission is needed before the land can be farmed.

In terms of other islands within Sanma province, several copra and cocoa plantations are located on Malo, the majority of farmers engage in subsistence farming for their own consumption and selling excess on the island or on Port Vila. Tourism (diving and fishing) and plantations are on Aore Islands which is the main provider of employment and economic revenue. Most of the inhabitants of Araki Island are subsistence farmers, exploiting the resources of land and sea for their own consumption; they also breed pigs and poultry.

4.4. Shefa province

One of the key objectives of the agri-tourism initiative is to increase consumption of selected locally grown produce in the tourism sector (urban areas) which is mostly Port Vila. Whilst tourism is the dominant economic sector on Port Vila, there is also a substantial subsistence farming sector. Fishing and subsistence farming are also important on the other islands (including Nguna, Pele, Emau, Shepard's Group of Islands and Epi). For completeness, this Mission report also elaborates briefly on conditions affecting small scale subsistence farmers on Efate.

Infrastructure

The team visited subsistence farms in South Efate, which is a major production area. The area was generally easily accessible by a paved road which seems to run around the entire islands. However, farming in the area visited by the team took place at high elevation areas which could only be reached by a dirt tract which leads from the main paved road. Discussions with farmers revealed that the road was subject to erosion and landslips during the wet season, which rendered it to be impassable at times. This also had cost implications and also affected post-harvest produce quality. Depending on the state of the road, farmers report paying upward of VT 4,500 to transport a truck

load of product to the central market in Port Vila which is about twenty minutes away. Farmers also informed the team that they often shared the cost of transporting products to the market in Port Vila. Because of these transport constraints, farmers here were only slightly better off than their counterparts in the outer islands as they did not have to incur the additional cost of transport by domestic vessel and the additional transactional costs involved. As was the case in the outer islands, there was no electricity in the area and farming was entirely dependent on rainfall.

Production pattern

The team was advised that there were about 3,000 farmers in South Efate. Farmers grew a variety of products such as papaya, cassava, bananas, corn, taro, pineapple, cabbage and island cabbage. The team was advised that both males and females are engaged in farming however, the females mostly went to the market in Port Vila. Lands in the area used for farming was customary land, and each farmer was allocated about five hectares. Not all of the land is cultivated at the same time and it was advised that farmers tend to shift cultivation from time to time based on the changing fertility of the land they were allocated. Farmers use basic farming implements and do not use inorganic fertilizer as most were engaged in slash and burn land clearing and reported receiving only limited extension support. It is also apparent that subsistence farmers on Efate face similar challenges to their counterparts on the outer islands.

Farmers suggested they go to the market in Port Vila every day, and also sell alongside the paved road. Farmers were entirely dependent on farming and reported income of about VT 20,000 per visit although they acknowledged they did not maintain proper farming records.

4.5. Tafea province

Location and demographics

Tafea is the southern province of the six provinces in Vanuatu. It is made up of five main islands: Tanna, Aneityum, Futuna, Erromango and Aniwa. The province has a population of 32,540 people and an area of 1,628 km². The main island in the province is Tanna with some 80 percent of the province population, with the provincial capital of Isangel and the largest village of Lenakel, both close together on the southwest coast. Tanna is the most populous island in Tafea province with a population of about 29,000. It is 40 km long and 19 km wide, with a total area of 550 km².



Figure 29 Isangel/Lenakel township, Tanna

Lenakel and Isangel have essentially merged into a single township area. The provincial administrative buildings, central market, fish market and main wharf are in close proximity to each other. There is network unpaved roads, with commercial buildings such as shops, gas stations, restaurants, guest lodges and the main playfield in the area which have the makings of well-defined township zone. The township area has twenty-four hour electricity service and good internet connectivity. The island of Tanna has the world's most accessible volcano, Mount Yasur (1,084 meters), which is the highest peak of the province. It is a major tourism attraction for the islands.

Aniwa is a coral atoll with a population of 340, located about 24 km southwest of Tanna. Futuna is an uplifted volcano, with steep coastline, which makes accessing the island very difficult. Erromango, with an area of 891.9 km², is the largest island in the province. According to the 2009 census, Erromango's population was 1,959. The largest villages are Dillon's Bay, Potnarvin and Ipota. It is densely forested on the windward eastern side of the islands, with grass plains and woodlands on the north-west side of the islands. Sandalwood farming was a major source of income for Erromango, while logging of kauri and tamanu trees is still a major economic activity on these islands. Efforts are being made to improve sustainable management of Erromango's forestry resources. Aneityum is the southernmost island of Vanuatu. The island is 159.2 km² (61.5 sq. mi) in size. It is a raised island, with two main villages on the south side of the island.

Infrastructure

Tanna Island is served by Whitegrass Airport and there are daily flights to and from Port Vila. Whitegrass Airport has a paved runway but does not have night time landing capability. Basic fire services are provided, appropriate for the category of aircraft using the airport. There is no control tower or meteorological services at the airport however, a wind sock is located at the airport. The airport terminal was damaged during TC Pam and is still awaiting rehabilitation works. It does not appear that Tanna airport has any cold storage facilities for agricultural products or fish; although the study team observed that fish was transported by aircraft in small potable ice boxes/coolers. Flights to the other island within Tafea are via Tanna.



Figure 30 Tanna's Whitegrass Airport showing TC Pam damage to terminal building roof

Basic strips are provided on the other islands in the province. Erromango has two airports, and has access to the capital via Tanna Island. Aniwa has limited infrastructure. The port access is difficult as it is close to the coral reef, which can cause damage to vessels. Shipping is once a month, from Port Vila via Tanna. There are no paved roads on Aniwa. There is a small airstrip in Aneityum on the island of Ince, which has three weekly flights to Port Vila via Tanna. This supports tourism on Mystery Island.

There are few paved roads in the province. However, major road improvement works are being undertaken on Tanna, with assistance from China. Specifically the south-west coast road, leading from the airport to the township, is currently being upgraded and improvements are also being

made to drainage systems. These works are scheduled to be concluded within a year. They should reduce the travel time to the airport from the township area to about twenty minutes, compared to close to an hour currently. It will also have favourable environmental impacts (drainage improvements and less freight charges) and should also reduce wear and tear on vehicles. Several unpaved roads are located across Tanna. In particular, the road leading across the Island from Lenakel to the Mount Yasur and Port Resolution; other roads in the middle of the island have been improved under the Australian road assistance project. A section of the road has been covered with cement to reduce erosion and drainage improvements have been undertaken. While on the Island, the study team observed community members who have been engaged under this program to assist with road maintenance.

Give the topography roads a subject to erosion and landslides during rainy condition, careful attention will need to be paid to maintenance of roads in the future and the engagements of members of the community in this area is laudable. There are no paved roads on the other islands in the province and like Tanna, a number of informal track roads are in place which are mostly used by farmers.

It currently costs about 700 VT to transport a truck of products from central Tanna to the market Lenakel. Notwithstanding ongoing road improvements, there will be limited impact on transportation of agricultural products. This is because as was observed on other islands, road improvements are taking place along coastal areas, while the majority of agriculture production takes place in hilly areas which are some distance from the coastal roads. Farmers therefore will continue to rely on dirt tracks to transport products to the coastal roads. They will still have to incur the costs to transport products to coastal roads, which will still result in post-deterioration being a challenge for farmers. In addition, the maintenance and upkeep of the track road will continue to be a challenge



Figure 31 Farming dirt road in Tanna



Figure 32 Lenakel Port, Tanna (Google Earth)

for farmers, which would have costs and ongoing maintenance implications.

With limited electrification, it will be difficult to store products to extend post-harvest before reaching to the township market or to the market in Port Vila. This increases the case for the adoption of renewable energy into agriculture production to extend post-harvest storage life of products.

The main port for the province is

located in Lenakel, directly across to the central market and fish market. The port has access to water and electricity supply. The port is fenced and has an administrative office and storage warehouse, which are located along the main road and can be accessed by forklifts to assist with the movement of cargo. The buildings are in a good state of repair, despite some damage during TC Pam. The port enclosed road leading to the berth is covered with crushed limestone and is in a good state of repair. The 'T'-shaped jetty head is constructed on the edge of the inner fringing reef allowing for a deep berth however, the port is exposed to swells off the outer reef which makes it very difficult to load and off-load cargo. During periods of the westerly wind and swell, the port will be inoperable. Ship operators have reported of swells also contributing to damages to some vessels, which is one of the many reasons the Vanuatu Ferry is using an alternate landing site on the south-west coast. Generally, the location of major port infrastructure on the south-west coast of Tanna, which has no natural harbour, poses a long-term challenge for development of import and export activities, especially given the close proximity to the barrier reef. The team was informed of a future proposal to construct another wharf in Port Resolution, which is located on the eastern coast and offers a sheltered harbour for small vessels.

Domestic shipping

There is profitable and reliable shipping between Tanna and Port Vila. However, shipping to the other islands in the province and the east coast of Tanna is uneconomical and unreliable. For these reasons, routes to these areas are being subsidised under the VISSP. The VISSP routes in Tafea provinces along with other shipping service are summarised below.

10 Focal Areas, key measures & implementation timeframe

Routes	Date awarded/ company	Region/areas served	Frequency	Outbound cargo	Inbound cargo
SSS2 ² (Tafea)	August 2014 Touaraken Shipping (MV Touaraken 1)	Connects Aneityum, Futuna and Aniwa to Port Vila/Tanna (to increase profitability of route)	Monthly	Timber from Aneityum; Citrus from Aniwa Vegetables and fruit from Tanna	Lifeline service: fuel, general food stuff, building materials, house items, water and beer
SSS2A	October 2015; Belair Shipping - <i>MV Island Claws</i>	Tafea East Services are to originate in Port Vila and call at the following Call Points: <ul style="list-style-type: none"> • Erromango: Port Narvin, Ipota; • Aniwa; • Tanna: Port Resolution; • Futuna: Mission Bay, Herald Bay; • Aneityum. 	Monthly	Timber Fruits and vegetables from Tanna Fish – pelagic from Aniwa and Aneityum	Lifeline service: fuel, general food stuff, building materials, house item, water, beer; imports support tourism in Mystery Islands
SSS2B	November 2015; Touaraken Shipping: <i>MV Touaraken</i>	Tafea West Services are to originate in Port Vila and call at the following Call Points: <ul style="list-style-type: none"> • Erromango: Dillon's Bay, Bongil, South River; • Tanna: Enalpat, Lenakel, Kwamera; • Aneityum. All call points are to be visited both outbound and inbound.	Monthly	Timber from Islands, Fruits and vegetable from Tanna From Erromango: Fish – deep bottom, reef, pelagic, coconut crab, small livestock	Lifeline service, imports support tourism in Mystery Islands. Lifeline service: fuel, general food stuff, building materials, house item, water and beer

² SSS2 reorganised in 2015 to form SSS2A and SSS2B to reduce voyage time for perishable products, and improve route logistics.

	MV Vanuatu Ferry		Weekly	Fruits, Irish potatoes, fish, spices, coffee peanuts and vegetables from Tanna	Life service
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Source: VISSP, Quarterly progress report July-September 2015, interviews

Economic setting



Figure 33 Variety of products at Lenakel Market

Agriculture is the most important economic activity in Tafea province, which is centered on Tanna Islands. While the study team was advised that anything can grow on the island with irrigation in times of drought, given the fertile nature of the land, there is no need for chemical fertilizers. Major agricultural products from Tanna are kava, coffee, coconuts and copra, fruits (papaya, citrus, mangoes, banana, and pineapple), a wide variety of root crops (yam, sweet potatoes, cassava, peanuts, and taro) and vegetables

(carrots, scallion, squash cucumbers, sweet peppers, beet root, cauliflower, broccoli, etc.). Farming is mostly done by small farmers, on small plots which are communally owned land. Most farming plots are located in the hills, some distance from the main coastal roads, which adds to cost as well as post-harvest damage and loss of products. Farming practices are labour intensive and mostly organic. Tanna possesses deep loamy soil, which is filled with organic matter. Farmers tend to cultivate an area for about 2-3 years until fertility starts to decline, before moving to another area. The study team was advised that most farming is done by women on small plots and that farmers consume about 10-20% themselves, with the remainder being sold at the market in Lenakel mostly on Fridays, or sent to Port Vila for sale. Most farmers also keep small livestock such as pigs (3-5 per household) and chickens (10-12 per household) for personal consumption.

Farmers also received aid from the Provincial agriculture office which is based in Lenakel. It sustained some damaged during TC Pam. Three extension officers are stationed on the island, and also make periodic visits to the other islands in the province. The agriculture office runs a demonstration farm and a number of support programs for farmers. These include promoting vegetable production (cauliflower, carrot, broccoli, tomatoes and lettuce), supplying seeds and seedling and offer farmer training programs (for example on biosecurity and improved farming practices). It is also making effort to form farmers association and to dissuade farmers from



Figure 34 Government demonstration farm, Lenakel



planting the same products so as to promote the development of a local market. The office has a tractor, which offers limited land clearing assistance to farmers. Some limited information is kept by the department. Cattle rearing are also being promoted by government through the Livestock Department in collaboration with VCF. It is understood that about 400 cattle are to be shipped to Tanna before the end of the year.

A number of NGOs are also active in promoting vegetable production and organic farming for household self-sufficiency. The team visited Nasi Tuan, which is a Christian based NGO in central Tanna. The following case study elaborates on the experience of Nasi Tuan, which can be replicated elsewhere on the Island.

Box 8: Case Study on Nasi Tuan

Nasi Tuan is located in the north-west elevated area of Tanna, about 45 minutes from Lenakel and 20 minutes from the airport. It was established in 2009, with support from the New Zealand based Tear Fund. Its main purpose is to move small farmers from subsistence farming to commercial farming, as part of a rural development thrust. This is consistent with a core objective of the Vanuatu government. It also aimed to improve farming practices. Following TC Pam, food security and improving diets became an important work area for the NGO.



Nasi Tuan currently provides extension service to 32 groups of farmers and 5 cooperatives. It encourages them to grow vegetables (cabbage, island cabbage, bean, cucumbers, beets, carrots and sweet peppers) to improve diets as well as for sale. It also promotes the cultivation of peanuts and coffee as cash crop. Both men and women are involved in the programs, although there is division of labour in some instances: men focus on growing of coffee, while females focus on the processing of peanuts. The peanuts have been certified as 'organic' and are sold at hotels and duty free shops throughout the country. The NGO also runs a program to encourage early school leavers to become involved in

farming.

Nasi Tuan has been instrumental in introducing new farming technologies to assist farmers. It is actively promoting composting and drip-irrigation (to conserve water). To promote sustainability and self-sufficiency, it is training farmers in fish farming and beekeeping. It is also keeping records of group yields and using this promotes group rotation. It is also training farmers in record keeping as well as using smartphones to inform farmers of farming practices. The area where Nasi Tuan is located does not have electricity or paved roads. It relies on solar power to run its office and peanut processing operation and recently has internet connection installed. Nasi Tuan does not have cold storage, but still assist farmers in improving post-harvest handling of produce and in marketing products in Port Vila.





Figure 35 Coffee Farmer, Tanna

There is limited fishing on Tanna, except for household use. However, fishermen from other islands in the province supply a variety of deep water, pelagic and reef fish to the fish market on Tanna, which is located adjacent to the central farmers market. The fish market was built with assistance from Japan (circa, 1990). It has access to electricity and water supply. It is equipped with three deep freezers and a blast freezer. Fish is sold locally or chilled and sent to Port Vila. The fish market also supplies (sells) block and crushed ice to fishermen. SPC is also providing technical assistance to the staff of the fish

market to improve supply and handling. Tourism is becoming an increasingly important activity on the island as tourists are attracted to the volcano and traditional culture. There are many accommodations available on the island, including small bungalows. It is also laudable that most hotels on the island procure the majority of their fruits and vegetables at the central market in Lenakel.

4.6. Torba province

Location and demographics

Torba province is the northern-most province of Vanuatu, consisting of the Torres Islands and Banks Islands (about 15 small islands in total). The Torres group has 4 main islands and 2 islets, while the



Banks group has 4 main and 3 smaller islands. The province is also Vanuatu's closest neighbour to the Solomon Islands. It has an area of 882 km² and a total population of less than 10,000 inhabitants. Sola, on Vanua Lava, with a population of about 2,600 is the provincial capital. Torres and Banks are small volcanic islands with rugged terrain, reaching up to Mount Gharat (797 m), on Gaua Island which is an active volcano at the centre of the island. The people in these islands live in scattered coastal villages on the western, southern and northeastern sides of the island.

Infrastructure

Infrastructure in Torba province is basic. There are no paved roads and only a few vehicles. There are several grass-stripped runways in the province. Air strips are located on the islands of Motalava, Vanua Lava and Gaua. Air Vanuatu provides three flights to Vanua Lava (via Luganville), but only to the other islands when there are passengers or there is cargo. The main mode of transport is walking or canoeing between islands.

Domestic shipping

There is limited passenger and cargo demand from Torba province. The main export from Torba is live coconut crab, which is subjected to strict licensing control (only two licences have been issued, one each for Luganville and Port Vila). Shipping service is uneconomical and subsidised service is provided as part of the VISSP to connect the province with Santo. The shipping service also supports health and education service provision.



Two VISSP routes have been developed (following an initial single route proposal) and provide a monthly passenger and cargo service to and from Luganville. These are described below.

SSS1: Torres Route:

Services originate in Luganville and call at specified call points in the Torres Islands via the west coast of Espiritu Santo.

All call points are to be visited both outbound and inbound.

MV Kawale from LCM Shipping is being awarded the contract for this particular route. First voyage service commenced in December 2014. Frequency of Service is monthly.

Source: VISSP September 2015 Quarterly Report



SSS3 Banks Route:

Services are to originate in Luganville and call at 16 specified points in Banks Islands.

Call Points to be visited in the Banks are:

- **Merelava:** Mission Passage, Tesmet;
- **Merig;**
- **Gaua:** Aver, Kaskar, Dorig, Jolap, Qetegaveg;
- **Mota**
- **Vanua Lava:** Sola, Misina, Vureas Bay;
- **Mota Lava:** Ra, Telvet;
- **Uneparapara:** Leserepla, Lehali.

All call points are to be visited both outbound and inbound.

Economic setting

Subsistence farming, limited fishing and horticulture are the main economic activity in Torba. The DARD is also making efforts to improve vegetable production in the province to improve diets and food security. During 2015 the following results were report by DARD:-

- a. Vegetable Nurseries and Seed beds were set up for demonstration on DARD Sola station to increase vegetable production.
- b. Multiplication of OP seeds.
- c. Distribution of vegetable seeds and conducted El Nino awareness to farmers.
- d. Provide training to farmers on vegetable production.
- e. Help in facilitating vegetables sales at the market.

The principal exports are copra, cocoa and some coconut crabs. The main imports are reported to be tinned fish, vegetables, rice, sugar, fuel, water and building materials. Effort is being made to promote tourism in Torba province. Fish is reported to be plentiful and there are other opportunities; together they will increase the demand for shipping.



Figure 36 Co-operative copra producers on Malekula



Figure 37 Planting material for research/distribution, Santo

Chapter 5 Key observations and analysis

In this chapter, we bring together information from earlier chapters to assess the impact of improvements in onshore cold storage and cold storage on-board ships. The analysis is presented within the context of addressing the shipping and logistical related issues highlighted within the IFC Report. Furthermore, the analysis shows that improvements in shipping and cold storage will not be sufficient to improve the prospects for successful agri-tourism linking farmers in rural areas with hotels and urban consumers in Port Vila and Luganville. There will be need for improvements in other sectors and complementary actions by other departments, some of these are captured in the analysis.

a. Policy context

The policy environment is favourable for achieving the objectives of the agri-tourism thrust. The centrality of this agri-tourism to achieving the government's rural development goals and reducing leakages from the national economy were clearly highlighted at the National Consultation (held in May). A number of closely related are policies in place including the Overarching Productive Sector Policy and the Agriculture Sector policy and a multi-disciplinary Agri-Tourism Steering Committee (ATSC) has been established to monitor progress. Notwithstanding the high level policy commitment to the agri-tourism initiative, the team found in traveling throughout these islands there was limited knowledge or awareness amongst farmers, and in some instances amongst lower level government officials. For farmers and some officials, it seemed to be *'business as usual'*. This attitude can undermine the concerted (and massive) effort and commitment which will be needed, on a sustainable basis, to achieve the reliability of supply and product quality improvements needed to win the confidence of hotels in locally grown products. There appears to be a need to increase knowledge and awareness of the agri-tourism initiative and its importance to national development in the country amongst the rank and file members of the community.

b. Infrastructure

The state of hard infrastructure such as ports, airports and roads in the islands visited during the study does not make it easy to successfully transport agriculture products and undermines the effectiveness of the supply chain. As was shown in Chapter 4 (community situation analysis), most islands do not have paved roads. Farming takes place in elevated areas and farmers rely on dirt tracts to transport produce to market or ports.

Ports in most instances have no passenger or storage sheds. Apart from the wharves on Port Vila and Santo, only the port on Tanna has access to electricity. Some jetties (such as Tanna) are located in exposed areas which increases risk of ship damage and also make it difficult to load and offload vessels due to sea swells. Where rural jetties are usable, most need rehabilitation work and preventative maintenance in the future. While it is costly to transport produce by air, the team observed the transport of fish from nearby islands to Tanna by airline in small iceboxes. Generally,



Figure 38 Lenakel jetty

storage sheds are provided at airports in rural islands, which limit prospects of transport of fish and high value perishable items by air subject to flight weight restrictions. The state of hard infrastructure therefore increases both land transport cost, increased post-harvest product damage and loss and has implications for the freight charges which are high to compensate for risks of damage to vessels.

The team observed that major road infrastructure improvement works are currently being undertaken on several of the islands visited. This will improve the economic development on rural islands. However, it was observed that most of the roads being constructed are in coastal areas or in main township areas; this is understandable given resource constraints. However, the impact on agricultural production will be minimal since



Figure 39 Passenger at temporary Port Vila domestic wharf

as noted before production on most islands takes place in high elevation areas and depend on dirt track roads which are often unusable during poor weather conditions. Farmers will still have to incur high costs to get products to the improved coastal roads, which will lessen cost savings from the improved roads. The poor road conditions will still add to post-harvest damage to products.

The team also notes that under VISSP project, a number of improvements are proposed to several wharves and jetties throughout the country (see table 1). Our understanding is that storage sheds would be provided in Port Vila and Luganville, but only repairs at jetties in the other islands. If this is indeed the case, there will be minimal impact on cold storage of products on islands such as Tanna and Malekula for instance. This justifies consideration of an alternative community based cold storage option using renewable energy to limit post-harvest loss before product reaches the ports. Some practical community options are discussed below.

The team notes that electricity and internet penetration are limited to main township areas on most islands. The absence of electricity will present a challenge for the introduction of cold storage. It will also have implications for the type of cold storage adopted and makes a case for using cold storage which is based on renewable energy. The team notes that a number of cold storage solutions (for example, in the fisheries sector) based on solar energy are already installed throughout the country, which can be adapted to meet the needs of the KfW project. This also justifies co-location and collaboration with fisheries projects as far as possible on cold storage options for products under the shipping components of the KfW project. Furthermore, a number of renewable energy supply and installation companies are based in Port Vila and Luganville, who have undertaken projects (involving international donors) in several provinces. Therefore, the capacity to install, operate and maintain renewable energy cold storage systems is present in Vanuatu. Limited internet penetration reduces the ability of extension officers to use smartphones to send information on farming practices, weather information and also for farmers to undertake financial transactions. The team notes that some farmers are already using smartphones to promote '*just in time*' shipping of produce, which should be encouraged to reduce shipping loss.

c. Shipping efficiency

With the agri-tourism initiative gaining momentum to be a game changer in Vanuatu, it is imperative that the associated supply chain including the shipping component augments the development that is taking place. The team carried out an extensive inspection of ships and met all levels of the shipping industry within which the shipping industry works. Given the dependence on shipping for most inter-island trade, it may be prudent to co-opt the Ministry of Infrastructure into the Agri-Tourism Committee. Several independent reports, including the IFC study, have noted the conditions on domestic ships and the team has noted similar issues. Whilst some ships are operated and maintained quite well, the same cannot be said for the others. During the visit, the team held discussions with several key stakeholders on the operation of ships and noted a contrast in the views of ship managers/operators which reflected in the way their respective ships are operated and could explain the current situation.

It became quite clear that for the shipping industry to function effectively, there needs to be a meaningful partnership between all levels of the industry. In line with the new international maritime conventions, the global maritime community is engaging more with the industry in order to meet their various international obligations as partners. In this regard, SPC is proposing the setting up of a National Shipping Council comprising key industry stakeholders and driven by the Head of the line Ministry. This is proving quite a success in other Pacific Island Countries (PICs).

The team understands that as part of the reform of the shipping industry, a new maritime administration is to be established as the national regulator. The team fully supports this reform as it will help address some of the challenges that the industry is currently facing and if implemented correctly, will also have a positive impact on the national economy, including the agri-tourism project.

Under the Safety of Life at Sea (SOLAS) Convention, ships should have a safe ship management system suitable for its operations. This is designed to address some major shortcomings that have led to numerous maritime accidents and incidents globally. In this regard, SPC has been trying to assist PICs, including Vanuatu, to implement a simplified version called the Pacific Islands Domestic Ship Safety programme (PIDSS). This will greatly assist in addressing some of the challenges currently facing the domestic vessels.

At the various islands visited, it became quite clear from interviews we had with passengers and shippers of cargo that they value a shipping service that is regular, timely, dependable and customer friendly. The ship should be clean and comfortable, has short travel time, is safe and that cargo is secure. The interviewees admitted that they were prepared to pay extra or even re-schedule their travel so as to travel on the ship of their choice. This presents several opportunities to other shipping service providers to re-strategise and re-train their staff to meet the new demand of the discerning passengers and their cargo. To ignore this growing demand for a better service will no doubt have implications. The better operated shipping service will slowly infiltrate into other areas displacing the “old” operators further into the unprofitable routes and thus exacerbate their situation.

Having visited some of the biggest production areas, the team noted that there is a simple system that is working quite well in the form of sealed ice boxes being sent to the shippers’ representatives in Port Vila or Luganville. The quantity is not large and those involved are quite satisfied with this

arrangement. Shippers have expressed their concern about putting their cargo on some ships and even more so if placed in cold storage for fear of tampering or going missing. Some fishing areas have deep freezers powered by batteries and charged by solar panels which are working quite successfully. The use of large refrigerated shipping containers may be too large to suit the current and foreseeable quantity. In several areas, we have seen smaller blast freezers and coolers. These small cold storage facilities can run off the main grid without a higher demand for three phase power. (A summary of suggested action to improve sustainability in shipping is in Appendix Table 14, Page 69).

d. Structure of subsistence farming sector

The majority of the produce being targeted under the agri-tourism project is grown by small subsistence farmers. However, the subsistence farmers use rudimentary hand tools and depend on rainfall (Agriculture Policy, 2013). Farmers report receiving limited extension support and difficulty accessing credit and inputs. This results in low productivity. Rural farmers also face marketing challenges due to the archipelagic nature of the country, exacerbated by high land transport and shipping costs and associated challenges. The majority of small farmers cultivate basically the same produce, which limits development of local markets. Crop rotation is not regular which results in depletion of soil nutrients in a short period time. In some instances, land tenure arrangements are tenuous. The team notes that increased effort is being made to improve productivity of small subsistence farming as well as marketing. A number of programs are being promoted by DARD and a number of NGOs, such as Nasi Tuan are involved in the sector introducing improved agronomic practices. These efforts need to be encouraged and replicated. To improve small scale farming in the short run, crop rotation should be promoted and farmers should be encouraged to plant different produce to encourage domestic market development. In addition, where products are in excess, simple processing should be encouraged.

e. Sale and marketing of products

During the visit, the team was advised that women were mainly responsible for selling products at the markets. However, when produce is sent to markets in Port Vila and Luganville, the farmers' most important objective is to ensure their products reach safely and that they receive their payment either in cash or by goods in a timely manner. Various means are used to transport and sell produce in markets in Port Vila and Luganville, which are the main hubs for the southern and northern provinces respectively. We encountered cases where farmers themselves went to the market and remained there until products were sold; farmers sent produce to relatives to be sold, who either sent payment in cash or in goods back to them; and where a group of farmers sent produce to a representative who lives in town to sell and then remit money for goods back to them. There are many transaction costs along the supply chain as agents and representatives have to be paid and there are handling charges involved for land transportation. In Instances where farmers actually go to market themselves, they are losing farming time. There also seems to be very limited market intelligence about what produce are in surplus or shortages. The marketing and selling of products need to be re-looked and improved. This is a key issue of the IFC Report where it was *noted* 'that of linkage between buyer and farmers via and aggregator or wholesaler led to a gap in information exchange and effective marketing of produce' (IFC Report, 2015).

The team notes a proposal by the VCF to take on the role of middleman by purchasing produce from farmers upfront and assuming the risk of transport and selling products at markets in Port Vila and Luganville. VCF also proposes to construct and operate cold storage markets in Port Vila and Luganville. It is planned that these should become showcases for local produce. Efforts would be made to improve packaging and labelling of produce and improve reliability of supply. In the medium, VCF proposes to acquire two vessels with cold storage to facilitate the transport of produce.

f. Technology

The team visited several local suppliers of a range of cold storage facilities including freezers, coolers and ice-making machines. Of interest were the widely used freezers and coolers which can be powered by batteries and charged by the sun. This type of equipment has been purchased and used widely in the education and medical sectors under donor funding with a five year maintenance contract and centrally-located performance monitoring facility. The fisheries sector also uses similar equipment located in the outer islands and coastal region. An increasing number of companies and individuals also have this equipment. During the visit, the team also visited companies that make fibreglass ice-boxes and those that import large esky/ice-boxes which are widely being used by shippers of frozen goods which would be ideal for the purpose of the project.

g. Data availability

In order to successfully forecast the demand for shipping, cold storage, market penetration and hence reliability of supply and price changes along the supply chain data on yield, freight rates and seasonality for instance, there needs to be readily available agriculture production data. The team notes that excellent data is available from the Vanuatu National Statistical Office (NVSO) on the important export cash crops (kava, cocoa, coffee and beef). Information quarterly export amount, value and price changes are readily available. In contrast, the small subsistence farming sector which is key to the success of the agri-tourism initiative is notable for the paucity of data.

The last agricultural census took place in 2007 (nine years ago) and had limited information on the subsistence sector, which is not useful for current analysis. The team was only able to collect limited information yield per hectare for subsistence products from official data. However, in discussions with officials, it was generally agreed that subsistence agriculture production has increased due to programs being promoted by DARD. Discussions also suggested that areas of the country are notable for production of particular products which will contribute to the success of the agri-tourism initiative (see table 2). The team was also able to collect limited information on land transport and freight rates through informal interviews with farmers, ship captains and farmers who send products to market by road or domestic vessels. The team is, therefore, unable to make any meaningful projections on demand for shipping or the amount of products being sent to markets. It is noted that an agriculture survey should be held shortly which is a good opportunity to begin the process of data collection from the subsistence sector on a consistent basis as is currently the case for the export cash crops. In the interim, it might be advantageous to conduct a detailed analysis of reports from the shipping company record to capture volumes of subsistence cargo shipped from the islands. Furthermore, data collection is being integrated into community based fisheries and VCF small farming projects. This is laudable.

Chapter 6 Measures

Based on the foregoing analysis, the team proposed the following measures to improve the impact of shipping and provision of cold storage to the success of the agri-tourism initiative. In presenting the measures, we focus on practical solutions which build on ongoing activities to encourage ease of implementation and sustainability. We also look at the ease of implementing a particular measure. In these measures, immediate refers to measures which can be implemented right away; short-term is considered to be 1 to 2 years; medium term 3-5 years and long term more than 5 years.

11 Focus areas, key measures & implementation timeframes

Focal Area	Key measures	Ease of Implementation	Timeframe
Policy	<ul style="list-style-type: none"> Increase awareness of the agri-tourism initiative and its importance to national development in the country amongst members of the community. 	Coordinating committee in place, VCF and departments should integrate awareness into work plans in rural communities.	Immediate
	<ul style="list-style-type: none"> Improve coordination and build synergies between the various donor projects currently being undertaken in the area of rural development. 	Periodic donor meetings already being held (and meeting can be formalised).	Immediate
	<ul style="list-style-type: none"> Boost the role of the Ministry of Infrastructure in the Agri-Tourism Committee. 	Invite the Ministry to join the committee.	Immediate
Infrastructure	<ul style="list-style-type: none"> Improve and maintain dirt tracks and other rural roads used by farmers, with active involvement of communities and provision of appropriate machinery and equipment. 	Build synergy with ongoing Australian funded road improvement program.	Short term
	<ul style="list-style-type: none"> Introduce community based cool storage solutions using renewable energy in central production areas to service nearby farmers. 	Appropriate technology solutions and capacity already in the country.	Immediate
	<ul style="list-style-type: none"> Install cold storage at ports with sheds to complement community based cold storage. 	Align with ADB project, and other plan rural development projects (e.g. EDF 11).	Short to medium term
	<ul style="list-style-type: none"> Co-ordinate with the Geoscience Division and National Charting agency for hydrographic work in Vanuatu. 	Build on existing work and inter-divisional co-operation as required by SPC.	Short to medium term
Shipping efficiency	<ul style="list-style-type: none"> Consider the establishment of the NSC. Promote the expansion of the PIDSS programme. Encourage the reform to separate the regulatory functions from operations. 	Work with the Ministry of Infrastructure and Department of Ports and Marine to implement NSC & PIDSS including the public sector reform.	Immediate
	<ul style="list-style-type: none"> Arrange general training of ships' crew and training on cargo-handling for stevedores. 	Liaise with training providers.	Short Term

	<ul style="list-style-type: none"> Strengthen inter-departmental collaboration/co-ordination to improve shipping of animals, etc. especially on weekends. Arrange training for ships' crew on proper cargo-handling and stowage on-board. Arrange training for Stevedores on cargo handling. <i>(detailed explanation is in the appendix)</i> 	<p>Heighten awareness. Build on and formalise existing collaboration with key stakeholders.</p> <p>Reinforce existing training programmes at the Maritime training institutes, establish NSC and encourage the reform of the sector.</p>	<p>Short Term</p> <p>Short Term</p>
Structure of subsistence farming sector	<ul style="list-style-type: none"> Co-ordinate with Fisheries and Department of Fisheries on fisheries and cold storage issues. Strengthen agronomic practices such as crop rotation and planting different crops to develop domestic markets. Promote small scale processing operations in rural communities. Co-ordinate with Land Resources Division/Bio-security and Ministry of Agriculture on bio-security issues. 	<p>Discussion on co-location has already commenced and appears favourable.</p> <p>This is already promoted by DARD and NGOs.</p> <p>Appropriate technology models exist and can be adapted for local context.</p> <p>Build on existing work and inter-divisional co-operation as required by SPC.</p>	<p>Immediate</p> <p>Short term</p> <p>Short to long</p> <p>Short to long</p>
Technology	<ul style="list-style-type: none"> Determine the number of sites and distribution of the appropriate technology. Finalise procurement plan including installation details. Call for expressions of interest. <i>(detailed explanation is in the appendix)</i> 	<p>Procurement plan and specification contained in this report and SPC model Tender documents exist.</p>	<p>Immediate</p>
Sale and marketing of products	<p>Promote aggregator or wholesalers services to support marketing of produce.</p> <p>Use market intelligence to inform which produce to plant and send to markets.</p> <p>Develop cold storage showcases in Port Vila and Luganville to demonstrate and improve display of local produce.</p>	<p>VCF is already considering assisting Co-ops in this area.</p> <p>VCF is already considering assisting Co-ops in this area.</p> <p>Technology exist which can be easily adapted for local conditions.</p>	<p>Immediate</p> <p>Short to medium term</p> <p>Immediate to short term</p>
Data availability	<p>Conduct a detailed analysis of produce from the shipping companies.</p> <p>Improve data collection on production from the subsistence farming sector.</p>	<p>Enlist the support of the VNSO to supervise.</p> <p>VNSO is to shortly undertake an agricultural census. Following this, periodic surveys, as is already the case for cash crops, should be undertaken (there may be staffing constraints to overcome).</p>	<p>Immediate</p> <p>Short to medium term</p>

Chapter 7 Conclusions

More than 80% of Vanuatu's population live in remote rural island communities. Subsistence farming and fishing are the most important economic activities in the remote islands, although all islands have a tourism sector. Rural development is a major priority for the government of Vanuatu to improve the livelihood of people living in these remote rural island communities, which are some distance from the main population centres in Port Vila (the Capital) and Luganville. Accordingly, a number of development projects are ongoing to improve development prospects and the standard of living in the remote islands. These include infrastructure development, expansion of agricultural programs and a revival of the cooperative movement.

Tourism and urbanisation are major drivers of imports into Vanuatu. A recent study by the International Finance Corporation (IFC) identified leakages from the domestic economy in the region of VT 400 million on importation of agricultural produce which can be grown locally. This is the basis of an agri-tourism initiative which the government through collaboration of the Ministries of Commerce and Trade, Tourism and Agriculture is promoting. The agri-tourism initiative would not only reduce leakages from the economy, it would also create linkages between the burgeoning tourism sector and rural communities, thereby promoting social equity. It could also form the basis of downstream processing activities creating local value addition and employment.

The IFC report identified several constraints which adversely affects the supply chain for domestic agriculture products. This includes several inter-related gaps such as infrastructure gaps, inefficiency in domestic shipping and absence of cold storage for products, which are being addressed by the Shipping Component of the SPC/KfW post TC Pam assistance to Vanuatu.

Based on field visits to several islands in Vanuatu (Tanna, Santo, Malekula and Port Vila) and literature reviews and interviews with officials, small scale farmers and ship operators, this report presents an institutional overview and situational analysis of issues related to domestic shipping and prospects to introduce cold storage throughout production areas and on ships.

The report finds that products are grown in specific regions of the country. Vanuatu's agriculture production consists of a formal cash crop sector (copra, cocoa, beef, coffee and kava) co-existing with the informal subsistence sector. This pattern of production influences the demand for shipping of primary sector products and the organisation of the domestic supply chain.

The report finds that a very favourable policy environment is in place to achieve the objectives of the agri-tourism initiative. However, there is need to increase awareness of this amongst farmers.

The report finds that while there are many challenges facing the farming sector and shipping of produce, farmers and shipping companies are already taking steps to address some of these. The extension service and NGOs are leading efforts to improve production. Several renewable energy projects are being implemented in the fisheries sector which can be replicated. There is capacity in the country to support renewable energy projects. This will overcome gaps related to low electricity penetration which would affect cold storage installation in farming areas. The report therefore proposed installing solar based cold storage at central locations in farming areas to service the needs of nearby farmers. Produce can be kept here and transported to ships on a '*Just in time*' basis on

improved rural roads which the report also recommends. The report proposes that where sheds are provided in a port, cold storage can be installed.

The report notes that efforts are being made to improve shipping reliability through the VISSP and that while many challenges face domestic shipping, there are good examples where ship owners are taking steps to improve transport of perishable products. The primary concern for farmers is the safety and security of the products they send to the market. The report finds that the size and state of maintenance of ship is not conducive to cold storage option involving refrigerated containers as was originally envisaged. To do so would reduce ship stability and increased ship safety risks. The report therefore proposes a practical option where produce are shipped in small ice boxes with improved labelling. The report noted, however, there is room for improvement in the handling and labelling of products which are shipped to the market and proposed training in this area.

The successful implementation of the agri-tourism projects and the shipping and cold storage action cannot be seen in isolation. They are a part of a number of complementary actions, involving several stakeholders which will be implemented over the short to medium timeframe.



Figure 40 Display Chiller for meat & fish

A



Figure 41 Display cooler for fruit & vegetables



Figure 42 Cooler or Blast freezer



Figure 43 Ship's empty Reefer Container used to stow personal effects & stores

Appendix

Box 9: Community Central Point Model

Given the low level of electrification in the production areas, the team agrees with the recommendation for the development by VCF of community based cold and other storage systems to meet the needs of farmers in defined districts. Solar powered coolers, freezers, ice making machines, etc. would be installed at a central location depending on the type of produce involved. Farmers would also be provided training on the timing and post-harvest handling of produce to reduce damage and loss. Farmers in the district would be provided with small sealed ice boxes/ eskies to secure, store and ship their produce to the port on a 'just in time' basis once information on the time of arrival/departure of vessel is received via smartphone. Efforts should also be made to provide a tractor with grading capability to assist the community to maintain access roads leading to coastal roads and ports.

Criteria for selection as a community cold storage centre

Demand – number of farmers in the district.

Access – distance and state of rural road.

Community leadership – presence of and/or ability of community to organise to manage and maintain cold storage.

Community self-help – ability of community to contribute towards up-keep of colds storage provided.

Co-location prospects – presence of other renewable energy solution e.g. in fisheries sector benefit from share management, existing capacity and standardisation.

Cross cutting issues – impact on women and youth, etc.

Back up support – tried and proven system with warranties and backstopping support in place.



Figure 44 Meeting with Fisheries Officials in Santo



Figure 45 Meeting with Agricultural Officials in Santo

12 Shipping survey Report

Issue	Remarks
Ship management	<p>During the visits, the team held discussions with key stakeholders on the operation of ships and noted a contrast in the views of ship managers/operators which reflected in the way their respective ships are operated and could explain the current situation.</p> <p>As part of the capacity building for shipowners, a refresher on ship management practice will be included.</p>
Competence of crew	<p>During the visits, the team observed that there were some good examples of crew competence and seamanship practice. Request for mandatory ship documents and information, machinery particulars and performance including crew qualifications were a challenge to obtain in many cases. However, there are many opportunities to improve with good mentors and good ship management and regulatory support.</p>
Cargo Security	<p>The initial high-powered meeting referred to concerns on post-harvest issues, shipboard handling of cargo and animal welfare. Discussions held with cargo shippers and cargo consignees confirmed that cargo at times goes missing, tampered or received damaged. Discussions held with some shipping company management and staff revealed that restrictions on port operating hours and cargo operations over the weekends have played a part in animal issues before their discharge.</p>
Cargo handling	<p>In observing cargo handling operations with a number of operators, the team noted some good practice and some that needed improvements which confirmed the concerns by some shippers. Subsequent discussions with ship management and staff revealed a variety of responses ranging from their obligation on duty of care whilst on-board, the need for shippers to clearly mark perishable cargo and some did not comment. It may be prudent that some general awareness to all concern on the statutory obligations on the carriage of goods by sea be made available.</p>
Condition of ship	<p>In reading other earlier official reports,³ our observations reveal that whilst the views expressed in these reports may be true for the majority of vessels, there are some good examples. This variance is evident on both the supposedly profitable and non-profitable routes.</p>
Shipboard equipment	<p>Observation carried out on ships that were in port revealed that most if not all had a fair range of electronic navigational and communication equipment sufficient for the trade, including a magnetic compass. Whilst some had equipment taken ashore for repairs, some have been under repair for some time. In one case, a ship had satellite-based navigational equipment on board but no nautical chart of the area to assist ship personnel safely navigate the vessel. It was reported that the ship had sustained several damages due to groundings in the area. Despite the modern tendency to rely heavily on Electronic Navigational Aids (ENA), the magnetic compass remains an essential navigation instrument on any sea going vessel, and continues to operate independently, in the not uncommon event of an electrical failure or electronics malfunction. Over reliance on electronic navigation aids can lead to trouble. A current deviation card or certificate of adjustment is a legal requirement on all sea going vessels where the deviation must not exceed 5 degrees on any heading. The team sighted numerous deviation cards showing as high as 17 degrees on east and west headings indicating that only a compass swing was made but no correction to reduce the deviation to zero or no more than five (5) degrees on any heading.</p>
Power supply on-board	<p>Information received from ship staff indicated that some ships had uninterrupted power supply throughout the voyage, whilst some were dependent on several factors. The power source included ship's main AC generators, small portable generators, cruising generators running off the main engine and battery powered by solar panels.</p>
Refrigeration	<p>Bigger ships with uninterrupted power supply tended to have good freezing and cooler facilities. Others reportedly only used their domestic freezers when there was sufficient frozen cargo to ship. Two ships visited were commended for cleaning and drying out freezers to reduce bacteria build-up whilst awaiting new frozen goods to arrive. Several did not have refrigeration capacity and even the crew were fed tinned and dried food for the voyage.</p>

³ Van: Interisland Shipping Support Project (ADB report for Ministry of Infrastructure & Public Utilities) Nov 2011.

	Some coastal boats visited were too small to have space for cold storage and if they did, it would affect ship stability thus, carried mostly dry cargo.
Administration	It would appear that a more active oversight of the shipping sector by the administration would be extremely beneficial to enable it to effectively contribute to the socio-economic development of the nation.
Maintenance	Observations of the available vessels indicate that more focus on ship maintenance would prolong the effective use of these costly assets and in return obtain better return on investment.
Customer Feedback	Discussions with ship's staff, passengers, cargo shippers, consignees and shippers' sales representatives in the various market centres have confirmed many of the above observations.
Current cargo Practice	Discussions with shippers revealed that under the prevailing conditions, they are currently sending fish and seafood in sealed ice-boxes/esky to their consignees in the main centres and are quite satisfied with this arrangement. Some have shown preference for certain shipping companies on the basis of regularity, consistency and security of cargo, etc. in spite of the freight rate being a bit higher than other companies. Similar sentiments were expressed by passengers who preferred to travel on ships in their view were regular, consistent with their schedule, clean and comfortable, albeit a bit more costly.
Suggestions	Given that perishable cargoes must arrive at its destination as quick as possible, and that most of the main routes are within reasonable steaming time from the main centres, the shipment of such goods can be effectively shipped in good time and stored in appropriate cold storage. Such goods can be made held onshore in cold storage and shipped in appropriate storage to reach its destination in good condition in a short time as possible.



Figure 46 Market vendor in Lakatoro



Figure 47 Wife of a Fisherman selling fish in Luganville



Figure 48 Female Co-op manager and assistant of Malekula

13 Appropriate technology detail report

Issue	Remarks
Management	For the success of this project, it is important that the cold storage facilities be placed under an effective management arrangement and to include an effective maintenance programme with spare parts service.
Current Practice	Current deep freezers in use operate from two batteries, solar panels, wiring and appropriate fittings. These freezers can be easily converted to a cooler or freezer with the removal/replacement of the cut-out switch.
Competence/skill required	Such simple and robust arrangement is easy to maintain with minimal training.
Type of cooling/cool and cold-storage	<ul style="list-style-type: none"> • Cold storage/freezer can be in the form of a deep freezer or a blast freezer the former can be operated by solar. This freezer can also make block ice which can be crushed and used to cool ice boxes in transit with frozen goods. • Cool storage can be in the form of a deep freezer with the cut-out switch removed. • Flake ice-making machine would have to run off AC power whereas a DC powered freezer could also be used to make ice. • Small Display Chillers for fish and meat. • Small Display coolers for vegetables.
Customer Feedback	Discussions with customers have revealed positive comments of the locally available products and after sales service.
Hygiene/Maintenance	Observations of available vessels with cold storage capacity indicated that some ships were cleaning and drying their freezers to await new cargo and thus, restrict bacteria growth and promote good hygiene practice. The same cannot be said of other vessels sighted.
Service maintenance and spare parts	The team visited a number of local suppliers of AC and DC powered cool and cold storage facilities of various sizes. They also have the capacity to provide service maintenance and spare parts if required, rather than having to go offshore for this service. Several are already providing such facilities to government, private companies, hotels and individuals. Some equipment is donor funded confirming the local capacity to do the work.
Global trend: (DC operated cool and cold storage facility powered by the sun)	Given that SDG 7 aims to ensure access to affordable, reliable, sustainable and modern energy for all, advances in solar technology has opened a wide range of options to provide cold and cool storage facilities for the handling of sensitive/perishable cargo such as fish, meat, vegetables, etc. In this regard, attention should be drawn to the utilisation of solar powered cool and cold storage facility of appropriate size.
AC versus DC cold storage system	The team's visit to production centres reveal that the larger producers have the necessary capital and equipment to cater for their products. The smaller producers would need appropriate technology and capacity to cater for their need. Most if not all these rural production centres are located in the central areas of the larger islands where the land is better suited for crop production etc. In this regard, a simple DC powered cooler charged by the sun would be more than adequate to meet their need. If AC power is available then an AC cooler would be advisable. The drawback with this system would be the ongoing electricity cost which is forecasted to increase over time and adding to the national fuel bill. This conflicts with national pledge to move towards renewables over time. To have a standalone AC generator would require a qualified engineer/electrician to operate, incurring cost and retaining such skill would be an issue. This is especially so in that the production areas are several and scattered whose quantity are not that large to warrant a large cool storage facility.

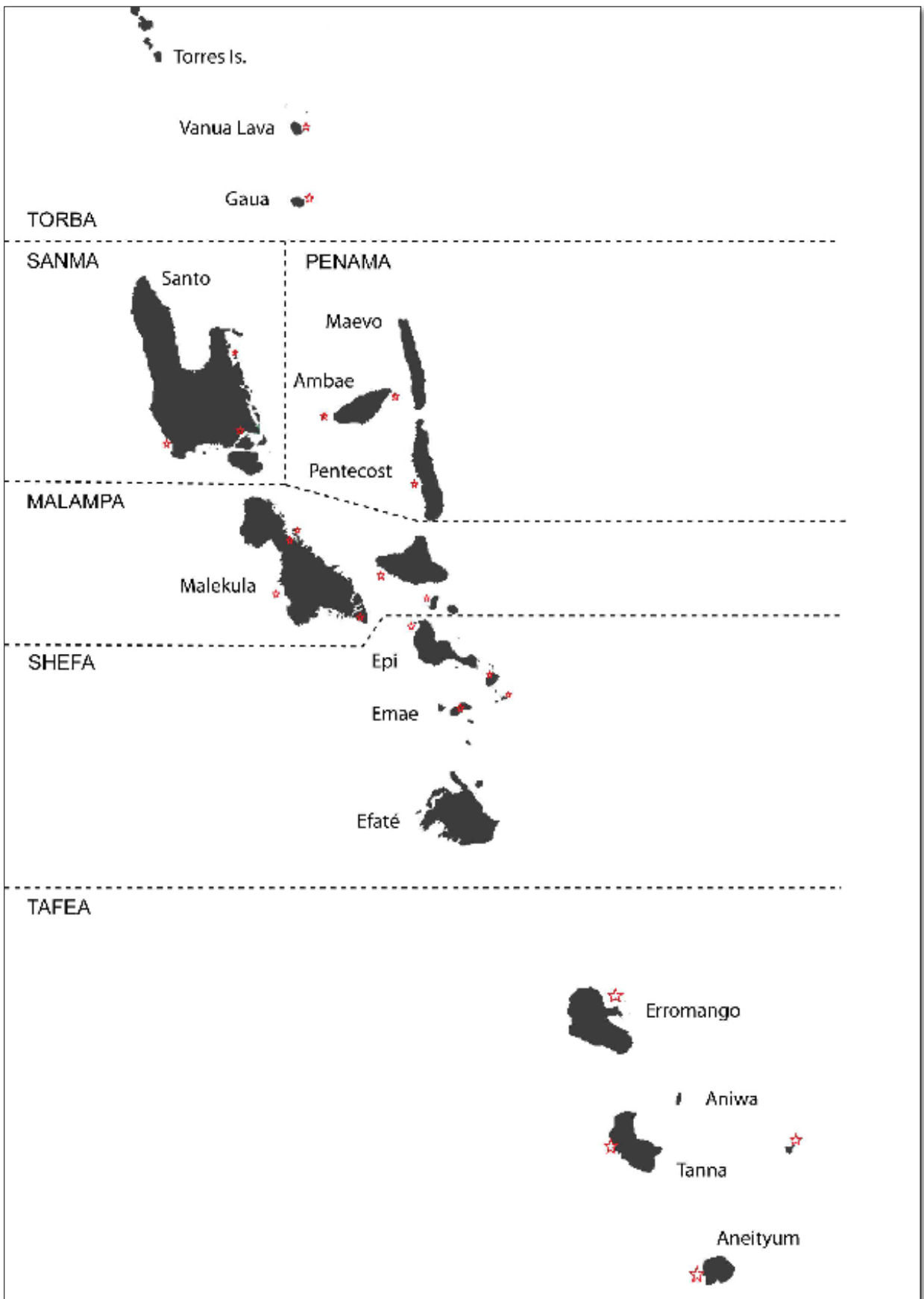
14 Suggested actions to improve sustainability in shipping

Area of concern	Issue	Remarks	Suggestions
Maritime Sector	Policy	Development and implementation of an effective shipping/maritime policy covering all aspects of shipping will guide the administration to achieve the national aspirations.	<ul style="list-style-type: none"> Develop and implement a shipping/maritime policy after wide consultation.
	Governance	Effective governance of the maritime sector has the potential to be a game changer in national development including domestic shipping issues.	<ul style="list-style-type: none"> Independent Review of the sector to set up and operate an effective governance structure and administration.
	National Shipping Council	The Council membership comprises of industry-based representatives providing Government an effective tool based on public/private partnership to manage the shipping sector that can significantly contribute to national development.	<ul style="list-style-type: none"> Establish a National Shipping Council.
	Safe ship management system	This system will provide shipowners and shipboard staff with a safe ship management system that will enhance their ship operation that will lead to sustainable shipping.	<ul style="list-style-type: none"> Implement the Pacific Islands Domestic Ship Safety programme (PIDSS).
Management	Shore-based	Whilst the team sighted some good ship management practices that led to successful management and operations of ships, the same cannot be said for other companies that were facing obvious difficulties which were affecting their service delivery.	<ul style="list-style-type: none"> Develop and implement practical and effective ship management training.
	Sea-going Officers	Whilst the team sighted some good shipboard management practices that led to successful management and operations of ships, the same cannot be said for officers of other companies that were facing	<ul style="list-style-type: none"> Develop and implement a practical and effective ship board management training for officers on-board ships. Need to inculcate the practice of good accurate

		obvious difficulties which were affecting their service delivery.	record-keeping to assist in better managing the shipping industry.
	Ship's crew and support staff	Whilst the team sighted some good examples of seamanship practices that led to successful ship and cargo operations, the same cannot be said for ship's crew of other companies that were facing obvious difficulties which were affecting their service delivery.	Develop and implement a practical and effective ship operations and seamanship training for ship's crew.
Vessels	Number of domestic vessels	<p>It would appear that there are more ships than the market demand resulting in an over tonnage and sub-standard shipping service.</p> <p>The team was reliably informed of more tonnage planned to enter the market.</p>	<ul style="list-style-type: none"> • Determination of the appropriate number of ships to provide an effective and successful domestic shipping service. • Remove over tonnage as it will result in uneconomical operation and poor maintenance of ships. • A lesser number of ships will increase ship loadings and thus generate profit for owners and help improve ship conditions that will attract more passengers. Ships staff can attract better salary thus reflect in improved performance all around.
	Age of domestic vessels	Some vessels sighted are aged, having been operated for years in other Pacific Island Countries and would be costly to operate and maintain at a reasonably safe standard as required by legislation.	Feedback from passengers is that they prefer to go by or put cargo on vessels with better conditions even if the fares and freight charges are higher. Hence, operators of these very old vessels will not be able to attract sufficient funds to properly maintain their ships.
	Condition of vessels	Whilst the team sighted some good clean ships in which the ship's staff knew their responsibility and which passengers preferred	Implement an effective house-keeping programme on-board all ships, similar to the improved taxis and Mama's market in Port Vila

		which led to successful operations of ships, the same cannot be said for other ships.	(Ambassador programme).
Ship's cargo	Increase ships loading	In order for shipping to be sustainable, it has to be profitable. By attracting more inbound and outbound cargo, this will contribute to its profitable operations and less reliance on subsidy.	<ul style="list-style-type: none"> • Focus on the successful implementation of the agri-tourism project to increase ship loading to and from the outer islands. • Explore other untapped source of island produce including coconut wood from senile coconut trees, etc. • Ship's crew to be trained on proper cargo-handling and stowage as poor handling can add to post-harvest loss of produce for farmers and fishermen.

Fisheries Cold Storage Sites



15 Detail of Fisheries Cold Storage Sites

Site	Fish Preservation	Condition
Sola (Vanua Lava)	2 x deep freezers	In good condition. Jimmy has just finished the temporary fish market house last year 2015, using local materials. Two freezers will be installed in the fish market.
Gaua	None	Potential site to establish cold storage.
Luganville	Ice machine	
South Santo	Ice machine	The ice machine has been relocated to Maskelynes and the generator moved to Port Olry. The generator has been shipped to Port Vila and will then be re-located to the Panita Satellite Centre.
Port Olry	Ice machine	Out of service, but we have replaced it with a normal chest freezer and installed it at the Port Olry fish market.
Saratamata	Ice machine - Deep freezer	Ice machine went some years ago. We have replaced it with a freezer which Tambe has already installed at Saratamata fish market.
Batnapni	Ice machine	Centre no longer exists. Ice machine and generator have been seized by the fisheries department due to a dispute and lack of maintenance.
Lakatoro	Ice machine/Cool Room	Walarano ice machine funded by AUSAID was the subject of disputes in the community and as a result it was destroyed. The 2.5 ton cold room is functioning well and is currently used by the Malampa fish market.
Maskelynes	Ice machine	The PACFISH project and an NGO group have revived the ice machine. Ice is currently produced with solar power. About 11 additional vendors have deep freezers.
Uripiv	Solar freezer	100% per full operation.
Craigove	none	Has not existed for many years. Potential site for future installation.
Pamma (Liro/Tahi)	Ice machine	Ice machine not working though the generator does. It is a failed project so the whole unit needs to be retrieved.
Lamen Bay	none	No longer exists. Cold room built later by investor did not work.
Buniga	-	-
Emae	Ice machine	Ice machine broke down following intense dispute. Generator still in good condition.
Panita	Ice machine-private	No information on the private ice machine but have allocated funding from Ming Dar TC PAM to renovate the shelter to install the generator.

16 Summary of inspection on available ships

Port of Inspection	No of Vessels & type	Routes & Cargo	Vessel condition	General Observation	Measures
Port Vila, Efate	Small Ex-Fishing vessel	Port Vila-Emae-Epi (weekly)	<ul style="list-style-type: none"> • Aged vessel converted to carry passenger and cargo. • Minimum space available on-board 	<ul style="list-style-type: none"> • Portable generator currently unserviceable. • Carries some ice-boxes. • Compass deviation card anomalies noted. 	<ul style="list-style-type: none"> • Crew would benefit from basic seamanship training.
	Catamaran	Port Vila-Islands en route-Luganville	<ul style="list-style-type: none"> • Reasonably kept. 	<ul style="list-style-type: none"> • Some good practice observed. • Could improve on cargo handling. • Has good navigation equipment on-board. 	<ul style="list-style-type: none"> • Some good ship management style that is workable in Vanuatu.
	Landing craft	Port Vila-Tanna-southern Islands & Charters (Privately owned)	<ul style="list-style-type: none"> • Vessel aged but attempts by crew to keep it operational and clean as best as they can. 	<ul style="list-style-type: none"> • Ship's crew commendable. • Has basic navigational equipment. • Compass deviation card anomalies noted. 	<ul style="list-style-type: none"> • Some good ship management style that is workable in Vanuatu.
	Landing craft	Port Vila-Malekula (Privately owned ship generally to cater for owners cargo)	<ul style="list-style-type: none"> • In reasonable condition. • Crew clean as best as they can. 	<ul style="list-style-type: none"> • Ship's crew commendable. • Has good navigation equipment. • Compass deviation card anomalies noted. 	<ul style="list-style-type: none"> • Some good ship management style that is workable in Vanuatu.
	Roll-on/Roll-off	<ul style="list-style-type: none"> • Luganville-Islands-Port Vila-Tanna • Charters 	<ul style="list-style-type: none"> • Aged but reasonably maintained. • Provides various cargo options. • Appear to be managed well. 	<ul style="list-style-type: none"> • Regular service. • Positive Feedback from passengers and cargo shippers. • Some negative feedback received. • Crew appear to know their job and are fully occupied. • Company bringing in another cargo vessel to complement the current operation. 	<ul style="list-style-type: none"> • Ship management style proven to be workable in Vanuatu. • A good ship management model for other operators to adopt/adapt. • Some opportunities to improve exist.

				<ul style="list-style-type: none"> • Customer focus with reasonable cargo and passenger facilities. 	
	Landing craft	Port Vila-Charters	<ul style="list-style-type: none"> • Vessel aged but in reasonable condition. 	<ul style="list-style-type: none"> • Has basic navigation equipment. • Compass deviation card anomalies noted. 	<ul style="list-style-type: none"> • Implement a <u>basic</u> Standard Operating Procedure (SOP). • Implement an effective planned maintenance program. • Implement an effective house-keeping practice. • Require basic ship management/operation skills. • Require basic cargo handling training.
Lenakel, Tanna	1 Passenger/Cargo	<ul style="list-style-type: none"> • Port Vila-Erromango-Tanna-Southern Islands • Charters 	<ul style="list-style-type: none"> • Generators unserviceable. • Main Engine used as a power take-off to run generator to operate crane etc. • All Ship's documents to be on-board 	<ul style="list-style-type: none"> • Reasonably good Navigational aids. • Solar-powered lighting & powering of some navigational aids. • Crew had potential but could more do with some guiding. • Compass deviation card anomalies noted. 	
Luganville, Santo	Inter-insular passenger-cargo	Luganville-Sanma-Penama & Torba provinces	<ul style="list-style-type: none"> • Vessel aged but attempts by crew to keep it operational and clean as best as they can. 	<ul style="list-style-type: none"> • Reasonably good ship's Navigational aids. • No charts of some areas. • Owner appears keen to provide a good service. • Compass deviation card anomalies noted. 	
	Landing craft	Luganville-Islands en route-Port Vila <i>(Privately owned ship generally to cater for owners cargo)</i>	<ul style="list-style-type: none"> • Vessel aged but attempts by crew to keep it operational. 	<ul style="list-style-type: none"> • Has basic navigational equipment. • Compass deviation card anomalies noted. 	
	Inter-insular passenger-cargo	Luganville-Sanma-Penama & Torba provinces	<ul style="list-style-type: none"> • Vessel aged. 	<ul style="list-style-type: none"> • Basic ship's Navigational aids. • Compass deviation card anomalies noted. 	

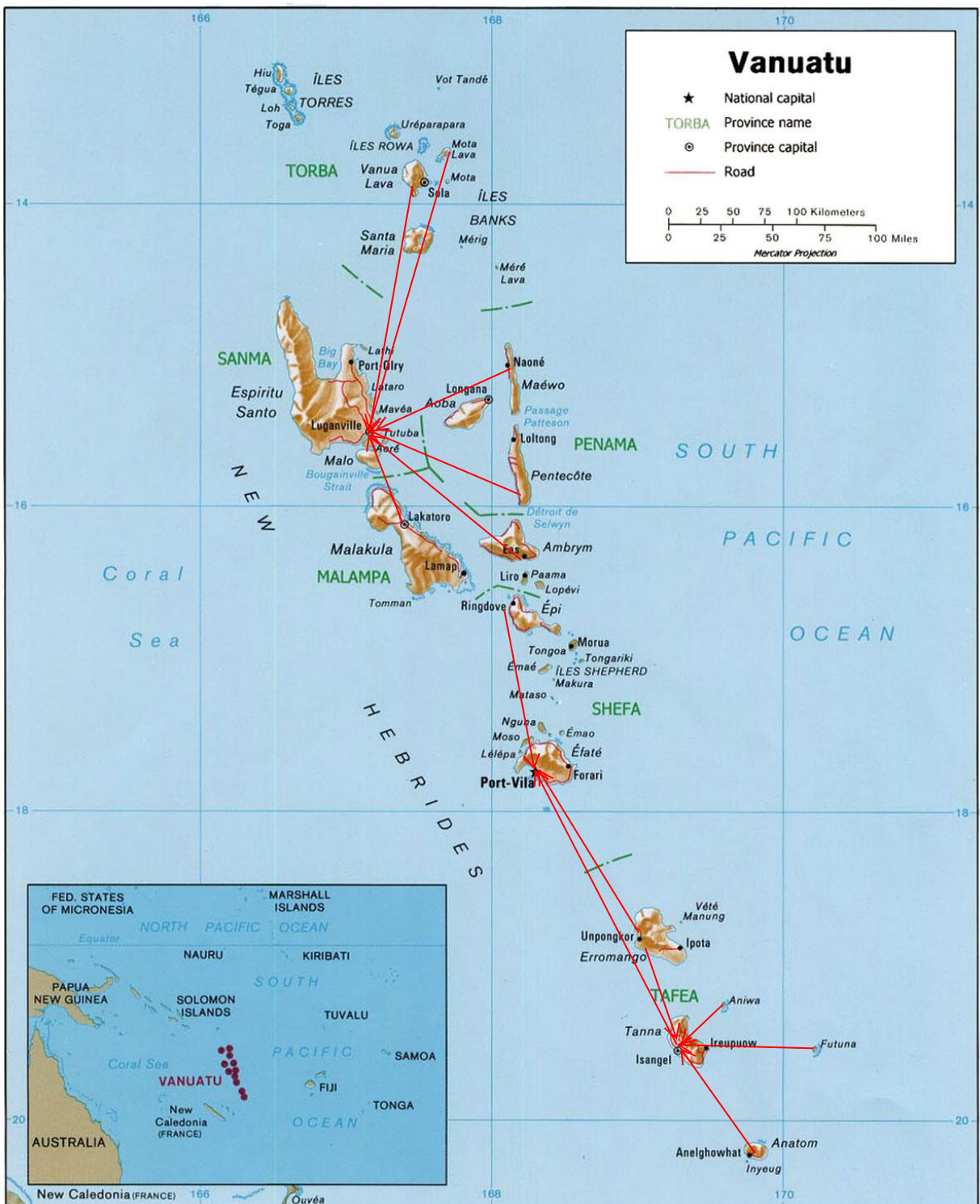
	Landing craft	Luganville-Islands en route-Port Vila <i>(Privately owned ship generally to cater for owners cargo)</i>	<ul style="list-style-type: none"> • Vessel aged but attempts by crew to keep it operational. 	<ul style="list-style-type: none"> • Has basic navigational equipment. • Compass deviation card anomalies noted. 	
	Small Ex-Fishing vessel	Luganville-nearby islands.	<ul style="list-style-type: none"> • Aged vessel converted to carry passenger and cargo. • Minimum space available on-board. 	<ul style="list-style-type: none"> • Portable generator currently unserviceable. • Carries some ice-boxes. • Compass deviation card anomalies noted. 	
	Small coastal passenger-cargo ferry	Luganville-Santo coast-nearby islands	<ul style="list-style-type: none"> • Aged vessel. • Minimum space available on-board. 	<ul style="list-style-type: none"> • Portable generator. • Carries some ice-boxes. • Compass deviation card anomalies noted. 	<ul style="list-style-type: none"> • Crew would benefit from basic seamanship training.
	Landing craft	Luganville-Islands en route-Port Vila <i>(Company owned ship to cater for customers)</i>	<ul style="list-style-type: none"> • In reasonable condition. • Crew clean as best as they can. 	<ul style="list-style-type: none"> • Ship's crew commendable. • Has good navigation equipment. • Compass deviation card anomalies noted. 	<ul style="list-style-type: none"> • Some good ship management style that is workable in Vanuatu.
Litzlitz, Malekula	1 Landing Craft	<ul style="list-style-type: none"> • Santo-Malekula-Outer Islands • Charters 	<ul style="list-style-type: none"> • Generators unserviceable. • Main Engine used as a power take-off to run generator to operate crane etc. • All Ship's documents to be on-board. 	<ul style="list-style-type: none"> • Could do with some basic shipboard management. 	<ul style="list-style-type: none"> • Implement a <u>basic</u> Standard Operating Procedure (SOP). • Implement an effective planned maintenance program. • Implement an effective house-keeping practice. • Require basic ship management/operation skills. • Require basic cargo handling training.
	1 small Passenger/cargo boat	• Malekula-Outer Islands	• Ship's documents to be on-board	• Basic manual cargo operation, etc.	

Note: The observations above are based on the team's short visit whilst the vessels were in port and this report does not take into account survey and other conditions of the vessels including the hull. The Pacific Community (SPC) accepts no liability for the content of this report, or for the consequences of any actions taken on the basis of the information provided, unless that information is subsequently confirmed in writing.

17 Summary of procurement plan

Province	Island/ Township	Solar Panels, Batteries, wiring, Controller, terminals	Deep Freezers (395 litres)	Coolers (395 litres)	Flake Ice-Making Machine & Bin (500 kg)	Display Chiller/Freezer (covered)	Display Cooler (covered)	Ice boxes (Plastic/ F-glass)	Blast Freezer (Cold Storage)	Cooler (Cold Storage)
TORBA	Vanua Lava									
SANMA	Santo/ Luganville				2	2	2		1	1
PENAMA	Pentecost									
MALAMPA	Malekula									
SHEFA	Efate/ Port Vila				2	2	2		1	1
TAFEA	Tanna									
TOTAL										
Total Cost										

Route Map



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