Pacific Horticultural and Agricultural Market Access Program (PHAMA)

Technical Report 45: Feasibility Study to Determine Infrastructure Requirements for Processing & Packaging Horticultural Products for Export (TONGA08)

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Abbreviations

Abbreviation	Description
AGC	Agricultural Growth Committee
AUD	Australian dollars
AusAID	Australian Agency for International Development
BQA	Bilateral Quarantine Agreement
CIF	Cost Insurance and Freight
EU	European Union
FAO	The Food and Agriculture Organization of the United Nations
FJD	Fiji dollars
GDP	Gross domestic product
GroCom	Growers Commodities Marketing Group Ltd (Tonga)
GroFed	Growers Federation of Tonga (Inc)
HACCP	Hazard and Critical Control Point
HTFA	High temperature forced air
MAF	Ministry of Agriculture and Forestry (New Zealand)
MAFFF	Ministry of Agriculture, Food, Forestry and Fisheries
MAWG	Market Access Working Group (PHAMA)
MCTL	Ministry of Commerce, Tourism and Labour
MORDI	Mainstreaming of Rural Development Innovation
NMAC	National Market Access Coordinator
NWC	Nature's Way Cooperative (Fiji) Ltd
NZAP	New Zealand Aid Programme
NZD	New Zealand dollars
PHAMA	Pacific Horticultural and Agricultural Market Access Program
PICs	Pacific Island Countries
PPP	Public-Private Partnership
PSDS	Private Sector Development Strategy
SME	Small and Medium Enterprise
STABEX	*Système de Stabilisation des Recettes d'Exportation*
TDB	Tonga Development Bank
TEQM	Tonga Export Quality Management Ltd
TOP	Tongan pa'anga
TSDF	Tonga Strategic Development Framework
URS	URS Australia Pty Ltd
USAID	United States Agency for International Development
USD	United States dollars

Exchange Rates

Australian dollars (AUD) 1.00 = Tongan pa'anga (TOP) 1.80

New Zealand dollars (NZD) 1.00 = TOP 1.44

United States dollars (USD) 1.00 = TOP 1.72

Executive Summary

Background: The Tonga Market Access Working Group (MAWG) requested assistance from the Pacific Horticultural and Agricultural Market Access Program (PHAMA) to assess the adequacy of present horticultural processing and marketing infrastructure in Tonga, to assess options for developing improved facilities, and to prepare specifications for the preferred option. Tonga has a number of well-established exporters handling squash, coconuts, watermelons and root crops (fresh and frozen) who are interested expanding their businesses and diversifying into high value air-freighted fresh produce once the export protocols are put in place. The Tonga MAWG recognises that such expansion cannot take place unless there is adequate infrastructure for processing, packaging and transporting these items to market.

Agricultural Exports: Tonga's agricultural exports have been very unstable over time. Traditional exports such as copra have declined over time, although coconut exports have been fairly consistent, increasing steadily during the last five years. Exports of tropical fruits (bananas, pineapples etc.) to New Zealand were important in the 1960s and 1970s but came under increasing competitive pressure from Central America and the Philippines, accentuated by increasingly stringent phytosanitary regimes and the demise of marketing parastatals in both Tonga and New Zealand. Fresh fruit and vegetable exports to New Zealand are currently negligible, although there are small amounts of trade to other Pacific Islands. Cucurbits and root crops are currently the two most important sectors, although performance has been patchy. Exports of cucurbits (mainly squash) collapsed during the last decade but have since staged a modest recovery. Exports of root crops have been fairly consistent over time, and there has been some recent success (supported by PHAMA) in developing watermelon exports to New Zealand. Current exports to New Zealand are confined to items that can be treated by fumigation either prior to shipment (e.g. watermelons) or after arrival in New Zealand (e.g. taro, tarua and yams).

Marketing infrastructure and transport services are generally adequate to support the current level of exports, but pose some limitations to future expansion and diversification.

The **Nuku'alofa export marketing facility** is well located, with paved roads on two sides, and is only about 500 m from the international shipping wharf. There is abundant land available to expand the facilities if needed. About a third of the complex is used for Ministry of Agriculture, Food, Forestry and Fisheries (MAFFF) offices, for work not necessarily related to export marketing. All other parts of the facility are available for use by exporters without charge other than payment for electricity used. Two or three exporters are using the facility on a regular basis to process root crops for export in sea containers, both frozen and chilled. However, the export processing and inspection area is mostly used for inspecting handicrafts for export and is not generally available for processing, packing and inspecting fresh produce for export. This area includes a cool room and blast freezer. The paved outside area between the two buildings is used for washing and packing root crops for export, but does not have a roof, packing tables, or adequate lighting and power supply. Wastewater is discharged directly to the sea without treatment. Water supplies come from rainwater tanks with a total capacity of 120,000 litres. The fumigation facility is currently able to treat all the watermelons exported and there is space to add an additional 40-foot fumigation chamber if needed.

The **Vava'u export processing facility** contains most of the equipment needed to process, pack and store fresh produce for export. It is well located in the port area, with good access to road and sea transport. The facility is available to anyone wishing to process fresh produce for export, but has never been used for this purpose. This may be partly attributable to the very low level of export activity in

Vava'u, with only one cassava exporter active on a semi-regular basis. However, there are also a number of design features that detract from the usefulness of the facility. The produce receival area would be very inconvenient to use, and the washing and packing area is a very narrow un-ventilated room with no windows, which would be extremely hot and humid to work in. The large open general work and storage area is potentially useful as a packing area, but contains no packing equipment (tables, scales etc.). The blast freezer is only about half the size needed to prepare a full container load of produce for export.

The **Fua'amotu airport facility** is designed to perform high temperature forced air (HTFA) treatment of fresh produce in line with the requirements for fruit fly host species (papaya, chilli, eggplant, breadfruit, mangoes, avocados, tomatoes etc.). The facility is well located, with direct access to the airport cargo area, and has all of the necessary equipment for HTFA treatment and cold storage chambers in an insect-proof area. It is also suitable for packing and cold storage of non-fruit fly host products (such as beans and okra) prior to export. Until recently, the facility was operated by MAFFF. There has been very little use of the facility since 2000 and maintenance has been limited, with the result that the facility is now in need of an overhaul to become operational again. Some repairs have been undertaken during the last year with the help of a New Zealand volunteer, but these have been only partial due to lack of funding.

In June 2010, the New Zealand Aid Programme (NZAP) and the Government of Tonga agreed to provide funding to support the overhaul of the airport facility and its operations for several years until throughput was sufficient to be self-financing. It was a condition of the agreement that the facility would be transferred to another parastatal company, Tonga Export Quality Management Ltd. (TEQM) and re-commissioned. However, the asset transfer agreement between MAFFF and TEQM was not executed until 15 March 2013, by which time the offer of NZAP funding had expired. Consequently, the planned overhaul was never completed and the facility remains idle.

Private Packhouses: The established exporters handling root crops, squash, pumpkins, coconuts and watermelons have packhouse and storage facilities that are adequate to handle the current volumes exported. During the narrow squash exporting season, these facilities need to pack up to 1,000 tonnes per week. However, they have handled much more than this in the past, when Tonga was exporting up to 20,000 tonnes in a two-month season.

Export Pathways and Infrastructure Needs: Current exports of **coconuts** are around 1,100 tonnes per annum. Exports of coconuts have increased from about 50 tonnes per month to almost 100 tonnes per month during the last five years, occasionally reaching 150 tonnes per month. Coconut exporters do not face any equipment or infrastructure constraints in handling these volumes. However, mechanised husking equipment has the potential to improve profitability of the value chain by reducing the amount of labour used in husking nuts.

Current **watermelon** exports are around 200–300 tonnes per annum, mostly during October, November and December, when monthly volumes can reach 80–100 tonnes. The watermelon exporters have the capacity to harvest, grade and pack this volume, using the same facilities as those used for squash. The MAFFF fumigation facility can handle two 10 tonne container loads per day, so with about three ships per month it is generally possible to fumigate the current level of exports during one or two days before sailing. The New Zealand market for watermelons is seasonal, with imports during Tonga's three-month export season in the range of 450 to 750 tonnes per month. If the fumigation facility works at full capacity, it could process 180 tonnes per month, which is only about 25–40% of the market requirements during Tonga's export season. The watermelon exporters have

plans to expand volumes towards 1,000 tonnes per annum over the next few years. On this basis, the capacity of the fumigation facility would become limiting in the near future.

Current exports of **squash** are around 3,300 tonnes per annum over a period of about six weeks. This requires an average harvesting and packing capacity of about 90 tonnes per day. The largest exporter has the capacity to harvest and pack this amount, more if necessary by working extended or double shifts. There are also several smaller squash packing facilities. Together these have handled much larger volumes of squash in the past. Since squash exports to Japan and Korea are unlikely to expand very much, and any exports to New Zealand will be over a longer seasonal window, the squash/pumpkin marketing pathway does not have any significant capacity constraints.

Tonga does not have the required infrastructure for hygienic and efficient processing of **root crops** in the required quantities. Current exports are about 1,650 tonnes of frozen cassava, 500 tonnes of other frozen root crops, and about 1,400 tonnes of chilled fresh root crops per annum. This represents about 240 twenty-foot containers per year or 4–5 containers per week. The New Zealand market has the capacity to absorb increased exports of root crops, and there are also markets further afield (including Australia and North America) with considerable potential, especially for frozen product. Processing infrastructure limitations constrain access to these markets. The MAFFF export processing facility at Nuku'alofa only has the capacity to process about three tonnes per day or one container per week. The facility is poorly designed and equipped and needs significant upgrading to increase capacity and operate more efficiently. Because the MAFFF facility lacks the capacity, most of the root crops are processed in very basic facilities that do not meet acceptable hygiene standards or levels of operational efficiency. The root crop exporters have expressed a preference for access to decentralised processing facilities with the equipment needed to process root crops hygienically and efficiently in the rural areas. It has been suggested that two decentralised units would be appropriate, one each in the Eastern and Western Districts of Tongatapu. Some small investments and operational modifications would also improve the capacity of the MAFFF facility.

Exports of **fresh fruit and vegetables** are currently running at a very low level, mainly confined to taro leaves (non-fruit fly host) and breadfruit (cooked and frozen). There are several MAFFF-registered packhouses currently used for watermelons that could be used to process fruit and vegetables, although none of these are Hazard and Critical Control Point (HACCP) certified. The airport facility has most of the equipment needed to prepare fruit and vegetables for export, including a cool room equipped to store air freight containers prior to loading. However, the facility is in poor condition and requires a thorough overhaul.

The **infrastructure needs** for processing and packing horticultural commodities, in order of priority, are:

1. Improvements to the Nuku'alofa export processing facility to increase its capacity and enable it to operate more efficiently.
2. Overhaul and improvement of the Fua'amotu airport facility.
3. Establishment of two decentralised general-purpose processing facilities on Tongatapu.

This report details the necessary works and equipment required for each of these facilities.

The **ownership and operation** of the export processing facilities detailed above is just as important as the structures and equipment therein. The preferred option is for the exporters to own and operate all processing and packaging facilities, similar to the Fiji model with Nature's Way Cooperative (NWC).

The two **MAFFF export facilities** at Nuku'alofa and Vava'u are available for use by exporters for the cost of electricity only. This arrangement is not sustainable, as it makes no provision for other operating costs, repairs, maintenance or replacement of the facilities at the end of their working life. It is inevitable that the condition of the facilities will deteriorate over time unless a system of full cost recovery is established. Ideally, the facilities should be leased to a private sector operator, preferably a NWC-type entity, which would charge commercial rates for use of the facility.

The **airport facility** has recently been transferred from MAFFF to TEQM, which is a state-owned company. TEQM has no other assets and no sources of revenue other than fees paid by users of the facility. It is recognised, however, that over the next few years revenue collected from users will almost certainly be insufficient to cover the full operating costs or to finance the necessary repairs, maintenance and improvements. TEQM will therefore need external funding for up to five years. As with the MAFFF facilities, once throughput is sufficient, the facility should be leased to a private sector operator, preferably a NWC-type entity.

The preferred option for ownership and operation of the proposed two **decentralised processing facilities** is for them to be controlled by the growers and/or exporters from the outset. The role of MAFFF would therefore be confined to technical support and inspection/certification. Charges for use of the facilities should be sufficient to cover all operating costs, as well as a sinking fund to accumulate money to finance replacement of the buildings and equipment as necessary.

1 Introduction

1.1 Background

The Pacific Horticultural and Agricultural Market Access Program (PHAMA) is an aid-for-trade program financed by the Australian Government through AusAID. PHAMA aims to increase exports of high value primary products from Pacific Island Countries (PICs) by working collaboratively with relevant government agencies and export industries to address regulatory aspects associated with gaining and maintaining access to key markets. This reflects the generally poor export performance of PICs during an era of strong growth in global trade, and Australia's very low level of horticultural and agricultural imports from the Pacific.

Each of the PHAMA participating countries (Fiji, Samoa, Solomon Islands, Tonga and Vanuatu) has a Market Access Working Group (MAWG) and a National Market Access Coordinator (NMAC). The MAWGs are responsible for prioritising the market access activities for PHAMA support, and for overseeing implementation of these activities.

The Tonga MAWG requested assistance from PHAMA to assess the adequacy of present horticultural processing and marketing infrastructure in Tonga, to assess options for developing improved facilities, and to prepare specifications for the preferred option once feasibility is established.

A study was undertaken during January–February 2013 to assess the adequacy of existing processing and marketing infrastructure in terms of current and projected export volumes, to identify significant constraints and bottlenecks, and to make recommendations on future requirements. The work was undertaken in parallel with a study to assess the commercial prospects for various horticultural export commodities, which is the subject of a separate report.[1]

1.2 Rationale

Despite having a very small land area, Tonga has very good agricultural production capacity, with good soils and favourable climatic conditions for a wide range of tropical and sub-tropical crops, as well as temperate horticultural products in the winter months. There are long-standing trade linkages with New Zealand, and Tonga has historically been a source of many fruit and vegetable crops for New Zealand, including pineapples, bananas, coconuts, root crops and winter vegetables. Tongan exporters also have long-standing trade linkages with Australia (coconuts and root crops), Japan (squash), North America, and other PICs.

However, exports have waned over a number of years due to increasingly stringent phytosanitary regulations, more demanding quality requirements and increasing competition from other suppliers, including Australia, South America and North America. In addition, some of the export protocols under various bilateral quarantine agreements (BQAs) have lapsed (e.g. beans to New Zealand).

Due to its proximity and transport linkages, New Zealand has always been Tonga's main target market for exports. Although small in absolute terms, the New Zealand market is large relative to Tonga's capacity to produce and export. Effectively, the size of the market does not represent a constraint from Tonga's perspective. New Zealand is heavily dependent on imports of temperate horticultural products during the cooler winter months (May to October), and of tropical products all year round.

[1] See PHAMA Technical Report 44: Feasibility Study on the Potential for Developing Exports of Selected Products From Tonga to New Zealand.

The large population of Pacific Islanders, Indo-Fijians and Asians in the Auckland area also provides market opportunities for specialised food products that target the culinary needs of these communities. New Zealand has five or six large fresh produce wholesalers who handle the full range of products and routinely import temperate products for the mainstream market through the winter months, and specialised tropical products for the ethnic communities all year round. This differs markedly from the Australian market, which is mostly supplied from domestic production and does not have a strong import culture.

Seasonality strongly favours Tonga in accessing the New Zealand market. Tongan production of horticultural products tends to be higher, and prices lower, between June and October. This coincides with the period when supplies of many items in New Zealand are scarce or non-existent, and when prices in Australia (a competing exporter) are the highest. There are good air and sea freight linkages between Tonga and Auckland, although costs (particularly for air freight) tend to be high due to low volumes. However, current exports are almost entirely confined to low value products transported by sea, such as root crops, pumpkins, squash, watermelons and coconuts. Exports of fresh fruit and vegetables are currently negligible, and there are no export protocols in place for a number of potentially profitable export commodities.

There are a number of well-established exporters handling squash, coconuts, watermelons and root crops (fresh and frozen) who are interested expanding their businesses and diversifying into high value air-freighted fresh produce once the export protocols are put in place. The Tonga MAWG recognises that such expansion cannot take place unless there is adequate infrastructure for processing, packaging and transporting these items to market.

Current annual exports include around 3,600 tonnes of root crops, 3,500 tonnes of squash and watermelons, and 1,100 tonnes of coconuts. Most of these exports go to New Zealand, except for the squash which goes mainly to Japan, and some of the coconuts which go to Australia. Most of the root crops (cassava, taro, giant taro, tarua and yams) are bulk shipments in 20 kg bags, with about 60% in frozen form. Significant increases in both volumes and value are considered possible if the exporting infrastructure is improved and the transition is made from bulk format to retail packaging. Importers with established national distribution networks in both New Zealand and Australia have agreed to partner the Tongan industry in this initiative, with national distribution trials for retail packed frozen root crops about to take place in New Zealand. Further development of the processed export pathway is regarded as a necessary means of managing potential market access issues.

Most export processing is currently undertaken in small, decentralised and basic premises, with consolidation taking place into reefer containers (chilled and frozen) prior to export. In an attempt to formalise this extensive informal trade, a modern post-harvest facility was established with European Union (EU) STABEX (Système de Stabilisation des Recettes d'Exportation) funding in 2010. This facility, which is under the control of the Ministry of Agriculture, Food, Forestry and Fisheries (MAFFF), is equipped with facilities for washing, peeling, cutting, bagging, chilling and freezing produce, with a capacity of around three tonnes per day. It also includes a fumigation chamber with a capacity of around 20 tonnes per day. The primary purpose of the plant is to act as a demonstration and product development facility, and it is not considered to have sufficient capacity to meet expanding industry needs. It is currently used sporadically for processing shipments of frozen root crops.

Apart from infrastructure, it is also necessary to be mindful of a number of other constraints. MAFFF has limited capacity to support the expansion of the export sector in terms of export inspection and certification. This is exacerbated by the demands on MAFFF to inspect and certify large numbers of

small consignments of handicraft products (mats, wood carvings, tapa etc.). MAFFF also has limited capacity to provide the necessary research and extension support (including grower registration and quality assurance schemes), maintain required biosecurity standards (such as pest and disease surveillance), and progress market access issues and negotiate export/import protocols. Other factors that need to be considered include the high cost of agricultural inputs (seeds, fertilisers, agro-chemicals etc.), the high cost of fuels and energy, and limited access to finance for agricultural and export development.

1.3 Strategic Framework

Tonga's recent agricultural and horticultural export performance has been generally disappointing. In contrast, developing countries globally have benefited from increased trade in high-value agricultural and horticultural products over the past 20–30 years. The relatively poor performance of Tonga and other PICs in this area is particularly disappointing considering: (i) these are agriculture-based economies, often with very limited alternative development opportunities; (ii) the comparative advantage often cited for the region in the production and export of a wide range of agricultural and horticultural products; (iii) the proximity of some large and affluent markets; and (iv) the commonly acknowledged role of economic growth and trade as a mechanism for promoting regional stability.

Difficulties in dealing with the regulatory processes associated with accessing key markets are a major reason behind this poor performance. Progress in negotiating new or improved access has been slow, resulting in a high level of frustration and missed export opportunities. New market access agreements have been few and hard won, and trade in some products has stagnated and in some cases declined due to the imposition of more onerous protocols for products that were historically traded with relative ease. These conditions apply to some extent to most agricultural and horticultural commodities, with approved market access pathways for some items (albeit with strict compliance protocols), but total import prohibition for others.

1.4 Study Methodology

The study is part of a process of developing Tonga's capacity to export horticultural products, including the traditional export commodities such squash, coconuts and root crops, as well as higher value perishable fruit and vegetables, by air or sea. It is intended to identify key infrastructure bottlenecks and constraints, which PHAMA and other industry stakeholders can then address. The scope of work included:

(i) Assess existing processing infrastructure in relation to installed capacity, throughput, condition, ability to comply with import standards, major product lines, ownership, and ability to meet projected medium-term industry needs. Particular reference should be made to the present and future role of the STABEX-funded facility.

(ii) Review current exports of fresh and processed crops and assess likely future exports (product type, volumes, markets and prices).

(iii) Identify major constraints and issues associated with present processing infrastructure, in particular the capacity to meet processing needs and standards.

(iv) If additional capacity is required, identify the main options for establishing this (e.g. private sector investment, expansion of the MAFFF post-harvest facility, establishment of a cooperative-owned and operated plant, etc.).

(v) Prepare concept plans for the preferred option.

(vi) Undertake a feasibility study for the proposed investment, identifying capital costs; operating costs; projected throughput; projected markets, sales, and prices; and ownership/ governance arrangements.

A three-stage process was employed:

- Analysis of supply issues (including the current volume and seasonality of supply); grading, packing and transport requirements; experience in exporting; and other factors influencing Tonga's capacity to supply the principal markets. This work was undertaken in close collaboration with MAFFF, the Tonga MAWG, other relevant Ministries and institutions, and a number of commercial agribusiness enterprises.
- Assessment of the design and capacity of the existing processing and packaging infrastructure relative to current and projected future export volumes in order to identify critical bottlenecks that may constrain export growth.
- Preparation of recommendations on the infrastructure required and the operational procedures to be employed in order to realise Tonga's export potential over the next five years.

This screening process provided some clear conclusions on the key infrastructure constraints and the steps required to overcome these.

2 Economic, Policy, and Agricultural Sector Background

2.1 The Economy

Tonga's gross domestic product (GDP) in 2010–2011 was estimated at TOP783 million (USD455 million) and its real per capita income was USD3,580. The average GDP growth rate in the period 2000–2010 was 1.3%, but it increased to 4.7% in 2010–2011. As recorded by the 2006 census, the unemployment rate was 4.9%. The total population is estimated at 104,000 for 2010, but its growth is strongly affected by net out-migration (to New Zealand, Australia and the United States) at an average rate of 1.7%, resulting in a 0.3% net annual population increase. Consequently, remittances (which constitute a significant share of Tonga's GDP) are an important source of income. In 2010–2011, agriculture accounted for about 16% of GDP, industries 22% and services 60%. Major economic activities are tourism, construction, and fishing. Important exports include squash, root crops, fish and vanilla, mainly sold into New Zealand, Asian markets, the United States and other PICs.

2.2 National Development Strategy

The **Tonga Strategic Development Framework** (TSDF) 2011–2014 presents the overarching national development strategy. It incorporates the vision, nine outcome objectives and four enabling themes. The **vision** *is "to develop and promote a just, equitable and progressive society in which the people of Tonga enjoy good health, peace, harmony and prosperity, in meeting their aspirations in life"*. The nine **outcome objectives** are:

1. Strong inclusive communities, by engaging districts/villages/communities in meeting their prioritised service needs and ensuring equitable distribution of development benefits.
2. Dynamic public and private sector partnership as the engine of growth, by promoting better collaboration between government and business, appropriate incentives, and streamlining of rules and regulations.
3. Appropriate, well planned and well maintained infrastructure that improves the everyday lives of the people and lowers the cost of business, by the adequate funding and implementation of the National Infrastructure Investment Plan.
4. Sound education standards, by emphasising quality universal basic education.
5. Appropriately skilled workforce to meet the available opportunities in Tonga and overseas, by delivering improved technical and vocational education and training.
6. Improved health of the people, by promoting healthy lifestyle choices with particular focus on addressing non-communicable diseases, and providing quality, effective and sustainable health services.
7. Cultural awareness, environmental sustainability, disaster risk management and climate change adaptation, integrated into all planning and implementation of programs.
8. Better governance, by adopting the qualities of good governance, accountability, transparency, anti-corruption and rule of law.
9. Safe, secure and stable society, by maintaining law and order.

The four enabling themes are:

1. Continuing progress to a more efficient and effective government by focussing on its core functions; improving coordination, service delivery and optimising use of resources.
2. Improving the macroeconomic environment and fiscal management, including effective revenue services.
3. Ensuring public enterprises are sustainable and accountable, and where appropriate moved into the private sector.
4. Ensuring a more coordinated whole-of-government approach in Tonga's partnership with development partners.

Outcome objective 1 (strong, inclusive communities) recognises that profound changes are occurring in the rural economy, including ageing populations. The primary sector (including agriculture and fisheries) and many traditional industries and activities are experiencing a long-term declining trend in their contributions to the economy. This loss of primary sector and traditional production is being somewhat made-up by the growth of the services sector, which is largely urban-centred; diversification into new activities; and the growing importance of tourism. Growth has been focussed in urban areas, most notably Nuku'alofa. This has resulted in increasing inequality in the distribution of benefits in terms of wealth and income between households and regions.

The TSDF notes that the agriculture, forestry and fisheries sector has shown zero growth over the past five years, and that agricultural exports have declined sharply. This repeats a common pattern both in agriculture and fisheries where promising new export markets expand rapidly only to decline due to a mix of poor management and lack of sustainability. However, the agriculture and fisheries sector still contributed approximately 19% of GDP in 2009–2010 and continues to be the mainstay of the rural economy, providing food security, employment and income for many households. For households in the rural areas of Tongatapu and the outer islands, home production accounts for approximately one third of all food consumed by households.

2.3 MAFFF Sector Plan

MAFFF has formulated the MAFFF Sector Plan, which provides a policy framework for promoting agriculture and food, forestry and fisheries development. It focuses on providing public and private sector support services to agriculture, forestry and fisheries development, through assistance to increase exports of agricultural, forestry and fisheries products; import substitution; reducing food insecurity and rural poverty; securing a sustainable increase in supply and availability of food; ensuring an enabling policy and regulatory framework; resource conservation and diversification of the resource base; and generating knowledge of agriculture and food, forestry and fisheries, acknowledging that the full commercial development of products that are technically viable requires private investment. The TSDF also recognises that market access is dependent on the transport infrastructure for the outer islands and is necessary for fundamental quality of life and potential investment.

The MAFFF Sector Plan adheres to the relevant TSDF development objectives, although the government has signalled that changes will be required in the way MAFFF and the public sector function as a whole. MAFFF has a mandate and a responsibility to review and refocus the ways it collaborates with the private sector, farmers, community service providers and external agencies, in order to make the best use of resources and the best contribution to agricultural development in Tonga.

2.4 Private Sector Development Strategy

The draft Private Sector Development Strategy (PSDS) (November 2012) identifies a number of challenges that are relevant to PHAMA's mandate. These include the poor investment climate; skill shortages; high cost of doing business; poor infrastructure; and restrictive traditions and religious obligations. The small domestic market and low exports worsen the situation. Economic activities are narrow, with few formal businesses (less than 2,500). Trade support services are inadequate and businesses are poorly organised. Agriculture, fisheries and tourism have comprised the bulk of economic activities. Only tourism is performing well; the other two have fallen by over 60% in the last ten years.

The PSDS defines its vision as "*a prosperous Tonga fuelled by the private sector*". Its purpose is to foster national development by maximising the impact of private sector activities. The strategy seeks to enhance private sector contribution by identifying key elements to accelerate private sector growth, and aims at improving the quality of life for Tongans by enabling the private sector to act as engine of growth. The specific objectives of the PSDS are to:

- Ensure the regulatory and policy framework is conducive for enterprise development;
- Identify opportunities for investment and growth of the private sector;
- Provide effective support services to the business community for competitiveness development;
- Address capacity constraints that impede productivity of the private enterprise; and
- Develop an effective model for credible implementation of proposed strategic interventions.

Six considerations are seen as key to private sector development: (i) the business environment, including public-private sector dialogue; (ii) the institutional support framework; (iii) sector performance as a basis for trade expansion; (iv) Small and Medium Enterprise (SME) services; (v) efficiency management (productivity); and (vi) crosscutting issues of gender, youth, environment and inclusiveness of all major islands.

The strategy is founded on four pillars: (i) business environment; (ii) productivity and trade expansion; (iii) trade support services; and (iv) SME development. Specific initiatives include improving efficiency in starting businesses; creating a facilitatory regulatory framework; addressing crime; enhancing the public-private partnership (PPP) dialogue; development of infrastructure, including access to land for development; and reducing the costs of doing business. On productivity and trade expansion, the PSDS targets Tonga's dependence on remittances and donor support, which are seen as being unsustainable. The PSDS proposes strategies for trade expansion, including: (i) improving access to trade finance; (ii) increasing the number of business operators; (iii) expanding external trade links; (iv) reviewing the quality and relevance of training and education programs; (v) developing new growth areas with high value products and market development; and (vi) providing a stimulus package to boost economic activities.

2.5 National Export Strategy

The National Export Strategy of 2009 identifies a number of key issues and constraints relating to exports. These include:

- Trade Financing – access to financing through the banking system, as seen by exporters, is a major impediment to developing and increasing Tonga's export business. For export receipts to make a larger contribution to GDP, Government and the private sector must both find alternative forms of financing.

- Alternative financial schemes, with less stringent conditions and cheaper/flexible terms, are proposed that would allow viable export projects to be funded. These schemes are also suited to finance export/import substitution projects at the micro-SME levels in the villages and outer islands. Overall growth in national exports must include participation from SME businesses.
- Quality Management – Tongan exports of goods and services can only compete successfully in overseas markets if they adopt and implement quality principles. Tongan exporters must be able to supply quality goods and services that compare favourably with international competition.
- Packaging – most packing and packaging materials are imported in small lots by individual businesses. This process is expensive. Alternatives include consolidation of purchases, and the establishment of a packaging materials factory in Tonga.
- Export Development – to maximise benefits from an export-led growth strategy, competence development is vital to help individuals attain the necessary training to acquire skills and qualifications to be successful exporters.
- Trade Information – there is a need to develop an effective trade information strategy where relevant information is acquired and disseminated to the public and private sectors.
- Regulatory Reform – a regulatory environment that is conducive to business will allow the private sector and exporters to concentrate more on development and growth.

The vision of the strategy is “to be a leading Pacific nation in export growth by creating a sustainable economic environment for exporting quality goods and services in three years’ time”. To achieve the vision, Tonga will pursue the following mission: “to identify issues that currently cause impediments to the growth of exports in agriculture, fisheries, manufacturing, services and tourism and to formulate and implement strategies that would remove those impediments”. Four objectives have been identified that will lead to the improvement of export performances: (i) streamlined access to finance; (ii) unimpaired processes; (iii) improvement in infrastructure; and (iv) education and training.

In relation to the agricultural sector, the strategy recognises that the sector has been the mainstay of Tonga’s economy in the past and continues to provide employment and livelihood opportunities for most Tongan families. The goal for the sector is to increase volume and value of agricultural products by 10% every year. There are opportunities to increase exports of existing products such as squash, vanilla, kava, root crops and taro leaves. There are also opportunities to develop new export markets such as Fiji and Samoa for vegetables, and new export products such as frozen root crops or crisps/chips, jams and pickles. The strategy to achieve a 10% annual increase is to remove unjustified non-tariff barriers to exports; consolidate and improve production post-harvest handling, packaging, formulations and marketing of existing products; and also identify and develop new export products and markets.

2.6 Proposed Agricultural Sector Plan

While the importance of the agricultural sector and its contribution to exports is recognised in the TSDF, the PSDS and the National Export Strategy, Tonga does not currently have an agricultural sector plan. However, steps have been taken to prepare such a plan, with Technical Assistance to be provided by the World Bank. The terms of reference for preparation of the plan emphasise the generally disappointing performance of the sector over recent years and in particular its reliance on a very few export commodities. In fact, until very recently, agricultural exports were dominated by a single commodity – squash. However, production and exports of squash have declined from about 21,000 tonnes in the early 2000s to under 2,000 tonnes in 2010 and 2011. Of the 2,000–3,000 farmers

engaged in this activity in the past decade, only about 20–30 remain engaged today, under the leadership of a single exporting company, with about two-thirds of total exports coming from the company's own crops. The decline of squash exports has been the result of a complex set of factors, including: increased competition in the main markets (Japan and Korea), specifically from Mexico; loose end-market linkages; lack of industry collective action; side-selling; lack of trust between producers and exporters; and weak producer-exporter linkages. The negative export performance has also extended to other export commodities such as root crops and coconuts.

An immediate challenge that the sector plan will address is to identify commodities that can offer market opportunities to replicate the scale and scope of squash production and exports. The focus has been in trying to address opportunities that have been identified by a few individual exporters, for export of commodities such as watermelon and zucchini to supply off-season markets in New Zealand and Australia. Compliance with market requirements, not only in terms of quality and consistency in the supply but increasingly in terms of biosecurity requirements, has become a clear priority. The proposed sector plan also recognises that, in addition to meeting market access conditions, ensuring a consistent supply remains a significant challenge. The knowledge-base for production of new export commodities is very fragile, with high expectations by the private sector that the public sector, through the research and extension services, will have the capacity to generate and transfer the knowledge required through introduction of new varieties, trials and extension activities.

The sector plan will also consider import substitution opportunities, which could significantly contribute to increased income for local populations. In 2009–2010, Tongan imports of agriculture products – mainly vegetables and animal products – reached TOP48.8 million. Imports of vegetables alone were estimated at TOP9.3 million.

It is estimated that less than 10% of farmers in Tonga are commercial producers; thus, the majority of Tonga's agriculture is still based on traditional/subsistence farming systems. Most farmers maintain multi-crop systems, from which they can satisfy their basic food needs. Some of the producers have the potential to move from a subsistence level toward more commercial production activities. Many other farmers will remain at a subsistence level.

The terms of reference for the sector plan envisage that the plan will identify the vision and priorities for maximising the contribution of agriculture and fisheries to Tonga's economic growth and food security. The sector plan would also articulate specific programs and activities needed to achieve sector priorities; clarify roles and responsibilities of the different actors in the sector; assess investment needs; and provide a framework for measuring progress in the short- and medium-term.

A significant amount of groundwork has already been completed in terms of defining broad objectives for the agriculture sector, including through the higher level national strategies and the establishment of the Agricultural Sector Growth Committee, and an initial corporate planning exercise for MAFFF. A process is also underway to facilitate preparation of detailed corporate plans for all Ministries, which will involve revising and updating the MAFFF corporate plan. This work provides a sound basis for formulating sector plans for agriculture and fisheries. As the main sector objectives have broadly been identified, the next steps should be to identify and prioritise programs and activities needed to achieve the agreed objectives and then clearly define the roles and responsibilities of different actors in the sector (government, private sector, non-governmental organisations and civil society).

Separate plans are to be prepared for agriculture and fisheries to achieve a balance between export-oriented objectives, import substitution and subsistence agriculture. The importance of integrating the

views of all stakeholders, of considering the different circumstances of the outer islands, and of identifying linkages with other related sectors (such as environment, health, education, tourism and infrastructure) is also recognised.

2.7 Reserve Bank Economic Dialogue 2012

The Reserve Bank's 2012 Economic Dialogue[2] considered the barriers to growth in the agricultural sector and how to dismantle them. The Dialogue regarded agriculture as "the seed of hope", as it is still the largest sector of the economy, and most people rely on it for food and employment. However, there is a need to build confidence among growers to produce for export and to minimise risks that cause doubt and uncertainty, e.g. operation of the high temperature forced air (HTFA) facility and operational procedures for exports. There is also a need for strategic public and private investment to improve production and services, reduction of tariffs for agricultural inputs, and lower hiring costs for agricultural machinery.

2.8 Agricultural Exports

Tonga's agricultural exports have been very unstable over time. Traditional exports such as copra have declined over time, although coconut exports have increased steadily during the last five years. Exports of tropical fruits (bananas, pineapples etc.) to New Zealand were important in the 1960s and 1970s but came under increasing competitive pressure from Central America and the Philippines, accentuated by increasingly stringent phytosanitary regimes and the demise of marketing parastatals in both Tonga and New Zealand. Fresh fruit and vegetable exports to New Zealand are currently negligible, although there is a small amount of trade to other Pacific islands. Cucurbits and root crops are currently the two most important sectors, although performance has been patchy. Exports of cucurbits (mainly squash) collapsed during the last decade but have since staged a modest recovery. Exports of root crops have been fairly consistent over time, and there has been some recent success (supported by PHAMA) in developing watermelon exports to New Zealand. Current exports to New Zealand are confined to items that can be treated by fumigation either prior to shipment (e.g. watermelons) or after arrival in New Zealand (e.g. taro, tarua and yams).

The biggest success story, and also the biggest disappointment, has been the **squash** export industry. Squash exports commenced in the late 1980s and grew to some 20,000 tonnes per annum, mainly to Japan during a narrow seasonal window (October–November). During the period 1994–2004, squash exports accounted for about 45% of Tonga's total export earnings and more than 60% of agricultural exports. However, squash exports subsequently declined to a low point of 1,800 tonnes in 2010, although they have subsequently recovered somewhat. Appendix A shows that peak monthly exports of squash were 2,500 tonnes in 2007, fell to less than 1,000 tonnes per month in the 2009 and 2010 seasons, but recovered to 1,500 tonnes per month in 2011 (3,180 tonnes total) and somewhat higher in 2012. Japan remains the major market for squash, although some has also been sent to Korea. The market window is very narrow, with almost all exports taking place in October and November.

Appendix A summarises Tonga's agricultural export statistics over the last five-and-a-half years, January 2007 to June 2012 (second half 2012 figures are not yet available). Among the root crops, **cassava** is the leading export, with New Zealand being the main destination. Cassava exports show a

[2] National Reserve Bank of Tonga (2012). Growing Our Economy: a Collective Effort: Session 6, Dismantling the Barriers to Growth of Agriculture Sector in Tonga.

gradual uptrend from around 50 tonnes per month in 2007 to more than 100 tonnes per month today, occasionally 150–200 tonnes. All cassava is exported in peeled and frozen form. While cassava can be produced year round, demand in New Zealand is somewhat seasonal and exports average about 70 tonnes per month during the first half of the year, increasing to over 100 tonnes per month during the second half. Exports of **giant taro** (*kape/ta'amu*) fluctuate markedly from month to month. Volumes fell to almost zero in 2010 but have since rebounded to 30–80 tonnes per month on average, but with a large spike in the October to December period. Exports of **swamp taro** are also highly unstable, but have shown a strong uptrend since 2010 and now average about 40 tonnes per month, with seasonal peaks in July–August and November–December. **Tarua** exports declined between 2007 and 2010 but have recovered since then to around 40 tonnes per month, somewhat higher in October–December. Export of **yams** is highly seasonal, reaching over 200 tonnes per month during the April–June peak season in 2007. The seasonal peak is now around 150 tonnes per month. Taking **all root** crops together, exports in 2007–2009 were 250–350 tonnes per month, or about 2,800–3,500 tonnes per annum. During 2010, exports slumped to 1,900 tonnes, but have subsequently rebounded and are now running at 250–350 tonnes per month. Because different root crops have different seasonal patterns, the tonnage exported is fairly consistent over the year, with a tendency to be a bit lower in January–February.

Watermelons have become a significant export since the opening of the MAFFF fumigation facility enabled access to the New Zealand market. The main watermelon export season is October to December, during which exports are running at up to 110 tonnes per month, with annual volumes of around 200–300 tonnes.

Exports of fresh mature (brown) **coconuts** have shown a steady uptrend from around 60 tonnes per month in 2007 to about 100 tonnes per month today. Exports of green nuts rarely exceed 20 tonnes per month. The only other significant exports are **kava** to other Pacific islands (110–170 tonnes per annum) and **taro leaves,** mainly to New Zealand (40–80 tonnes per annum). There are occasional shipments of breadfruit (fresh and frozen). Vanilla exports declined from 13.6 tonnes in 2009 to less than 2 tonnes in 2011. Fresh fruit and vegetable exports are negligible due to the lack of market access protocols and the non-operational status of the HTFA facility.

2.9 Institutional and Regulatory Framework

MAFFF is the lead institution responsible for agricultural production and marketing. MAFFF is organised into the following divisions: (i) Office of the Director/Corporate Services Division; (ii) Research Division; (iii) Quarantine and Quality Management Division; (iv) Livestock Division; (v) Extension and Women's Development Division; (vi) Forestry Division; (vii) Fisheries Division; and (viii) Outer Islands Operations Division. MAFFF's vision is "an Island Kingdom where agriculture, fisheries and forestry contribute significantly to better living standards of all, in an economically, socially and environmentally sustainable manner". The mission of MAFFF is "to help build a better economy from agriculture, forestry and fisheries for present and future generations". MAFFF's authority to perform its functions is derived from a number of laws and regulations (see Box 1 below). The divisions responsible for research, extension, and quarantine and quality management are key to the future success of agricultural production and export marketing.

Box 1: Legislative and Regulatory Framework

- Animal Disease Act and Regulations, 2004
- Agricultural Commodities Export Act, 2002
- Pesticides Act and Regulation, 2002
- Plant Quarantine (Fees) Regulation, 1997
- Plant Quarantine Regulations, 1995
- Plant Quarantine (Amendment) Act, 1995
- Fruit Export (Buttercup Squash) (Amendment) Regulations, 1994
- Fruit Export (Buttercup Squash) Regulations, 1993
- Fruit Export (Vanilla) Regulations, 1993
- Plant Quarantine (Squash and Vanilla) (Fees) Regulations, 1992
- Rhinoceros Beetle Act, 1988
- Plant Quarantine Act, 1988
- Noxious Weeds Act, 1988
- Copra Act, 1988
- Diseases of Plants Regulations (Cap. 127A)
- Infested Areas Declarations (Cap. 127B)
- Prescribed Treatment for Bunchy-Top (Cap. 127C)
- National Forests Policy, 2009

The **Ministry of Commerce, Tourism and Labour** (MCTL) includes five divisions: (i) Leadership and Labour Division; (ii) Corporate Services and External Information; (iii) Intellectual Property Office; (iv) Consumer Protection Division; and (v) Trade, Investment and Business Development Division. MCTL is responsible for licensing agricultural exporters and is actively involved with PHAMA in export promotion and export market development.

The **Ministry of Finance** administers the Agricultural Marketing Fund, which is a TOP1.0 million revolving loan facility intended to facilitate export marketing by Tongan business enterprises.

The **Tonga Chamber of Commerce and Industry** promotes economic growth in Tonga, makes representations to Government, creates training opportunities, and provides information on the business environment. Other associations operating in Tonga include the Tonga New Zealand Business Association and the Small Business Association. The Tonga New Zealand Business Association has a membership of over 70 businesses throughout Tonga and New Zealand. It focuses on creating a strong business relationship between the countries. The Small Business Association concentrates mainly on small enterprises.

A recent initiative of the Government is the establishment of the National Growth Committee and a number of Sector Growth Committees, one of which is the **Agricultural Growth Committee** (AGC). The AGC includes representatives from both Government and the private sector and is intended to inform the National Growth Committee on policies and priorities for the agricultural sector (including food, fisheries and forestry). The AGC is responsible for overseeing preparation of the Agricultural Sector Plan in 2013 (with technical assistance provided by the World Bank) and an agricultural census (with assistance from the Food and Agriculture Organization of the United Nations, or FAO).

The **Growers Federation of Tonga (GroFed)** was established in 2008 as an umbrella organisation for the agricultural sector. It is registered as a not-for-profit incorporated association to engage in policy dialogue to obtain a favourable economic policy environment and political support for the agriculture sector in the long term. Its objectives are:

- To strengthen private sector representation by ensuring that each sector is represented by one cohesive organisation; and
- To work closely with Government ministries and communities and assist to stimulate economic growth by identifying and recommending policy initiatives to the National Economic Development Council.

GroFed's constitution requires that all registered growers from all island groups elect their representatives to the 34-member Council, and that the Council elects the seven members of the Board of Directors. The vision and strategic objectives of GroFed are shown in Box 2.

Box 2: GroFed Vision and Strategic Objectives

Vision: "To be the leading private sector organisation enhancing prosperity and maximising benefits for the growers of Tonga."

Strategic Objectives:

Marketing:

- To create and enhance opportunities and market access for our agricultural produce, including to New Zealand, Fiji, American Samoa, Australia, the United States and also other countries.
- To double the existing market demands (volumes and gross income earnings).

Production:

- To increase our agricultural production to achieve 1,000 acres or more every year.
- To search for and promote additional fresh export market crops such as tomatoes, courgettes, cucurbits, pineapples, maize, sweet potato, sweet yam, organic crops etc, for export markets.
- To train growers to increase production of marketable yields as well as sustainable and consistent supplies.

Infrastructure:

- To ensure that all quarantine and biosecurity facilities and post-harvest facilities and other new technological export facilities are established and operating to underpin GroFed's export produce.

Export Financing:

- To ensure that growers and exporters are getting easy access to the Export Finance Facility and for Government and Banks to set up the Export Finance Facility to support the export sector.

Maximise Economic Returns to Growers:

- To promote and train growers on production professionalism, agriculture as a business, and understanding the financial benefits of production based on financially viable crops (gross margin analysis of production).

Outer Islands Transport:

- To ensure more frequent and regular shipping services to the Niuas and Ha'apai for shipment of their produce.

Research and Development:

- To work together with Government (MAFFF) on funded research and development works at the Research Division.

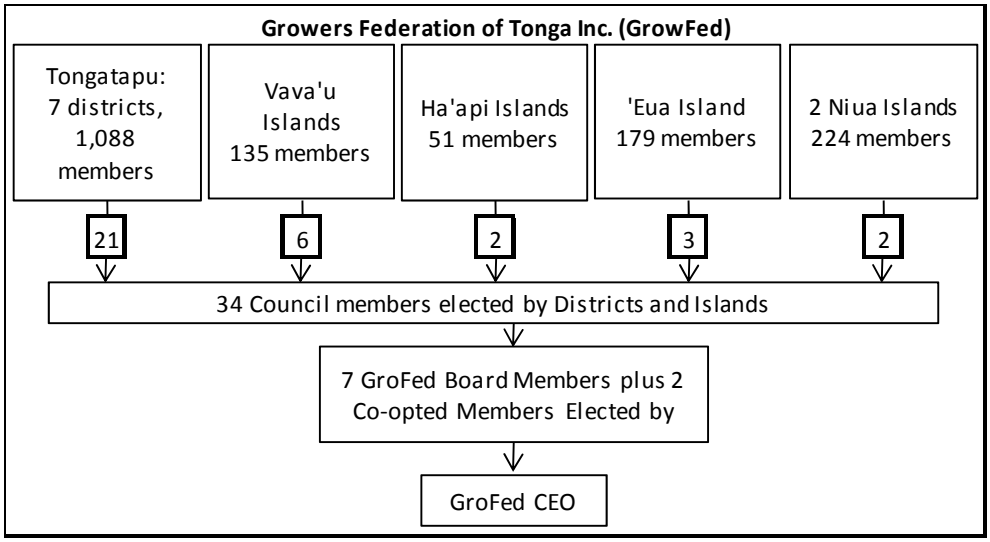
Risk Management:

- To manage operational risks on financial performance and conditions to ensure there are enough resources for GroFed's operations.
- To ensure effective management and leadership of the GroFed's businesses.
- To minimise technical risks that may cause doubts and uncertainties for growers to participate in production, for example:
  - Non-biosecurity and quarantine compliance for agri-exports;
  - Shipping and aircraft schedules for export of both fresh and frozen produce to markets; and
  - Inconsistent supplies to market's demands, etc.

The organisational structure of GroFed is shown in Figure 2-1. GroFed represents a high level public-private partnership between the growers and the Government to assess sector performance and identify key policy issues. Current policy issues raised by GroFed include the need for increased investment in technology for agricultural production, exporting, marketing, research and development, and human capital in the form of professional, managerial and technical skills. GroFed is calling for: reduced tariffs on agricultural inputs; reduced hire rates for agricultural machinery; increased regional trade with Fiji, Samoa, American Samoa and other Pacific islands; and better access to finance for

growers. In relation to export marketing, GroFed is advocating improved packaging and labelling facilities for frozen root crops; opening of market opportunities, including Australia and the United States; and improved agricultural roads.

Figure 2-1 GroFed organisational structure



GroFed is a not-for-profit organisation and cannot therefore engage in commercial activities. To overcome this constraint, GroFed has established its own marketing subsidiary, known as **Growers Commodities Marketing Group Ltd (GroCom)**. GroCom is 76% owned by GroFed and 24% owned by four exporters. The GroCom board includes several members from the GroFed Board, exporters, and representatives from the GroFed Council. GroCom's role is to search for more market opportunities for export produce with better prices to growers, with a requirement for the exporter to pay the growers before the shipment leaves Tonga. GroCom acts as an export broker under an exclusive arrangement with Fresh Direct Ltd, one of the major New Zealand-based importers and wholesalers. The system works as follows:

- Fresh Direct Ltd provides indicative Cost Insurance and Freight (CIF) prices and specifications for produce it wishes to import.
- The four exporter shareholders of GroCom are invited to submit bids to fill the Fresh Direct Ltd order.
- The bids are evaluated by a bid panel appointed by the exporters and GroFed on the basis of the prices to be paid to the growers, with the stipulation that the growers are paid when the produce leaves Tonga.
- Fresh Direct Ltd pays GroFed on the basis of 30% on the provision of documents for the consignment, 30% seven days after clearance, and 40% 21 days after clearance.
- GroFed pays the growers the agreed contract price and forwards the remaining amount to the exporter, after deducting a 2% levy to finance its own operations.

This system is popular with growers, because it provides prompt payment at the time of export, and has been successful in improving prices – in the case of coconuts, grower returns have doubled. Two of the exporter GroCom members are active in bidding for contracts, the other two less so.

PHAMA shares office facilities with GroFed and is working together with GroFed and other stakeholders in identifying and facilitating export support services to increase market access opportunities. PHAMA has also provided export market development grants to facilitate the development of two new export products – sweet yam and Guinea yam. The grant funds have been used to help establish a small yam packing facility in the Eastern District, which avoids the need for growers in the area to transport their produce all the way to the Nuku'alofa export facility.

The Government initially supported GroFed with a grant of TOP60,000 per year for two years, after which the Federation was expected to be self-sustaining from levy income from produce exports brokered by GroCom. However, the levy income is not yet sufficient to finance the operating costs and the organisation is currently struggling to fulfil its mandate.

The **Tonga MAWG** acts as the steering committee for PHAMA activities in Tonga (there are equivalent MAWGs in the other PHAMA countries). For each MAWG, four major meetings are scheduled each year, with interim meetings held as required. The Tonga MAWG fulfils key coordination and communication roles, and engages in screening and prioritisation; monitoring; consideration of longer-term sustainability issues; and improving general understanding of international market access systems and processes. The Tonga MAWG is responsible for identifying and approving all PHAMA-supported activities in Tonga. Recognising that market access priorities need to be developed by the MAWGs on an ongoing basis in response to evolving needs and information, an approval process has been agreed with AusAID that permits further refinement (and possibly extension) of activities already defined, within the planning year. The Tonga MAWG contains two exporter representatives, three grower (GroFed) representatives, two representatives from MAFFF and two representatives from MCTL Trade and Investment Division.

The **Tonga Development Bank** (TDB) is the leading institutional provider of development finance with the mandate to promote Tonga's economic and social advancement by providing banking and a broad range of other financial services. TDB was established in 1977 and has six branches, in addition to its headquarters in Nuku'alofa. It has a long history of providing financial services to farmers, agricultural marketing ventures and exporters. It provides credit to assist growers and exporters to make investments, and also finances working capital needs. TDB is also a business development service provider that assists its clients to prepare business and marketing plans, improve bookkeeping and accounting skills, etc. TDB gives priority to supporting enterprises with positive developmental impacts.

The BQA between Tonga and New Zealand governs two-way trade in food and agricultural products between the two countries. The responsible ministries are MAFFF in Tonga and the New Zealand Ministry of Primary Industries. Under the BQA, some 40 plant species (shown in Table 2-1) are approved for export from Tonga to New Zealand, subject to various conditions and forms of treatment, including fumigation and HTFA.

Table 2-1 Plant species approved for export from Tonga to New Zealand

Botanical name	Common name
Abelmoschus manihot	Island cabbage / pele
Artocarpus altilis	Breadfruit
Carica papaya	Papaya
Citrullus lanatus	Watermelon
Colocasia esculenta	Taro, taro leaves
Colubrina asiatica	Soap bush
Cucurbita moschata	Butternut
Evodia hortensis	
Glochidion ramiflorum	
Lycopersicon esculentum	Tomato
Manihot esculentus	Cassava
Morinda citrifolia	Indian mulberry
Musa paradisiaca	Plantain
Piper graeffei	Pepper
Psychotria insularum	Wild coffee
Solanum melongena	Eggplant
Syzygium inophylloides	Lillypilly
Ticus obliqua	
Wedelia biflora	
Xanthosoma sagittifolium	Tarua

Botanical name	Common name
Alocasia macrorrhiza	Giant Taro / Kape / Taamu
Capsicum frutescens	Chilli
Centella asiatica	Indian pennywort
Cocos nucifera	Coconut
Cucurbita maxima	Squash
Dioscorea spp	Yam
Gardenia taitensis	
Hoya australis	
Mangifera indica	Mango
Microsorium scolopendria	Wart fern
Musa spp	Banana
Persea americana	Avocado
Piper methysticum	Kava
Saccharum officinarum	Sugarcane
Syzygium cornocarpus	Lillypilly
Syzygium malaccense	Malay apple
Vigna marina	Beach bean
Xanthosoma sagittifolium	Tarua
Zingiber zerumbet	Ginger

3 Marketing Infrastructure and Transport Services

Marketing infrastructure and transport services are generally adequate to support the current level of exports, but pose some limitations to future expansion and diversification. The three main export facilities are at Nuku'alofa port, Vava'u port and Fua'amotu international airport.

3.1 MAFFF Export Marketing Facility, Nuku'alofa

- Location: Nuku'alofa port area, adjacent to main roads on two sides, 500 m from the main wharf and 2.5 km from the town centre.
- Land area: 100 m x 65 m (6,500 m^2):
  - Offices: 400 m^2 x 2 levels = 800 m^2 of office space, used by MAFFF
  - Food processing area: 130 m^2
  - Export processing and inspection area: 270 m^2
  - Fumigation facility: 300 m^2
  - Forecourt, container stands, and un-used areas: 5,400 m^2.
- Food processing/preservation area (130 m^2): includes equipment for pilot scale food processing, cooking, preserving, refrigeration etc. Operated by the Food Department of MAFFF.
- Export processing and inspection area (270 m^2): includes tables and benches for inspection, scales, forklift, cool room (50 m^3) and blast freezer (50 m^3). Operated by MAFFF Quarantine.
- Fumigation facility (300 m^2): includes 40-foot container used for methyl bromide fumigation, and separate doors for incoming and outloading into sea containers. Operated by MAFFF Quarantine.
- Paved area between the export processing and inspection area and the fumigation facility (approximately 120 m^2): includes water supply, and washing vats – used for washing and packing root crops for export. No roof or lighting.
- Electricity: three-phase power with a back-up generator installed by PHAMA.
- Water supply: not connected to municipal water supply – rainwater from roof catchment stored in six 20,000 litre tanks.
- Waste disposal/treatment facilities: effluent is discharged via a concrete drain to the sea.

The Nuku'alofa export marketing facility was constructed in 2010 using EU STABEX funding. The facility is well located, with paved roads on two sides, and is only about 500 m from the international shipping wharf. There is abundant land available to expand the facilities if needed. About a third of the complex is used for MAFFF offices, for work not necessarily related to export marketing. All other parts of the facility are available for use by exporters without charge other than payment for electricity used. Two or three exporters are using the facility on a regular basis to process root crops (cassava and Japanese taro) for export in sea containers, both frozen and chilled.

The food processing facility is available to anyone wishing to undertake pilot food processing activities, but is rarely used. The export processing and inspection area is mostly used for inspecting handicrafts for export and is not generally available for processing, packing and inspecting fresh produce for export. This area includes a cool room and blast freezer, the latter of which is used for freezing root crops for export. However, the blast freezer appears not to be functioning adequately. The paved outside area between the two buildings is used for washing and packing root crops for export, but does not have a roof, packing tables, or adequate lighting and power supply. Wastewater is discharged directly to the sea without treatment. Water supplies come from rainwater tanks with a total

capacity of 120,000 litres. The fumigation facility is currently able to treat all the watermelons exported and there is space to add an additional 40-foot fumigation chamber if needed.

3.2 MAFFF Export Marketing Facility, Vava'u

- Location: Vava'u port area in town centre, approximately 100 m from main wharf, with main roads on two sides.
- Land area: 65 m x 35 m (2,275 m^2)
  - Offices: 250 m^2 on upper/mezzanine level
  - Produce receival area 25 m^2
  - Washing and packing area 100 m^2
  - Food processing and quarantine/inspection area 150 m^2
  - Packing and storage area: 175 m^2
  - Fumigation facility: 50 m^2
  - Open general purpose storage, packing and loading area: 1,000 m^2.
- Forecourt, car park, and unused areas: 775 m^2.
- Produce receival area (25 m^2): adjoins road but below road level. Vehicles must park on road for unloading.
- Washing and packing area (100 m^2): long narrow room with no windows or ventilation. Tiled floor, equipped with washing vats and crates but no tables.
- Food processing/preservation and quarantine/inspection area (150 m^2): includes equipment for pilot scale food processing, cooking, preserving, refrigeration etc., as well as quarantine inspection equipment, microscope etc.
- Packing and storage area (175 m^2): adjoins fumigation facility. Used for storing packaging materials.
- Fumigation facility (50 m^2): includes 20-foot container for methyl bromide fumigation, and separate doors for incoming and outloading into sea containers.
- Open general purpose storage, packing and loading area (1,000 m^2): large area open on two sides suitable for packing, storage and loading. Includes a small blast freezer of 15 m^3.
- Electricity: three phase power.
- Water supply: connected to municipal water supply, supplemented by rainwater from roof catchment stored in one 20,000 litre tank.
- Waste disposal/treatment facilities: effluent is discharged to the town sewerage system.

The Vava'u export processing facility was upgraded in 2010–2011 using EU STABEX funding. It contains most of the equipment needed to process, pack and store fresh produce for export. It is well located in the port area, with good access to road and sea transport. The facility is available to anyone wishing to process fresh produce for export but has **never been used** for this purpose. This may be partly attributable to the very low level of export activity in Vava'u, with only one cassava exporter active on a semi-regular basis. However, there are also a number of design features which detract from the usefulness of the facility. The produce receival area would be very inconvenient to use, being below road level and with no vehicle parking space. The washing and packing area is a very narrow un-ventilated room with no windows, which would be extremely hot and humid to work in. The large open general work and storage area is potentially useful as a packing area, but contains no packing equipment (tables, scales etc.). The blast freezer is only about half the size needed to prepare a full container load of produce for export. There are also no certified fumigation operators (the Vava'u

delegate was unable to obtain his Australian Fumigation Accreditation Scheme certificate at the training held in Fiji).

3.3 Fua'amotu Airport Export Facility

Location: Fua'amotu airport, Tongatapu, adjoining the domestic passenger terminal, 700 m from the international cargo area and about 25 km from Nuku'alofa town centre

Building size: 32 m x 36 m = 1,150 m^2

- Open area for produce receival, washing, grading and preparation (460 m^2)
- Insect-proof (screened) area for packing and chilling produce (690 m^2)
- Office and toilet facilities.

- Equipment:
  - Boiler, hydrocooler, forklift, washing tank, standby generators, bins and crates
  - HTFA unit, twin chamber, connecting the receival area and insect-proof areas. Includes computers for monitoring temperatures and hydro-cooler for lowering fruit temperatures after treatment
  - Screened area contains a forced air cooler of 60 m^3 capacity and a quarantine cool room of similar size for storing packed air containers and opening onto the tarmac
  - Rainwater tank.

The airport facility was constructed in 1996 with funding from New Zealand and USAID. Its main purpose is to perform HTFA treatment of fresh produce in line with the Tonga-New Zealand BQA requirements for fruit fly host species (papaya, chilli, eggplant, breadfruit, mangoes, avocados, tomatoes etc.). The facility is well located, with direct access to the airport cargo area, and has all of the necessary equipment for HTFA treatment and cold storage chambers in an insect-proof area. It is also suitable for packing and cold storage of non-fruit fly host products such as beans and okra prior to export. The facility was initially operated by a state-owned company, Export Produce Treatment Services Ltd, but throughput was insufficient to cover operating costs and the company was wound up in 2000. The facility was then handed over to MAFFF. There has been very little use of the facility since 2000 and maintenance has been limited, with the result that the facility is now in need of a major overhaul to become operational again. Some repairs have been undertaken during the last year with the help of a New Zealand volunteer, but these have been only partial due to lack of funding.

In June 2010, the New Zealand Aid Programme (NZAP) and the Government of Tonga agreed to provide TOP184,000[3] in funding to support the overhaul of the airport facility and its operations for several years until throughput was sufficient to be self-financing. It was a condition of the agreement the facility would be transferred to another parastatal company, Tonga Export Quality Management Ltd. (TEQM) and re-commissioned. However, the asset transfer agreement between MAFFF and TEQM was not executed until 15 March 2013, by which time the offer of NZAP funding had expired. Consequently, the planned overhaul was never completed, the facility remains idle and there are no exports of fruit fly host species to New Zealand or Australia.

[3] TOP141,000 was to be provided by NZAP and TOP43,000 by the Government of Tonga.

3.4 Private Packhouses

The established exporters handling root crops, squash, pumpkins, coconuts and watermelons have packhouse and storage facilities that are adequate to handle the current volumes exported. During the narrow squash exporting season, these facilities need to pack up to 1,000 tonnes per week. However, they have handled much more than this in the past, when Tonga was exporting up to 20,000 tonnes in a two-month season.

3.5 Air and Sea Freight

Air New Zealand operates the following flight schedule from Nuku'alofa to Auckland.

Table 3-1 Airline schedule and cargo capacity, Nuku'alofa to Auckland

Day	Depart	Arrive	Aircraft	Cargo Capacity
Monday	11.10	14.15	A320	Up to 3,000 kg, depending on passenger loading
Tuesday	21.20	00.25		
Wednesday	13.20	16.25		
Thursday	--------- No service ---------			
Friday	11.45	14.45	B767 [a/]	6–7,000 kg, regardless of passenger loading
Saturday	19.30	22.30	A320	Up to 3,000 kg, depending on passenger loading
Sunday	--------- No service ---------			

[a/] *The B767 service will be moved to Saturday from April 2013 onwards. During the tourist season (June–August), there are usually two B767 services per week.*

For fresh produce exports, the most convenient consignment days are Wednesday and Friday/Saturday. Produce shipped on Wednesday will be cleared and ready for sale on Friday. Produce shipped on Friday or Saturday will be cleared over the weekend and ready for sale on Monday. Most of the produce is expected to be exported during the winter months, when ambient temperatures in Auckland are quite cool (minimum 8–12°C, maximum 15–18°C), so that if there are delays in inspection and clearance, product deterioration will be limited. Flights with evening or early morning arrivals are preferred (Tuesday and Saturday).

There are about three ship departures per month from Nuku'alofa to Auckland and one departure every three weeks from Vava'u. These are used for exporting root crops (chilled and frozen), watermelons and coconuts.

3.6 Internal Transport

Tonga has two international sea ports (Nuku'alofa and Vava'u) and one international airport (Fua'amotu). Due to the limited and expensive inter-island transport services, the bulk of agricultural exports originate in Tongatapu, where they are transported by road to packing facilities and the seaport. There are also some root crop exports direct from Vava'u. Internal air freight services are too unreliable and too expensive to consider air transport of produce from the outer islands to Tongatapu for export via Nuku'alofa international airport.

3.7 Export Opportunities and Constraints

While Tonga's track record as an agricultural exporter is patchy, there have been some notable success stories in the past, and there is considerable potential to develop the sector in the coming years. The strengths of Tonga's agricultural export sector lie in:

- A core group of established and experienced fresh produce exporters, currently exporting root crops, coconuts and cucurbits, who are eager to expand and diversify their export activities;
- Well-established commercial linkages between these exporters and several of the major New Zealand importers/wholesalers;
- The existence of GroFed and its commercial affiliate GroCom, and the marketing arrangements between GroFed/GroCom and Fresh Direct Ltd in New Zealand;
- Satisfactory (but expensive) transport linkages (sea and air) with Auckland;
- Climate and soils favourable to production of a wide range of tropical crops year round, and winter season temperate crops during the months when supplies are lowest and prices are highest in New Zealand; and
- A clean/green image with capacity to be turned into a powerful marketing/promotion tool.

It is also necessary to be mindful of a number of constraints that have prevented the full realisation of these opportunities until now. Foremost among these are:

- The lack of workable market access protocols for most agricultural commodities other than those that can be treated by fumigation;
- The lack of a coherent sector strategy that defines the role of export market development in the development of the agricultural sector;
- Institutional weaknesses, particularly in research and extension support and quarantine and quality control functions; and
- Infrastructure constraints, especially for export inspection and certification, pre-export treatment (fumigation and HTFA), and decentralised packing and chilling/freezing facilities.

4 Export Pathways and Infrastructure Needs

In order to assess the resources needed for exporting various items, the following section details the steps in the export pathways for the major product categories, the actual and projected volumes exported, and the estimated equipment and infrastructure needs. This serves to highlight the critical infrastructure bottlenecks in Tonga's export marketing pathways for agricultural and horticultural produce.

4.1 Coconuts

Export of fresh mature coconuts by refrigerated sea container to New Zealand and Australia.

Steps in export pathway	Equipment and infrastructure requirements
• Collect nuts from plantation	• Tractor and trailer • Potential to use mechanised husking equipment
• Transport to husking station	
• Remove husks and discard defective nuts	
• Transport to packhouse	• Tractor and trailer or truck
• Final inspection – discard defective nuts	• MAFFF-registered packhouse, preferably Hazard and Critical Control Point (HACCP) certified
• Size grading and bagging	
• Pack bags in container	
• Chill container	• Container stand with reliable power supply
• Move container to port	• Truck to lift 20 foot container
• Wash container	• Container washing facility
• Load container onto ship	• Container loading hoist at wharf

Current exports of coconuts are around 1,100 tonnes per year, equal to about 60 twenty-foot containers (20,000 nuts/18 tonnes per container). Exports of coconuts have increased from about 50 tonnes per month to almost 100 tonnes per month during the last five years, occasionally reaching 150 tonnes per month. Coconut exporters do not face any equipment or infrastructure constraints in handling these volumes. However, mechanised husking equipment has the potential to improve profitability of the value chain by reducing the amount of labour used in husking nuts.

4.2 Watermelons

Export of watermelons in refrigerated sea containers to New Zealand.

Steps in export pathway	Equipment and infrastructure requirements
• Harvest into field bins	• Tractor, trailer and harvesting boom
• Transport field bins to packhouse	• Tractor and trailer or truck
• Wash, sort and grade	• MAFFF-registered packhouse, preferably HACCP certified, with mechanised washing facility, and grading/packing conveyer belt
• Discard defective fruit and pack in export bins	
• Transport export bins to MAFFF fumigation facility	• Forklift and truck
• Unload truck and place bins in fumigation chamber	• Forklift

Steps in export pathway	Equipment and infrastructure requirements
• Fumigate with methyl bromide for 4 hours	• Insect-proof fumigation area • Fumigation chamber with minimum 12 tonne capacity
• Stow export bins in 20 foot reefer container	• Forklift and insect-proof outloading area
• Chill container	• Container stand with reliable power supply
• Move container to port	• Truck to lift 20 foot container
• Wash container	• Container washing facility
• Load container onto ship	• Container loading hoist at wharf

Current watermelon exports are around 200–300 tonnes per annum, mostly during October, November and December when monthly volumes can reach 80–100 tonnes or 8–10 twenty-foot containers (assuming 10 tonnes of melons per container). The watermelon exporters have the capacity to harvest, grade and pack this volume, using the same facilities as those used for squash. The MAFFF fumigation facility can handle two 10 tonne container loads per day, so with about three ships per month it is generally possible to fumigate the current level of exports during one or two days before sailing. However, the capacity of the fumigation facility could become limiting if the watermelon industry expands significantly. The capacity of the facility is estimated as follows:

- Two 10 tonne container loads per day for three days prior to shipment = 60 tonnes per shipment
- Three shipments per month = 180 tonnes per month
- Three months x 180 tonnes = 540 tonnes per annum.

The New Zealand market for watermelons is around 60 tonnes per week (260 tonnes per month), supplied mainly by imports from Australia for around nine months per year. However, the market is seasonal, with imports during Tonga's three-month export season in the range of 450 to 750 tonnes per month. If the fumigation facility works at full capacity, it could process 180 tonnes per month, which is only about 25–40% of market requirements during Tonga's export season. Watermelon exporters have plans to expand volumes towards 1,000 tonnes over the next few years, which would be a market share of around 60% during the season. On this basis, the capacity of the fumigation facility would become limiting in the near future. One way to overcome this capacity constraint would be to extend the watermelon export season, but to take advantage of the strong demand in the spring and early summer, there would still be a need to install a second fumigation chamber. The fumigation facility is only used for watermelons at present. If exporters wish to use it for other commodities, or expand beyond 180 tonnes per month of watermelons, it would be necessary to install a second fumigation chamber. A second chamber would certainly be needed if the industry target of 1,000 tonnes is to be realised over, say, five months. There is sufficient space in the building to install a second chamber beside or above the existing chamber. It is also important to be mindful of the risks to the exporter of any malfunctioning of the fumigation facility, for example through equipment breakdowns, shortages of fumigant, or non-availability of trained operators. This would have disastrous consequences for the exporters, since an entire shipment could be lost.

4.3 Squash, Pumpkins etc.

Export of squash or pumpkins to Japan, Korea or New Zealand.

Steps in export pathway	Equipment and infrastructure requirements
• Harvest into field bins	• Tractor, trailer and harvesting boom
• Transport field bins to packhouse	• Tractor and trailer or truck
• Wash, sort and grade	• MAFFF-registered packhouse, preferably HACCP certified, with mechanised washing facility, and grading/packing conveyer belt
• Discard defective fruit and pack in export bins	
• Stow export bins in 40 foot reefer container	• Forklift
• Chill container	• Container stand with reliable power supply
• Move container to port	• Truck to lift 40 foot container
• Wash container	• Container washing facility
• Load container onto ship	• Container loading hoist at wharf

Current exports of squash are around 3,300 tonnes per annum over a period of about six weeks. This requires an average harvesting and packing capacity of 92 tonnes per day (3,300 tonnes / 6 weeks / 6 days per week). The largest exporter, Nishi Trading, has the capacity to harvest and pack this amount, more if necessary by working extended or double shifts. There are also several smaller squash packing facilities. Together, these have handled much larger volumes of squash in the past. Since squash exports to Japan and Korea are unlikely to expand very much, and any exports to New Zealand will be over a longer seasonal window, the squash/pumpkin marketing pathway does not have any significant capacity constraints.

4.4 Root Crops

Cassava and other root crops exported **frozen.**

Steps in export pathway	Equipment and infrastructure requirements
• Harvest into field bins, baskets or sacks	• Tractor and trailer or truck
• Transport to packhouse	
• Peel, sort and discard defective material	• MAFFF-registered packhouse with facilities to peel, sort, wash and pack root crops, preferably HACCP certified • Access to clean water and electricity • Facilities for solid and liquid waste disposal
• Wash in water	
• Rinse in sodium metabisulphite solution	
• Drain and pack in wholesale (20–25 kg) or retail (3–5 kg) plastic bags	
• Freeze	• Blast freezer with capacity reduce the temperature of produce to -15°C in 4 hours
• Stow in freezer container	• Container stand with reliable power supply
• Move container to port	• Truck to lift 20 foot container
• Wash container	• Container washing facility
• Load container onto ship	• Container loading hoist at wharf

Taro, giant taro, tarua, yams and other root crops exported **chilled.**

Steps in export pathway	Equipment and infrastructure requirements
• Harvest into field bins, baskets or sacks • Transport to packhouse	• Tractor and trailer or truck
• Wash, peel, trim and discard defective material • Drain and pack in red-net bags and export bins	• MAFFF-registered packhouse with facilities to peel, trim, sort, wash and pack root crops, preferably HACCP certified • Access to clean water and electricity • Facilities for solid and liquid waste disposal
• Chill	• Chiller and/or reefer container
• Stow in reefer container	• Container stand with reliable power supply
• Move container to port	• Truck to lift 20 foot container
• Wash container	• Container washing facility
• Load container onto ship	• Container loading hoist at wharf

Tonga does not have the required infrastructure for hygienic and efficient processing of root crops in the required quantities. Current exports per annum are about 1,650 tonnes of frozen cassava, 500 tonnes of other frozen root crops, and about 1,400 tonnes of chilled fresh root crops. This represents about 240 twenty-foot containers per year or 4–5 containers per week (15 tonnes per container). The New Zealand market has the capacity to absorb increased exports of root crops, and there are also markets further afield with considerable potential, especially for frozen product, including Australia and North America. Processing infrastructure limitations constrain access to these markets.

The MAFFF export processing facility at Nuku'alofa only has the capacity to process about three tonnes per day or one container per week. The facility is poorly designed and equipped and needs significant upgrading to increase capacity and operate more efficiently. Because the MAFFF facility lacks the capacity, most of the root crops are processed in very basic facilities that do not meet acceptable hygiene standards or levels of operational efficiency. The root crop exporters have expressed a preference for access to decentralised processing facilities with the equipment needed to process root crops hygienically and efficiently in the rural areas. It has been suggested that two decentralised units would be appropriate, one each in the Eastern and Western Districts of Tongatapu. Some small investments and operational modifications would also improve the capacity of the MAFFF facility.

4.5 Fresh Fruit and Vegetables

Steps in export pathway	Equipment and infrastructure requirements
• Harvest into field bins, baskets or sacks • Transport to packhouse [a/]	• Tractor and trailer or truck
• Wash (if necessary) and sort – discard defective material • Pack into re-usable plastic crates/lugs	• MAFFF-registered packhouse with facilities to sort, wash and pack fruit and vegetables, preferably HACCP certified • Access to clean water and electricity • Facilities for solid and liquid waste disposal
• Transport to MAFFF airport facility	• Covered truck

Steps in export pathway	Equipment and infrastructure requirements
• Transfer to HTFA bins [b/]	• Functional HTFA facility
• HTFA treatment [b/]	
• Final sort/grade and pack into cardboard cartons in insect-proof area	• Work benches, scales, supply of cartons in insect-proof area etc.
• Cool produce in cartons in forced air cooling chamber	• Forced air cooling chamber in insect-proof area
• Transfer cartons to air container	• Air containers and cool room with outloading onto airport tarmac
• Store air container in quarantine cool room	
• Transfer container to international airport	• Covered holding area for cargo prior to loading • Airport cargo handling equipment
• Load onto aeroplane	

[a/] *May be exporter's packhouse or Fua'amotu airport facility.*
[b/] *These steps not required for non-fruit fly hosts (e.g. beans and okra).*

Exports of fresh fruit and vegetables are currently running at a very low level, mainly confined to taro leaves (non-fruit fly host) and breadfruit (cooked and frozen). There are several MAFFF-registered packhouses currently used for watermelons that could be used to process fruit and vegetables, although none of these are HACCP certified.[4] The airport facility has most of the equipment needed to prepare fruit and vegetables for export, including HTFA treatment if required, a large forced air cooling chamber for rapid temperature reduction, and a cool room equipped to store air freight containers prior to loading. However, the facility is in poor condition and requires a thorough overhaul.

[4] PHAMA is currently considering providing assistance to obtain HACCP certification for some of these facilities.

5 Conclusions and Recommendations

5.1 Priority Infrastructure and Equipment Needs

The infrastructure needs for processing and packing horticultural commodities, in order of priority, are:

1. Improvements to the Nuku'alofa export processing facility to increase its capacity and enable it to operate more efficiently.
2. Overhaul and improvement of the Fua'amotu airport facility.
3. Establishment of two decentralised general-purpose processing facilities on Tongatapu.

5.2 Nuku'alofa Export Processing Facility

The main requirements to improve the Nuku'alofa facility are to free-up the existing floor space so that it can be used as originally intended, and to install additional equipment in the outdoor washing and packing area to improve operational efficiency. The necessary works include:

- Construct and equip a new building of around 40 m^2 for inspection and certification of handicrafts for export. This will free-up much of the export processing and inspection area in the existing building for processing of horticultural exports.
- Equip the existing export processing and inspection area with stainless steel benches to facilitate sorting, grading, packing and inspection of produce for export.
- Install shelving in the blast freezer to allow for faster freezing of produce in individual pieces, with bagging after freezing prior to transfer to the shipping container. This is more energy efficient than bagging the produce before freezing, provides for quicker and more uniform freezing, and improves product quality by allowing individual pieces to be easily separated for placement in retail packs either at the packing facility or by the importer/distributor. Packing ready frozen produce is standard procedure for most frozen food products.
- Engage a qualified refrigeration engineer to check the operation of the blast freezer to ensure that it is working satisfactorily. The long periods required to freeze cassava suggest that the freezer may not be functioning properly, although freezing bagged product also contributes to the problem.
- Construct a roof over the 120 m^2 paved area between the export processing and inspection area and the fumigation facility. This area is used for washing and packing root crops for export. The area also needs to be equipped with stainless steel benches, lighting, three-phase electricity, weigh-scales and a washing machine for root crops. These machines greatly accelerate the washing and packing of cassava and other root crops, use much less water, and enable a full twenty-foot container load to be processed in 4–6 hours.
- Install additional rainwater tanks or connect to the town water supply to allow for increased volumes of root crops to be processed.
- Assess compliance of wastewater disposal with environmental regulations, and if necessary install a wastewater treatment facility. Install removable bins for solid waste disposal.
- Monitor utilisation of the fumigation facility. If exporters plan to export more than about 60 tonnes of fumigated produce per shipment, the capacity of this facility would become limiting and an additional fumigation chamber will need to be installed. Accreditation of additional MAFFF staff also appears to be a wise precaution to guard against possible disruptions to exports.

The above works would enable the capacity of the facility to increase from about 3 tonnes of root crops per day to one full container load (about 15 tonnes) per day; and increase the capacity of the fumigation facility from 60 tonnes per shipment to 120 tonnes.

5.3 Fua'amotu Airport Facility

The facility has recently been signed over from MAFFF to TEQM (a state-owned company), which proposes to operate it on a commercial basis. This facility has all major items of equipment required for handling fresh fruit and vegetables for export by air freight, but needs a fairly extensive overhaul before it can become reliably operational. Significant repairs and maintenance have been carried out over the last year with the help of a New Zealand volunteer, but due to lack of funding a number of items still need attention, including:

- Structural repairs to the building, including replacement of guttering, repairs to the insect screens, and repair of the main entrance gates;
- Installation of shutters on the Western side of the building to keep the working areas dry during heavy rain storms;
- Installation of a lockable storage area;
- Overhaul of the electrical system, including standby generator;
- Installation of a larger boiler and a new boiler room;
- Installation of work benches for grading and packing produce;
- Overhaul of the toilet and washroom facilities; and
- Ancillary equipment, including a new forklift, platform scales, office equipment and computer.

Once these repairs and improvements have been carried out, the airport facility will be ready to process and pack the complete range of fruit and vegetables for export by air, including products for which market access is currently being pursued (courgettes/zucchini and possibly green beans), and including those commodities requiring HTFA treatment. However, it should be noted that the facility does not have the water supply or drainage systems required for washing produce. If washing is required, this will have to be carried out at a separate facility beforehand.

5.4 Decentralised General-Purpose Processing Facilities

The current level of root crop exports would fully utilise the Nuku'alofa facility, even after the enhancements detailed above. Therefore, if root crop exports are to expand, additional facilities will be needed. Exporters have expressed a preference for decentralised facilities close to the main root crop production areas, where produce can be processed and packed in shipping containers. It is suggested that growers and exporters in the central part of Tongatapu would use the Nuku'alofa facility, and that two new facilities would be constructed in the rural areas, one in the Eastern District and one in the Western District. These would be general purpose processing and packing facilities able to handle the full range of root crops (chilled and frozen) and cucurbits. The facilities would each have the capacity to process one twenty-foot container load of produce per day. They would include:

- An open-sided shed of around 200 m^2 with a concrete slab floor to allow for ventilation and easy cleaning, together with small office and lunch area, toilets and wash room.
- Equipped with stainless steel benches, washing vats, washing machines and weigh-scales to facilitate sorting, grading, packing and inspection of produce for export.
- Connection to three-phase power with a backup generator and lighting to enable night operation.

- Borehole and tank for clean water supply, with high pressure pump to allow the work area to be cleaned.
- Blast freezer of about 50 m^3, sufficient to freeze one twenty-foot container load of root crops per shift.
- Parking space (concrete slab) and power for two twenty-foot reefer containers.
- Lockable areas to enable users to store packing materials and equipment.
- Composting bins for solid waste disposal (leaves, peel, reject produce etc.).
- A wastewater treatment facility to allow clean wastewater to be discharged or re-used.
- Access to an all-weather road suitable for heavy vehicles.
- Forklift for loading/unloading produce, bins etc.
- Perimeter fence, approximately 3 m high.

The decentralised facilities would be available to exporters on a fee-for-service basis. The operators would hire the facilities by the day and be responsible for engaging their own labourers and for provision of all movable tools, consumables, packaging material and other equipment. It is likely that the facilities would be mainly used for processing frozen root crops, but they could also be used for coconuts, watermelons or other produce. The facilities would enable much more efficient and hygienic operations than the current makeshift facilities used by most exporters, as well as ensuring better quality product by blast freezing rather than the current practice of freezing bagged product in containers. Chilled product would be chilled in the container, avoiding the need for a separate cool room. The facilities would also be potentially HACCP certifiable if this becomes necessary in the future.

5.5 Vava'u Export Processing Facility

While the Vava'u facility has some design problems that partly explain why it is not being used, there is also only one root crop exporter in Vava'u, who operates on an intermittent basis and prefers to use his own facilities. On this basis, improvements to the Vava'u facility are considered low priority at this stage.

5.6 Ownership and Operational Issues

The ownership and operation of the export processing facilities detailed above is just as important as the structures and equipment therein. The preferred option is for the exporters to own and operate all processing and packaging facilities, similar to the Fiji model with the Nature's Way Cooperative (NWC). NWC (see Appendix B) is a cooperative (owned by the exporters) that owns and operates the HTFA facility and export packhouse near Nadi Airport. It has been in operation for 16 years, during which the number of shareholders has grown and throughput has steadily increased. NWC has a full-time professional management team, operates on a user-pays basis, and is financially self-sustaining. However, it is important to note that NWC received substantial amounts of donor support during its early years, and has only recently become fully self-supporting.

The two **MAFFF export facilities** at Nuku'alofa and Vava'u are available for use by exporters for the cost of electricity only. This arrangement is not sustainable, as it makes no provision for other operating costs, repairs, maintenance or replacement of the facilities at the end of their working life. Given the constrained budgetary position of MAFFF, it is inevitable that the condition of the facilities will deteriorate over time unless a system of full cost recovery is established. Ideally, the facilities

should be leased to a private sector operator, preferably a NWC-type entity, which would charge commercial rates for use of the facility.

The **airport facility** has recently been transferred from MAFFF to TEQM, which is a state-owned company. TEQM has no other assets and no sources of revenue other than fees paid by users of the facility. It is therefore essential that these fees are adequate to cover the full operating costs. As a parastatal, TEQM is able to retain the fee income it generates, unlike a ministry where fee income goes back to the treasury. It is recognised, however, that over the next few years revenue collected from users will almost certainly be insufficient to cover the full operating costs or to finance the necessary repairs, maintenance and improvements. TEQM will therefore need external funding for up to five years. As with the MAFFF facilities, once throughput is sufficient, the facility should be leased to a private sector operator, preferably a NWC-type entity. This was in fact the intention under the NZAP-Government of Tonga agreement, which envisaged that TEQM would hand over to the private sector, probably GroFed, once the facility had sufficient throughput to cover its costs. Now that the facility has been transferred to TEQM, the transition to private sector operation can again be considered, but it will take several years until this can take place.

The preferred option for ownership and operation of the proposed two **decentralised processing facilities** is for them to be controlled by the growers and/or exporters from the outset. The role of MAFFF would therefore be confined to technical support and inspection/certification. In the absence of a NWC-type entity, GroFed would the most appropriate organisation to own and operate the facilities. However, this would require substantial strengthening of GroFed both financially and managerially, over a period of about five years. Charges for use of the facilities should be sufficient to cover all operating costs, as well as a sinking fund to accumulate money to finance replacement of the buildings and equipment as necessary.

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Appendix A

Appendix A Tonga's Agricultural Exports 2001–2012

Appendix A

Figure A-1 Monthly exports of cassava 2007 – June 2012 (tonnes)

Cassava exports show a gradual uptrend from around 50 tonnes per month in 2007 to more than 100 tonnes per month today.

All cassava is exported in frozen form.

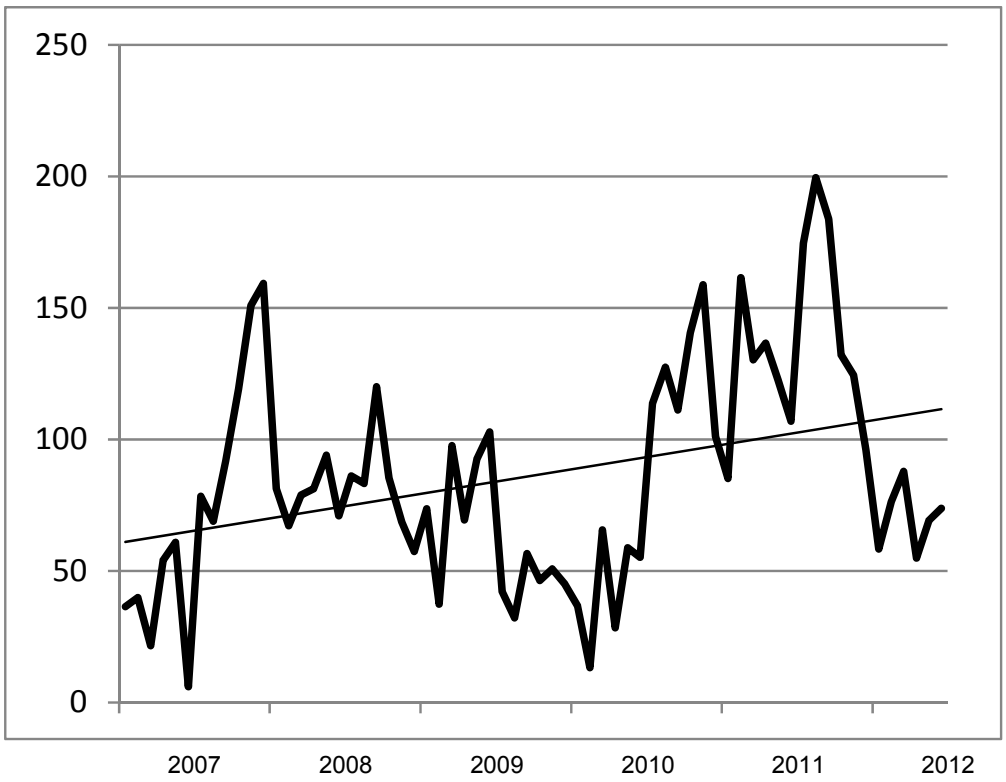
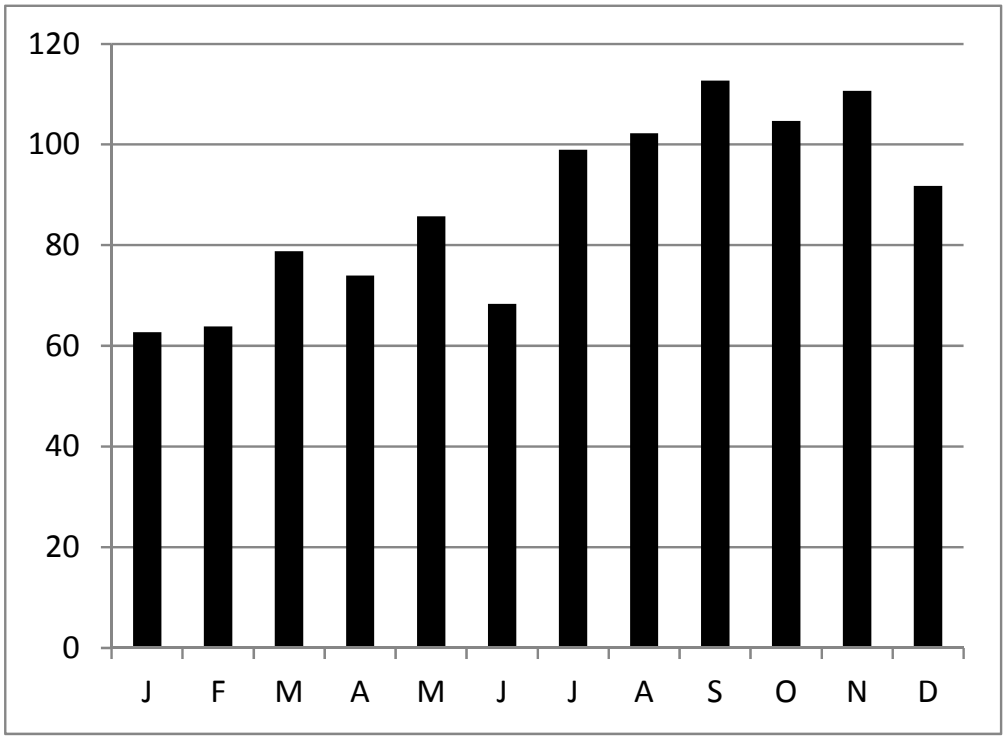


Figure A-2 Average monthly exports of cassava 2007–2011 (tonnes)

Cassava exports average about 70 tonnes during the first half of the year, increasing to over 100 tonnes during the second half.

This is related to the seasonality of demand in the New Zealand market.



Appendix A

Figure A-3 Monthly exports of giant taro (Kape) 2007 – June 2012 (tonnes)

Exports of giant taro fluctuate markedly from month to month.

Volumes fell to almost zero in 2010 but have since rebounded to 30–80 tonnes month.

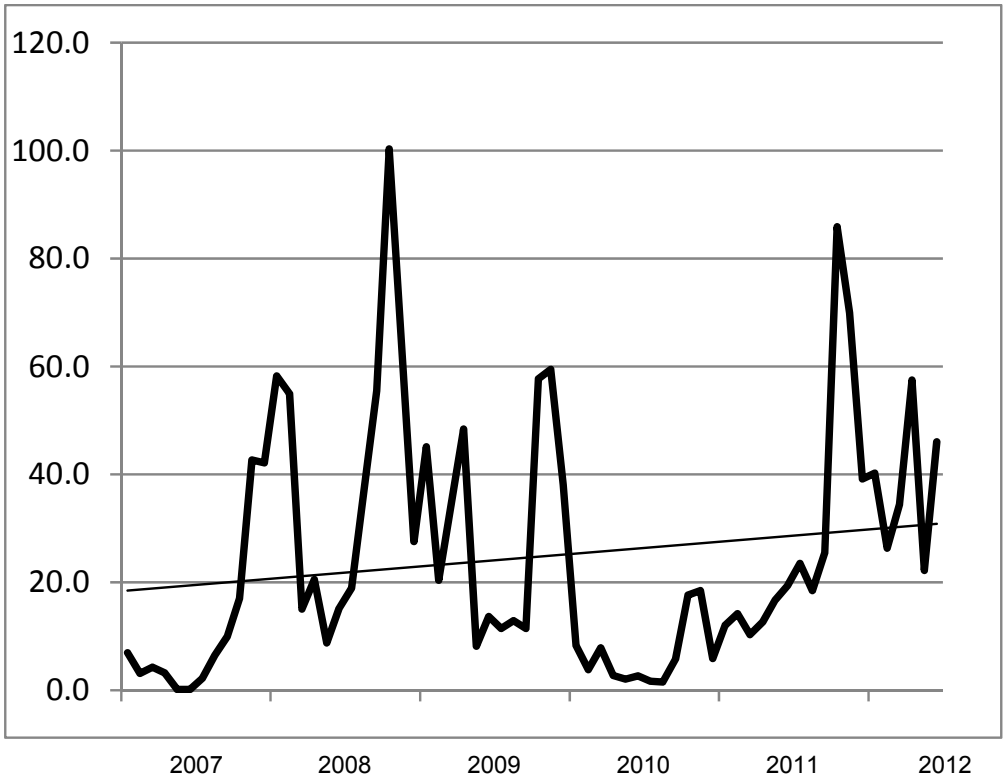
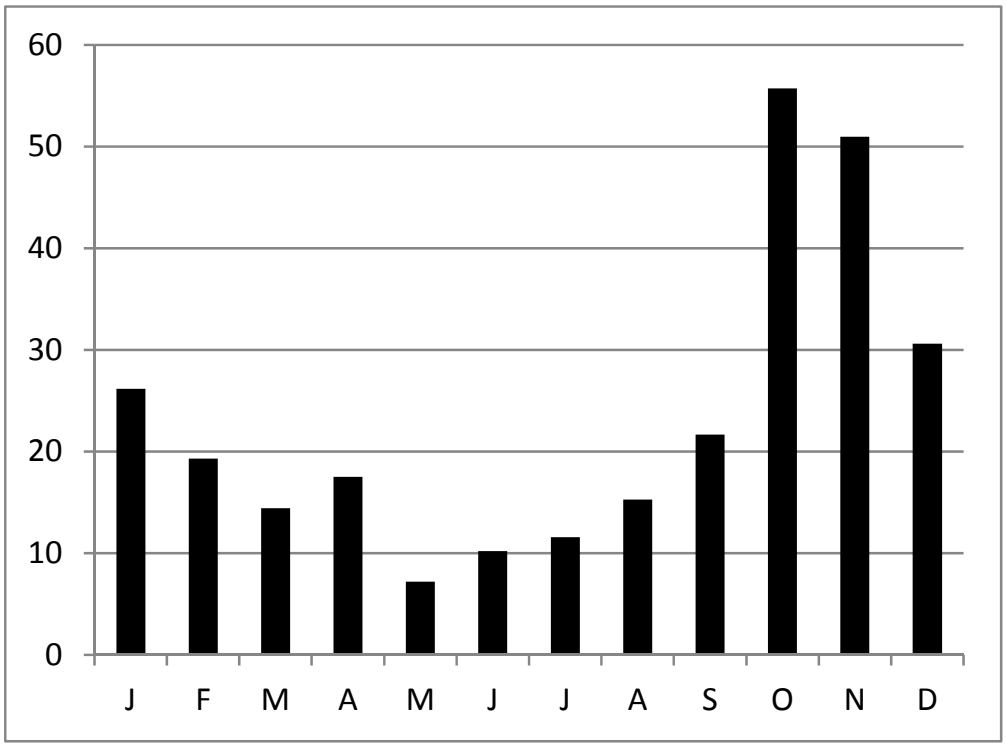


Figure A-4 Average monthly exports of giant taro (Kape) 2007–2011 (tonnes)

There is a large spike in giant taro exports during the October–December period.



Appendix A

Figure A-5 Monthly exports of swamp taro (Taro Tonga) 2007 – June 2012 (tonnes)

Exports of swamp taro are also highly unstable but have shown a strong uptrend since 2010.

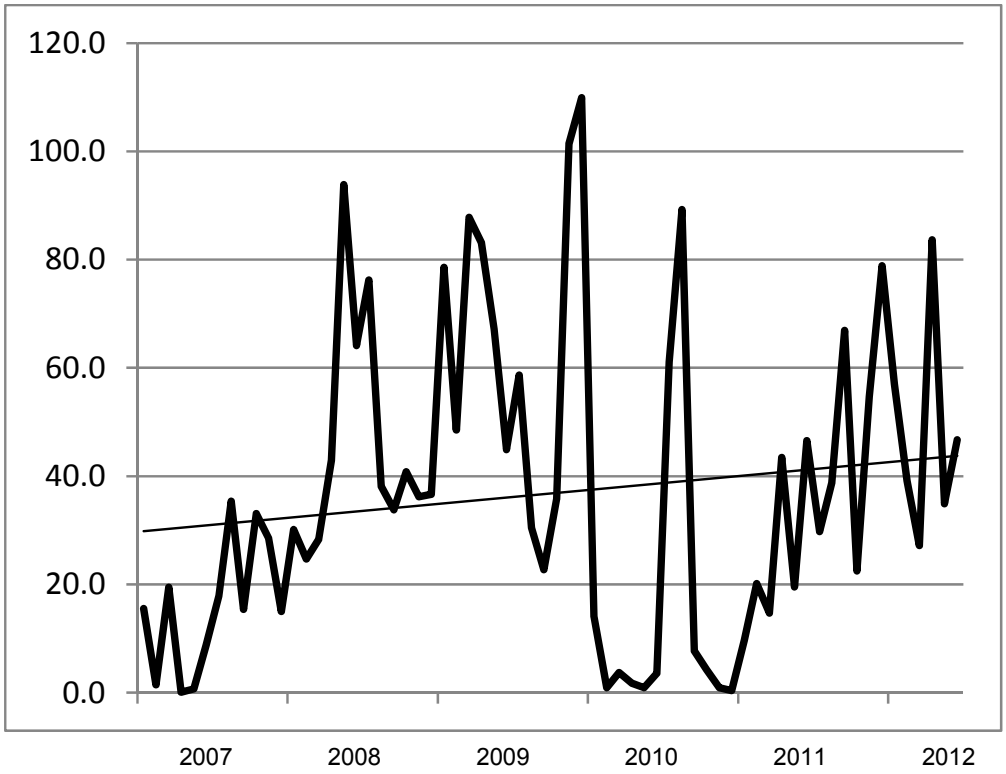


Figure A-6 Average monthly exports of swamp taro (Taro Tonga) 2007–2011 (tonnes)

Exports of swamp taro tend to be highest in July–August and November–December.

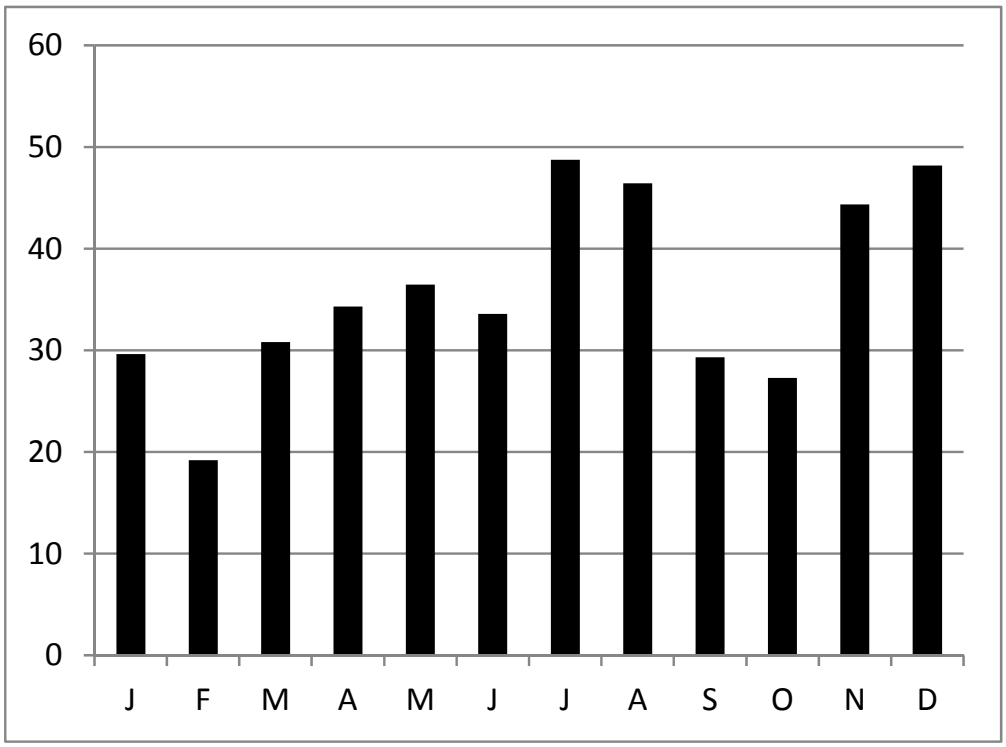


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Figure A-7 Monthly exports of Taro Tarua (Taro Futuna – Tea) 2007 – June 2012 (tonnes)

Taro Tarua exports declined between 2007 and 2010 but have recovered since then.

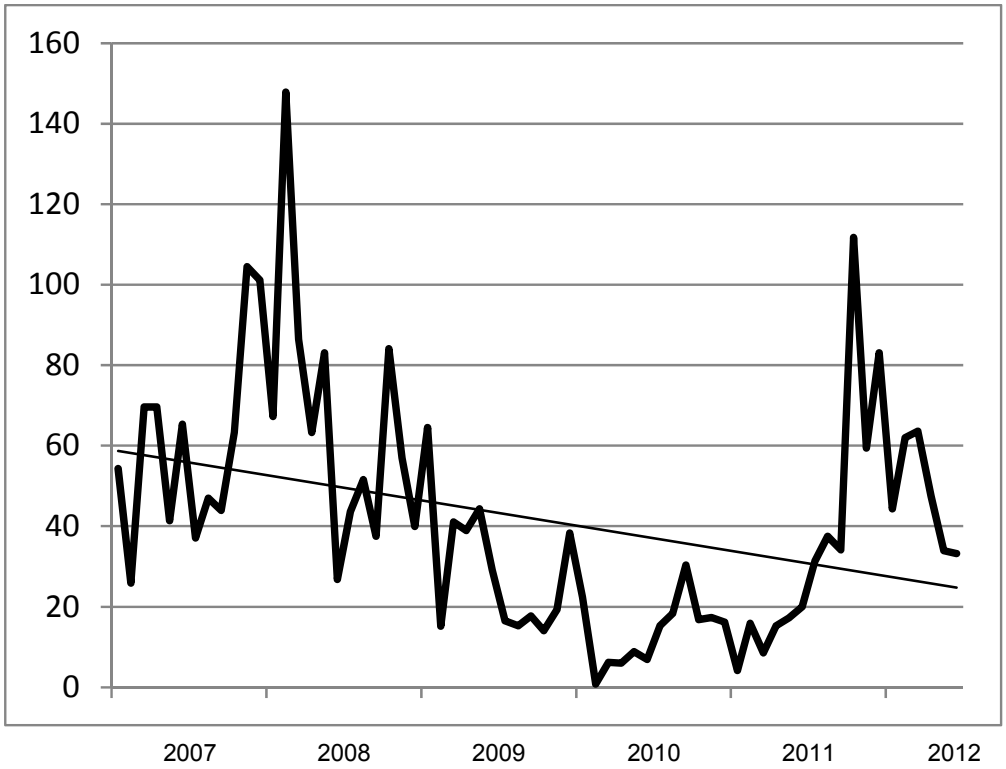

Figure A-8 Average monthly exports of Taro Tarua (Taro Futuna – Tea) 2007–2011 (tonnes)

Taro Tarua exports tend to be stronger in in the October–December period and weakest in June–July.

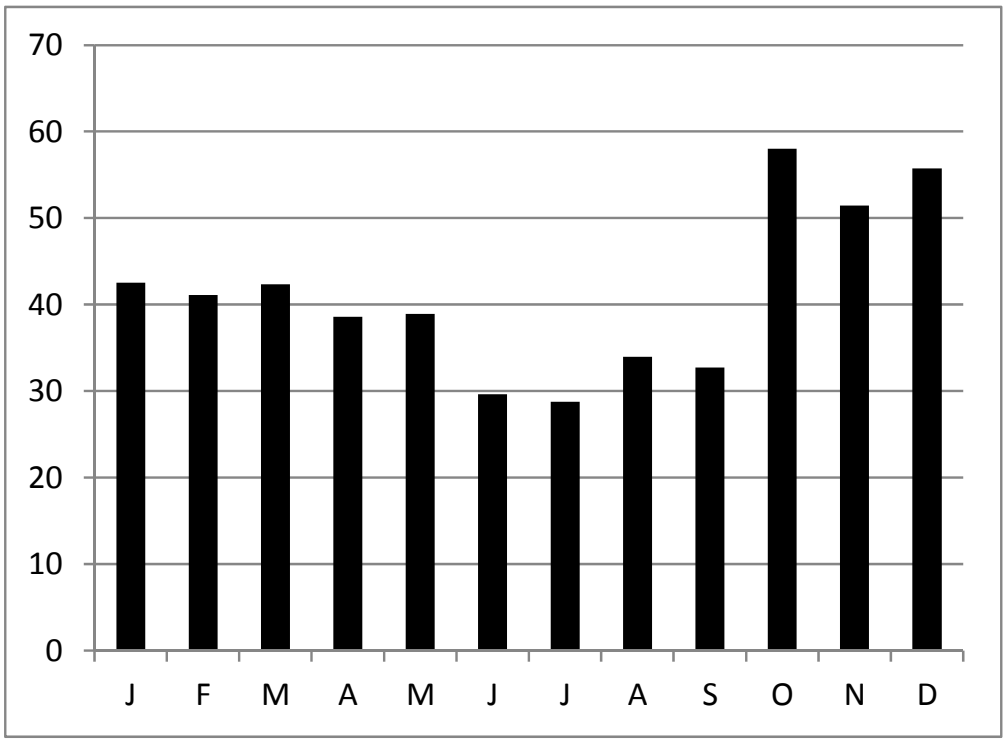

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Figure A-9 Monthly exports of yam 2007 – June 2012 (tonnes)

Exports of yams reached over 200 tonnes per month during the peak season in 2007. The seasonal peak is now around 150 tonnes per month.

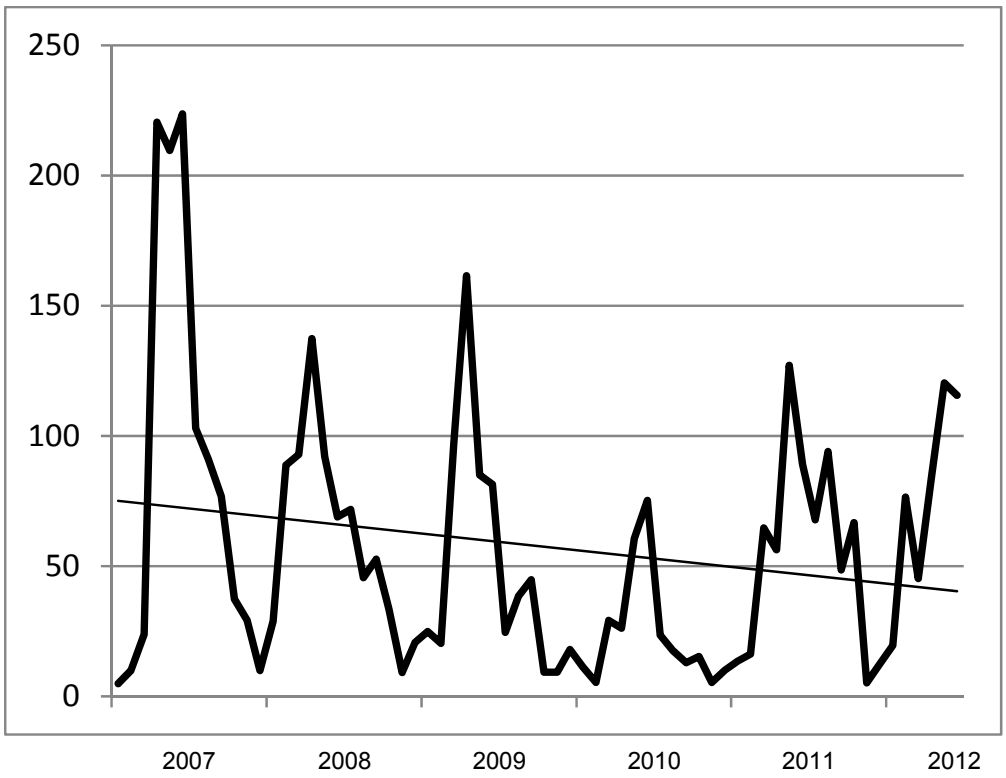
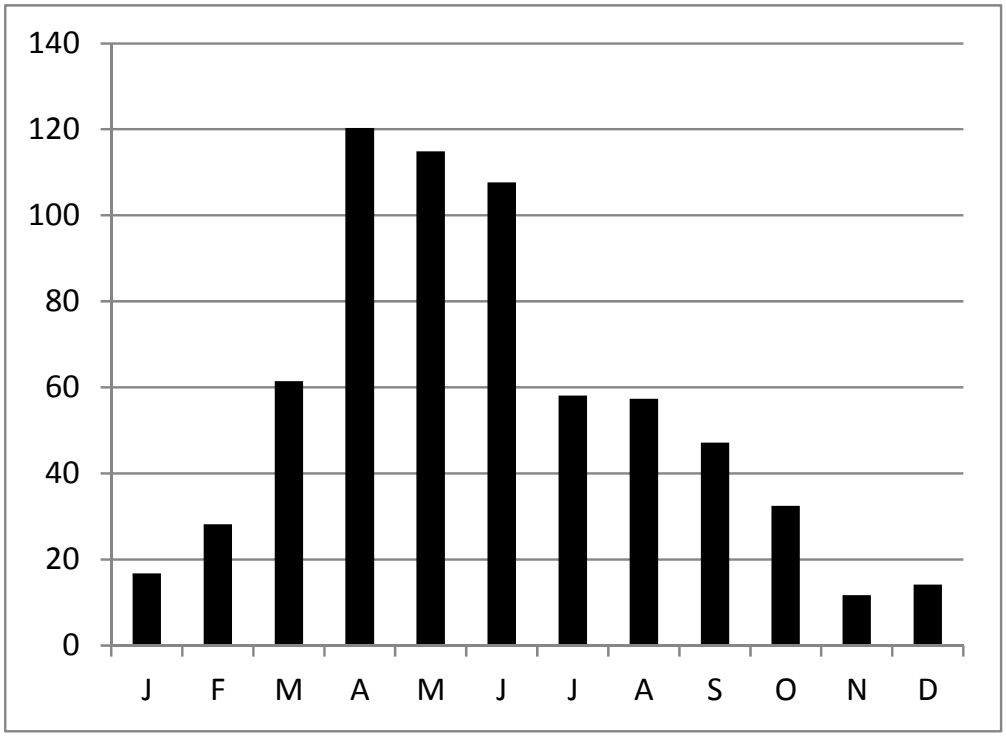


Figure A-10 Average monthly exports of yam 2007–2011 (tonnes)

Yam exports are strongly seasonal with the peak period being April–May–June.



Appendix A

Figure A-11 Monthly exports of all root crops 2007 – June 2012 (tonnes)

Combined exports of all root crops have rebounded strongly from their low in early 2010 and are now running at 250–350 tonnes per month.

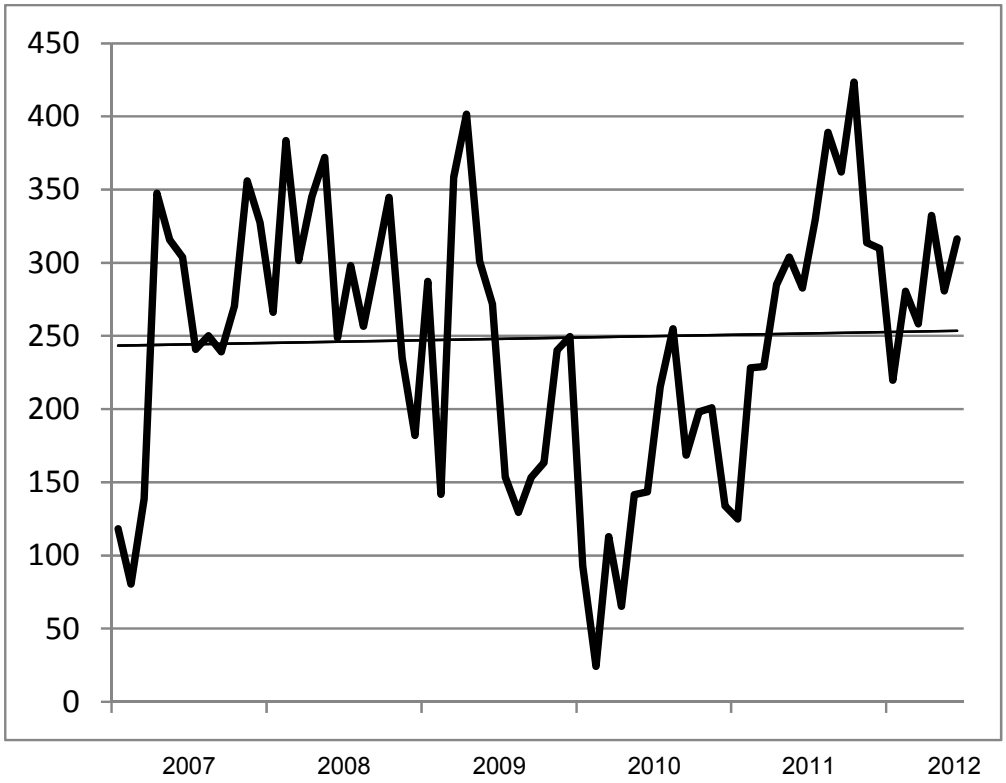
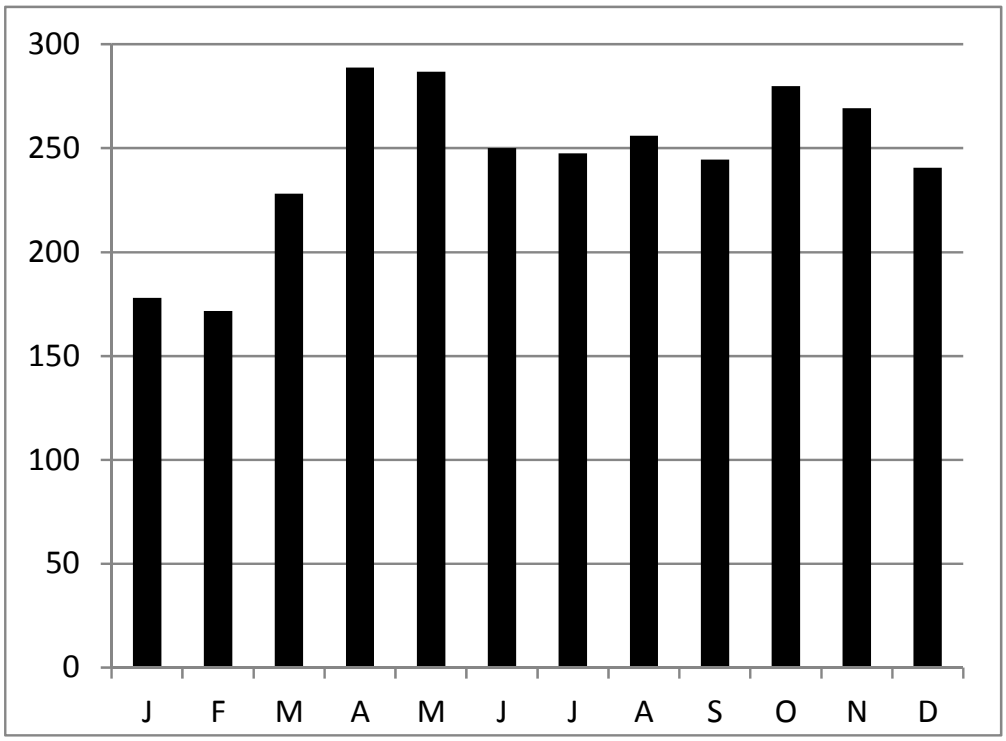


Figure A-12 Average monthly exports of all root crops 2007–2011 (tonnes)

January–February is generally the low point for root crop exports but export volumes are fairly stable over the remainder of the year.



Appendix A

Figure A-13 Monthly exports of squash 2007 – June 2012 (tonnes)

Monthly exports of squash reached 2,500 tonnes in 2007, fell to less than 1,000 tonnes per month in the 2009 and 2010 seasons, but recovered to 1,500 tonnes in 2011.

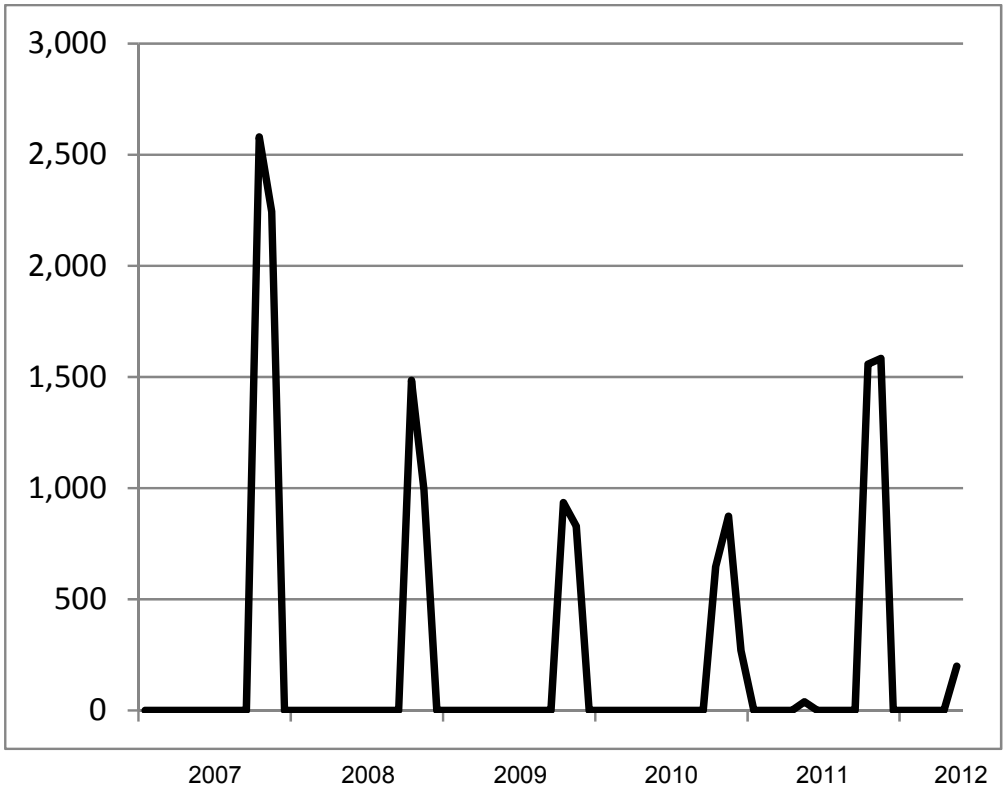
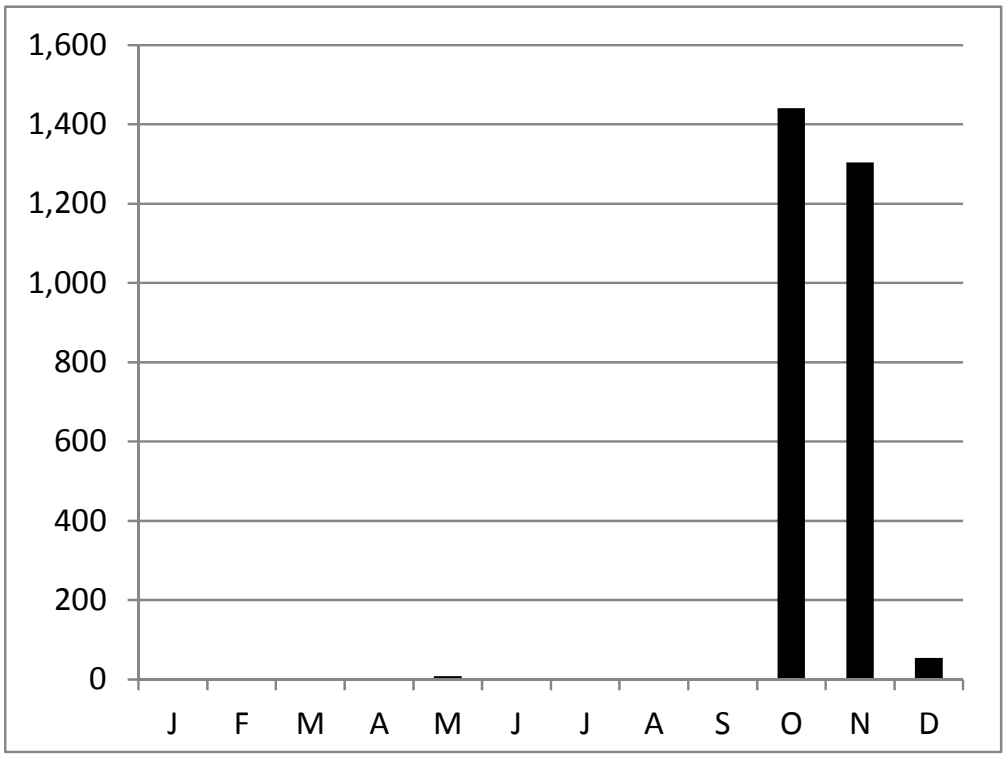


Figure A-14 Average monthly exports of squash 2007–2011 (tonnes)

The squash export season is concentrated in October and November.



Appendix A

Figure A-15 Monthly exports of watermelon 2007 – June 2012 (tonnes)

Watermelons have become a significant export since the opening of the MAFFF fumigation facility has enabled access to the New Zealand market.

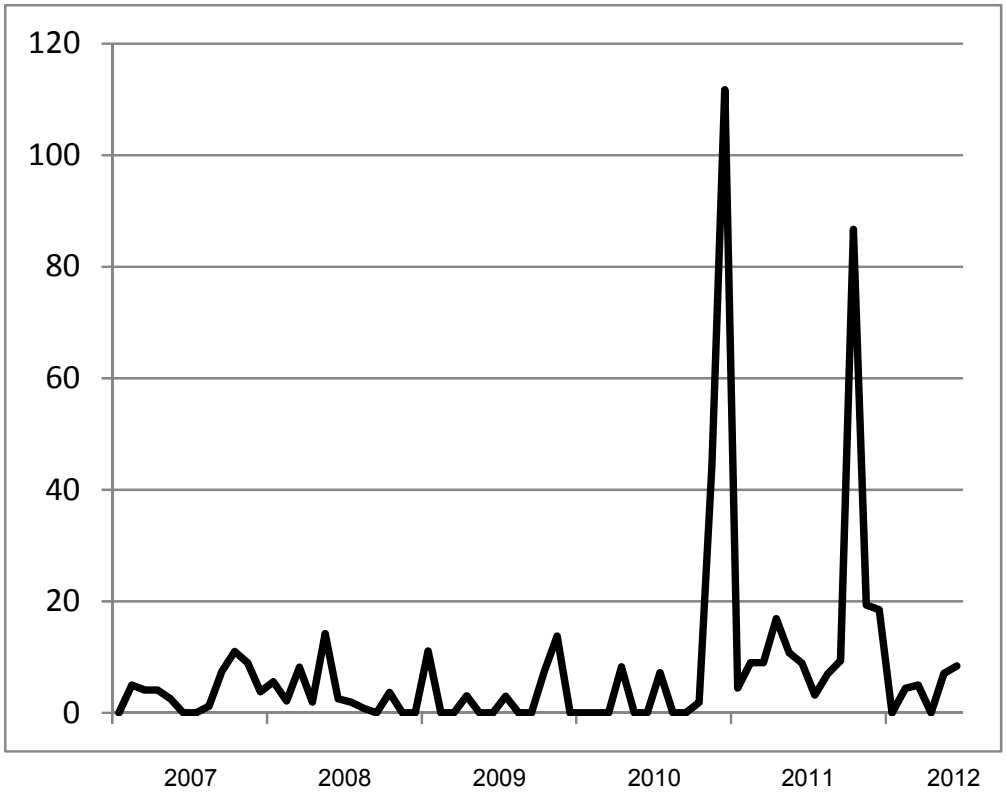


Figure A-16 Average monthly exports of watermelon 2007–2011 (tonnes)

The main watermelon export season is October to December.

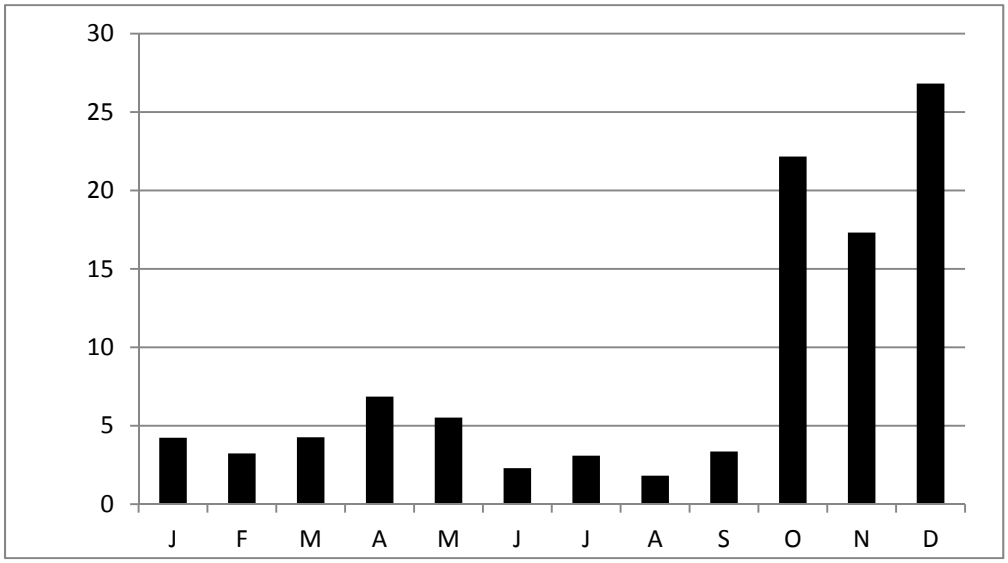


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Figure A-17 Monthly exports of coconuts 2007 – June 2012 (tonnes)

Exports of fresh mature (brown) coconuts have shown a steady uptrend from around 60 tonnes per month in 2007 to about 100 tonnes per month today.

Exports of green nuts rarely exceed 20 tonnes per month.

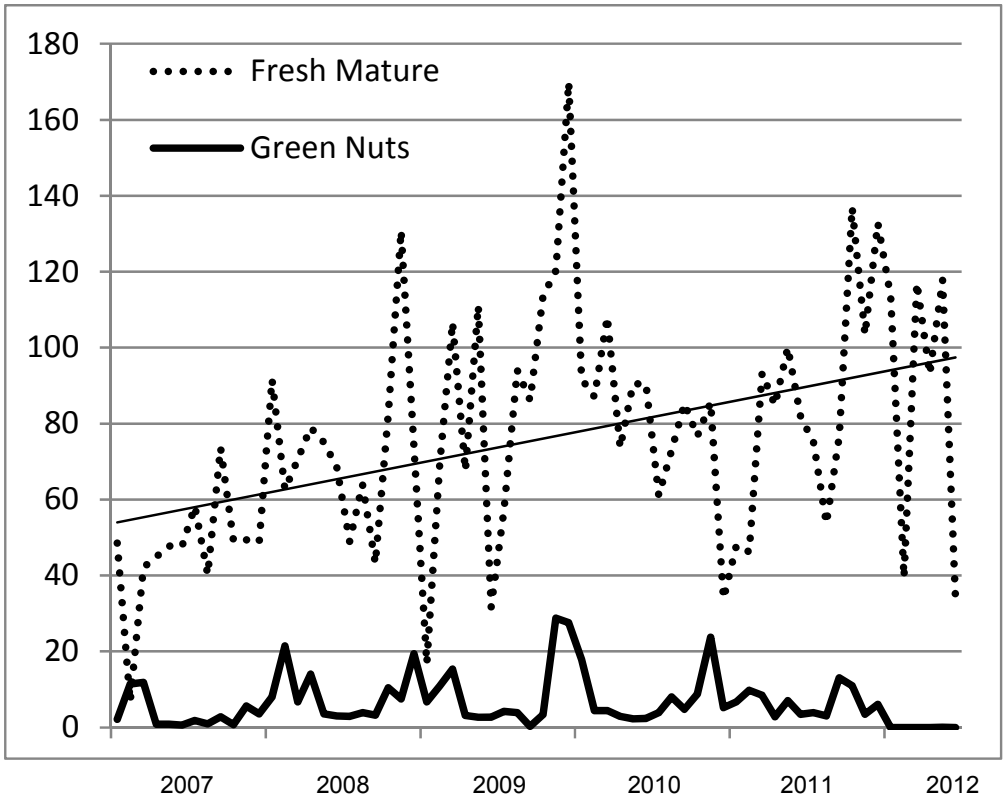

Figure A-18 Average monthly exports of coconuts 2007–2011 (tonnes)

Coconut exports are strongest during the last quarter of the year. Most green nuts are exported during the New Zealand / Australia summer months.

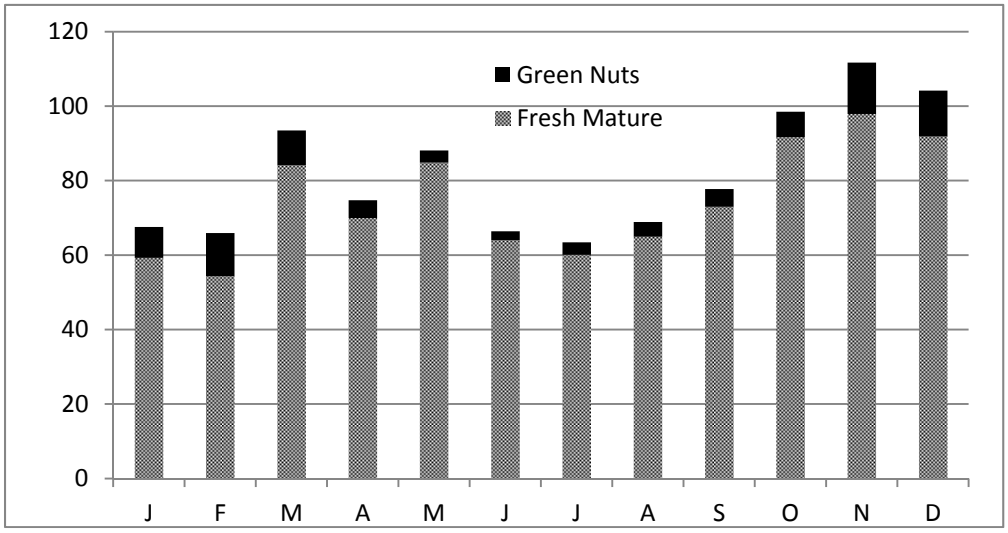

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Table A-1 Other agricultural exports 2007 to June 2012 (tonnes)

	2007	2008	2009	2010	2011	To June 2012
Kava (poweder, chips, roots)	78.81	126.34	170.52	152.39	112.79	81.36
Taro Leaves	80.94	67.95	48.09	35.32	44.56	9.34
Breadfruit (cooked and frozen)	0.08	0.00	3.03	23.28	57.83	17.81
Vanilla beans (cured)	4.76	4.12	13.63	6.02	1.92	0.15
Tomatoes	0.340	0.340	0.426	0.000	0.000	0.000
Coffee (green beans)	0.402	0.255	0.000	0.000	0.439	0.000
Pele (Island Cabbage)	0.000	0.000	0.000	0.000	0.890	0.000
Cabbage	0.250	0.250	0.000	0.000	0.000	0.000
Carrots	0.290	0.000	0.000	0.000	0.000	0.000
Chillies	0.000	0.000	0.270	0.000	0.000	0.000
Cucumber	0.000	0.200	0.000	0.000	0.000	0.000
Avocado	0.000	0.103	0.000	0.000	0.000	0.000
Lettuce	0.020	0.000	0.000	0.000	0.000	0.000

Kava and taro leaves are significant exports – kava to other Pacific islands and taro leaves mainly to New Zealand. Breadfruit exports have increased during the last three years, but vanilla exports have dwindled to almost nothing. Exports of other fruits and vegetables are insignificant.

Appendix B Nature's Way Cooperative, Fiji

This Appendix presents the findings of a 2009 review of the operations of Nature's Way Cooperative in Fiji.[5] *A number of the lessons learned have implications for the ownership and operation of processing and marketing infrastructure facilities in Tonga.*

An industry-owned business, Nature's Way Cooperative (Fiji) Ltd (NWC) is a registered cooperative owned and operated by the Fiji fresh produce export industry. NWC's core business is the quarantine treatment of fruit fly host products. Over the last decade, NWC has grown from a small business handling just 30 tonnes of papaya to an agribusiness treating 1,200 tonnes fruit (papaya, mango, eggplant and breadfruit) annually for export. Currently, NWC annually generates around FJD2 million in export earnings and FJD800,000 in farmer income. Because of the capital investment made by NWC, a threefold increase in export earnings and farmer income is now feasible.

A number of key factors have contributed the success of NWC. These are:

- The quality and continuity of management;
- There has been no government interference in the operations of the business;
- An appropriate public-private sector partnership;
- Shareholders have not interfered in the day-to-day operations;
- Quarantine treatment fees have been set at an economic rate from the outset – enabling the business to meet operating costs, fund repairs and maintenance, invest in expansion and make "rainy day" provisions for events such as cyclones and trade bans; and
- The business was able to quickly move to a level of plant utilisation that yielded a positive cash flow.

Successful quarantine treatment in the Pacific Islands requires a public-private sector partnership. The public sector cannot be successful on its own, nor can the private sector. However, through appropriate collaboration, success can be achieved. The appropriate role and contribution of the two parties in the PPP are:

- **The public sector:**
  - Facilitates the initial transfer of specialised technology to the fruit and vegetable export industry.
  - Provides start-up capital (equipment, building, land and some working capital) and contributions toward expansion projects in the form of capital.
  - Facilitates the timely negotiation of bilateral quarantine agreements (BQAs) that open up markets for the business.
- **The private sector:**
  - Owns and operates the facility on behalf of the fruit and vegetable export industry.
  - Provides a significant contribution for the start-up and working capital by taking shares in the business.
  - Generates the retained earnings to maintain the business and to invest in future expansion.

[5] McGregor A, Gonemaituba W and Stice K (2009). Nature's Way Cooperative (Fiji) Ltd: A Case Study of Agriculture for Growth in the Pacific.

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Operating as a formal registered cooperative has served the quarantine treatment business reasonably well in its 13 years of operation. There have been two major benefits to this structure:

- Under Fiji Cooperative Act, a new cooperative is entitled to a 7 year tax holiday.
- There has been a steady increase in exporter members of NWC. A principal objective of the cooperative is to expand its membership. This would not necessarily be the case for a limited liability company providing services.

However, there have been a number of shortcomings and problems arising from NWC being a cooperative:

- A generally negative perception of cooperatives.
- Inadequate administrative support provided by the Department of Cooperatives.
- Under capitalisation.
- The risk of unjustified change of management.

NWC has grown from a small service cooperative to a mature agribusiness whose turnover will soon exceed a million Fiji dollars annually. The longer term sustainability of the business depends on being able to:

- Maintain a high level of retained earnings;
- Attract more equity investment on the part of its shareholders;
- Maintain high quality management that make decisions that are in the long term interest of the industry; and
- Have an effective credit control system in place for the recovery of debtor payments.

The first three of these objectives would be more likely to be achieved if NWC was a limited liability company, under the Companies Act, with the exporters and farmers as shareholders.

With the completion of the current capital investment program, NWC will theoretically have the capacity to treat around 3, 800 tonnes per annum. A realistic maximum capacity is likely to be more in the order of 3,000 tonnes per annum.

With the Fiji fresh fruit and vegetable export industry starting to realise its potential, treatment requirements may in the not too distant future exceed this expanded capacity. However, NWC has decided not to make any more investments in treatment capacity. The argument was that if treatments exceeded 3,000 tonnes per annum, the larger exporters would have sufficient throughput to invest in their own treatment facilities.

The success of NWC has created pressure to replicate the facility in two other locations – one on the remote northern island of Rotuma and the other on the Eastern side of the main island of Viti Levu. Neither of these ventures has been subject to an economic feasibility study and it is highly unlikely that either could be commercially viable, with the throughput unlikely to justify the capital investment. This contrasts markedly to the situation at NWC, where the initial investment and subsequent expansion were subject to detailed feasibility studies.

NWC‘s core business has been quarantine treatment. However, there have been opportunities to take advantage of NWC‘s strategic position to raise funds to undertake other service activities on behalf of the horticultural export industry. Such activities should not undermine NWC’s ability to provide efficient quarantine treatment services. The Cooperative has been very successful in accessing donor funding

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to support the establishment of these service role activities. Examples of such service activity roles are:

- A body representing the needs of the horticultural export industry
- Operating a field service
- Market access facilitation
- Input supplies (field crates and seedlings).

Appendix C

Appendix C List of Persons Contacted

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