Pacific Horticultural & Agricultural Market Access Plus Program

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Root Crops Market Study (Fiji, Samoa, Tonga, Vanuatu)

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Acronym List

Acronym	Description
ADB	Asian Development Bank
APCP	Australia Pacific Climate Partnership
AUD	Australian Dollar
BAF	Biosecurity Authority of Fiji
BICO	Biosecurity Import Conditions database (Australia)
CSO	Civil Society Organisation
DAWE	Department of Agriculture, Water and the Environment
FAO	Food and Agriculture Organisation
FAVIR	Fruits and Vegetables Import Requirements (USA)
FCLC	Fiji Crop and Livestock Council
FJD	Fiji Dollar
FWF	Fiji Women's Fund
FWRM	Fiji Women's Rights Movement
GAP	Good Agricultural Practice
GEDSI	Gender Equality, Disability and Social Inclusion
GOV	Government of Vanuatu
HACCP	Hazard Analysis and Critical Control Point
HPW-HWT	High Pressure Washing/Hot Water Treatment
IFC	International Finance Corporation
IHS	Import Health Standard (New Zealand)
ITC	International Trade Centre
IWG	Industry Working Group
MAF	Ministry of Agriculture and Fisheries (Samoa)
MAWG	Market Access Working Group
MeBr	Methyl Bromide
MPI	Ministry of Primary Industries (New Zealand)
NGO	Non-Government Organisation
NPPO	National Plant Protection Organisation
NZ	New Zealand
PHAMA Plus	Pacific Horticultural and Agricultural Market Access Plus program
PIC	Pacific Island Country
PTI	Pacific Trade and Invest
PWD	Persons with Disabilities
SCHS	Sea Container Hygiene System
SCN	Sector Concept Note
SFA	Samoa Farmers Association
SROS	Scientific Research Organisation of Samoa
SVSG	Samoa Victim Support Group
SWAG	Samoa Women Association of Growers
TLB	Taro Leaf Blight

TNCWC	Tonga National Centre for Women and Children
TOP	Tongan Pa'anga
VNCW	Vanuatu National Council of Women
VPPA	Vanuatu Primary Producers Authority
VUV	Vanuatu Vatu
VWC	Vanuatu Women's Centre
WST	Samoan Tala

Pacific Island Root Crops

Common Name	Scientific Name	National Names			
		Fiji	Samoa	Tonga	Vanuatu
Taro	Colocasia esculenta	dalo	talo	talo	aelan taro
Giant Swamp Taro	Cyrptosperma chamissonis	via kan	pula'a		navia
Giant Taro	Alocasia macrorrhiza	via	Ta'amu	kape	pia
Tannia	Xanthosoma sagittifolium		Talo plagi	Talo futuna	Taro Fiji
Cassava	Manihot esculenta	tapioca, tavioka	manioka	manioke	Manioc
Sweet Potato	Ipomoea batatas	kumala	umala	kumala	kumala
Yams	Dioscorea spp.	uvi	ufi	ufi	

Exchange Rates (September 2021)

	National Currency Units per:		
National Currency	USD	AUD	NZD
Fiji Dollar - FJD	2.00	1.48	1.42
Samoan Tala - WST	2.39	1.77	1.70
Tongan Pa'anga - TOP	2.11	1.56	1.50
Vanuatu Vatu - VUV	108.78	80.57	77.39

Executive Summary

Production and Trade

Root crops are a traditional pillar of food security in Pacific Island Countries (PICs) and, despite changing dietary habits, including a shift towards consumption of imported cereal staples, remain important food and cash crops.

Whilst important in the region, Pacific root crop production only represents about 0.4% of total global production. Amongst the three main study countries of Fiji, Samoa and Tonga, total production is around 190,000 tonnes, with Fiji accounting for 70% of this. Most production is consumed locally, with exports representing just 5-6% of production in Fiji/Samoa and 16% in Tonga.

During a peak period between 2006 and 2009, New Zealand, Australia and the USA imported around 14,000 to 15,000 tonnes of root crops from PIC exporters. Since then, the volume has contracted somewhat, but remains around 12-14,000 tonnes, with New Zealand absorbing around 60% of this, Australia 30% and the USA 10%. There have been significant changes in the market share of the three exporters, with Samoa increasing from a very low base, Tonga gaining market share and Fiji's exports declining.

Fiji, Tonga and Samoa are the three principal exporters. Vanuatu has exported small volumes in the past and is interested in becoming a more regular supplier. Total exports peaked at 15,500 tonnes in 2007, declined to 10,000 tonnes in the drought/cyclone-affected 2015, and have since recovered to reach 14,500 tonnes in 2020, worth a record USD 20.4m.

The export marketing system operates in parallel with a domestic market which, in all cases, handles much higher volumes than the export pathways. There are two different export market systems, the formal/commercial market and the informal market, with the latter prevalent in Tongan and existing to some extent in Fiji and Samoa.

There have been significant changes in trading patterns over the last decade, with Fiji losing market share, and Australia and the USA expanding their imports, the latter from a low base. Non-PIC suppliers are dominant in the USA and are increasing their market share in Australia and New Zealand. Across all three markets, PIC exports are predominantly consumed by Pacific Island diaspora communities.

Comparing data for the last five years (2016-2020) with the preceding five-year period, trade grew by 13%, with volumes going to the USA rising by 35%, Australia by 16% and New Zealand by 8%. Tonga increased its exports by 132% and Samoa by 104%, whilst exports from Fiji declined by 23%. However, Fiji remains the dominant supplier of taro, with 66% of the market overall and almost 95% of the Australian market. In overall root crop export terms, taro remains the most important product category, accounting for almost 60% by volume and a higher percentage by value, due to the premium prices being obtained. Yam increased from 4% to 9% of the volume traded, and cassava from 17% to 22%. Fiji and Samoa's exports are mainly taro, whilst Tonga exports a mix of taro, cassava and yams. Frozen products are believed to be gaining market share at the expense of fresh products, although the latter attract higher prices.

Gender Equality Disability and Social Inclusion Context

Roles and responsibilities within root crop value chains are gender-differentiated, with men more involved in crop production and women in processing and marketing, but with differences between countries and communities, according to socio-cultural norms and traditions. However, there are significant barriers facing women, youth and persons with disabilities (PWD) in accessing employment in the value chains or starting their own businesses. Young people are expected to contribute labour but are inclined to pursue other career opportunities with agriculture being seen as a 'last resort'.

There are opportunities to promote greater inclusion in root crop value chains through: (i) improving access to market information and business development openings for marginalised groups; (ii) disseminating information on compliance requirements and product standards; (iii) workplace GEDSI training on codes of conduct and workplace policies; (iv) strengthening workplace health and domestic violence policies; (v) advancing women's leadership in managerial, marketing and supervisory functions; (vi) creating incentives for more inclusive

practices; (vii) encouraging leadership in the adoption of new technologies or processes; and (viii) training and access to business/communication networks for marginalised groups.

Longer-term inclusion opportunities include: (i) improving access to agribusiness education through partnerships between exporters and education providers; (ii) training women and youth to fill gaps left by seasonal worker programs; and (iii) highlighting the invisible roles played by PWD and further efforts to connect PWD to suitable opportunities.

Key Export Markets

New Zealand is the oldest and largest market for Pacific Island root crops with volumes fluctuating between 8,000 and 10,000 tonnes per annum over the last 20 years, and in 2020 were near the upper end of that range. The Australian market has grown at around 3.3% per annum over 20 years and is now larger than New Zealand in value terms, but with non-PIC countries supplying up to half of the market. In the USA, imports have grown steadily from around 100,000 tonnes in 2001 to over 250,000 tonnes in 2020, with the great majority of imports sourced from Central and Southern America. PIC exporters have less than 2% market share. Prices are generally highest in the US and lowest in New Zealand, with Tonga's mainly informal trade receiving significantly lower prices than the other two exporters.

Across all major markets, COVID-19 has caused major headaches through disruptions to air and sea transport, increasing freight rates, and other supply continuity problems. This has seen retail prices skyrocket, particularly for fresh taro.

General Conclusions

Root crops are one of the Pacific Islands' oldest and most resilient food exports with three main exporting countries, three main export markets, and a product range covering four species (taro, giant taro, cassava and yams) in both fresh and frozen formats. Vanuatu is a fourth potential supplier, but with much to do to establish a viable export industry. The principal conclusions arising from the marketing study are:

Market Opportunities

- The study has not identified any significant new/un-tapped opportunities in terms of products or markets. The three major export destinations are well-established, and it is unlikely that any significant new markets will open up, at least in the short-to-medium term.
- The largest market for PIC exports (New Zealand) is showing signs of maturity; whilst the Australian market is expanding, but with most of the growth coming from frozen products supplied by Asian exporters; and the smallest market (USA) is growing (from a low base).
- Knowledge about the New Zealand and Australian markets is readily accessible. However, less is known about the USA market, other than the fact that PIC exporters supply a small niche in a very large market, and that prices appear stronger. Some exporters are optimistic about expanding this niche.
- PICs supply at least 80% of the New Zealand market, and about 50% of the Australian market, but less than 2% of the USA market. However, there is limited potential to win market share from the other suppliers (or vice versa) due to taste preferences and cultural affiliations.
- Whilst opportunities to expand volumes may be limited across all markets, there are opportunities to increase profitability by improving quality, reliability, logistics and biosecurity compliance.
- Exporter and importer declarations that they are eager to source additional supplies need to be interpreted with caution. They generally prefer increased volumes on offer so that they can be more selective, push down prices and win market share from competitors.

Challenges

- The resilience of the trade suggest that it will continue to provide opportunities for PIC exporters in the long-term. However, root crops should be considered a mature market. Increasing volumes alone is unlikely to achieve much other than driving down prices.

- It is likely that the trade will remain heavily dependent on demand from Pacific diaspora communities whose food habits are becoming westernised. The number of people prepared to pay high prices for imported (especially fresh) root crop products is likely to dwindle.
- Many issues identified in studies conducted 9-10 years ago remain current, if not a greater challenge. These focus on quality and consistency of supply, biosecurity and food safety compliance, potential for value addition, post-harvest management, and formalisation.
- Significant biosecurity and logistic challenges remain, and COVID-19 has seriously disrupted supplies. There appears to have been limited progress in improving compliance with biosecurity protocols. Food safety and social accountability standards are likely to become more stringent.
- The frozen sub-sector is likely to perform better over time because of biosecurity and logistic advantages and consumer preference for cheaper and more convenient products.

Value Addition

- Value adding opportunities exist in both the fresh and frozen sectors. The best way to add value is improved quality at all stages from primary producer to consumer, recognising that the highest returns can usually be obtained from premium quality fresh rather than frozen or processed products.

Social Inclusion

- Improving access to market information can support new actors, including marginalised groups that currently face barriers in accessing export opportunities.
- The skills of women in postharvest handling and administration suggest that attempts to strengthen quality and standards should be twinned with efforts to promote women's leadership within agribusinesses.
- Strengthening workplace health and domestic violence policies and partnerships can increase the productivity and performance of value chains, particularly within processing facilities.

Recommendations

1. Pacific Island root crop growers and exporters should re-focus on marketing fundamentals including quality and consistency of supply; attractive/convenient packaging and presentation; consumer convenience; food safety, traceability and social accountability; gender equality and social inclusion; and regulatory/biosecurity compliance.
2. Develop a better understanding the potential of the US market, recognising that it has shown the best growth performance of the three main markets, although from a low base. PIC exporters are likely to remain niche players in this large market, but it needs to be better understood to inform exporters about its potential.
3. Vanuatu's aspirations to become a root crop exporter should be supported through the development of a comprehensive business plan for the sector, recognising that, as a late starter, this will require long-term commitment and investment framework.
4. Strengthen inclusion within agribusiness partnerships by enhancing the ability of management to develop and implement strategies to address barriers faced by women, youth and PWD.

1 Introduction

1.1 Overview and Study Structure

Root crops are a traditional pillar of food security in the Pacific Island Countries (PICs), and remain important food and cash crops, despite changing dietary habits and including a shift towards consumption of imported cereal staples such as rice, bread, pasta, noodles etc. There are three main root crop exporters (Fiji, Tonga, Samoa), three main markets, and a combination of species, varieties and products (fresh and frozen) being traded. More recently, Vanuatu has expressed interest in developing its root crops export sector. However, it has been over nine years since the most recent market studies were completed and these have been partial, focused on one commodity group (taro) and mainly on one market (New Zealand).

The primary objective of this study is to provide an up-to-date, sector-wide assessment of the root crops market system and to produce a set of findings and recommendations to help identify opportunities to make the existing market system operate more efficiently for exporters and growers, with specific consideration given to the role of women, youth and Persons with Disabilities (PWD) as actors in the market system.

The study includes:

1. A review of previous studies.
2. Sector context from a GEDSI perspective.
3. A sector context and update on global and PIC root crop production, consumption and export patterns.
4. Presentation of producing country profiles, providing a snapshot of the current status.
5. Presentation of importing country profiles.
6. Study conclusions and recommendations.

2 Root crops – previous studies

There is a very large volume of literature on root crops in the PICs, reflecting the social and economic importance of the sector. This includes almost 30 PHAMA studies and reports relating to the root crop sector since 2011 which are listed and summarised in Annex 2. However, there have been a limited number of studies that address marketing issues, none of which are recent or cover the full range of commodities and markets.

2.1 Taro Market Access Scoping Study – Australia & New Zealand (2011)

This study[1] focused on quarantine protocols and production/marketing pathways for taro exports from PICs. The study found that exports had the potential to 'more than double' if quarantine protocols were reformed and there were substantial improvements in production, export certification and market pathways. Key findings were:

a) Imports of Pacific Island taro to Australia were about half that of New Zealand (now around 70%) for the following reasons: (i) smaller Pacific Islander population, especially Samoans; (ii) growing domestic Australian taro industry; and (iii) Australia's quarantine protocols. For example, the requirement to devitalise fresh taro imports from Fiji results in product loss (10-15% by weight), increased handling costs and reduced quality and a requirement to use airfreight to overcome reduced shelf-life. The report also noted the further product damage by methyl bromide fumigation to address the regular insect interceptions at the border.

b) Per capita consumption of taro amongst Pacific Islanders living in New Zealand was around 20 kilograms per annum; a fraction of the consumption levels in Samoa and Fiji. Despite a strong cultural preference for taro, there had been no market expansion over the past five years and per capita consumption had fallen significantly. This was explained by the relatively low incomes of Pacific Islanders, the 'exceptionally high' price of taro relative to other starch sources (potatoes, rice, and wheat flour), and the generally poor quality of the taro available. Excessive fumigation contributes to the high prices and poor quality of taro sold in New Zealand.

c) The report considered that the potential gains from relaxation of quarantine protocols in Australia and New Zealand should be supplemented by improvements in the efficiency of the export industries themselves. For the Fiji industry, and Taveuni in particular, this would involve: (i) restoration of land productivity – to improve yields and corm size; (ii) better handling to reduce bruising and damage and improve keeping quality; (iii) improved packing to reduce damage and post-harvest diseases; and (iv) improvements in the cool/cold chain. The report proposed the following improvements to the taro marketing pathway:
   - Training of farmers, buyers, buying agents, transporters, packhouse workers and quarantine staff in proper taro handling, quality and grading systems.
   - Improved agronomic methods including crop rotation and good quality planting material to increase corm size and yields.
   - Proper handling during harvesting, grading and transportation from the farm to the exporter packhouses.
   - Cool storage facilities to be cleaned regularly with antiseptic and temperature maintained with minimal fluctuations.
   - Improved pack house conditions to minimise contamination after processing and packaging.

[1] Pacific Island Taro Market Access Scoping Study. McGregor A, Afeaki P, Armstong J, Hamilton A, Hollyer J, Masamudu R and Nalder K. EU-Funded Facilitating Agricultural Commodity Trade Project. (March 2011).

2.2 Taro Exports to New Zealand (PTI and FAO – 2012)[2]

This study found that the New Zealand market was concentrated in Auckland, where most Pacific Island people reside. This market was deemed to be mature but unstable, fluctuating between around 6,600 and 7,900 tonnes, mostly supplied by Fiji, with Tonga a distant second place. About 80% of the market was pink taro, mainly consumed by Samoans, and 20% is white taro preferred by Tongans. At that time, the retail market included the small/independent fruit and vegetable stores, estimated to account for about 50% of sales, with the supermarkets and the informal trade accounting for the remainder. Supermarkets generally sourced taro from importers or wholesalers, rather than importing directly. As shown in Table 1 there was a mix of large and medium commercial importers as well as small and informal traders. The study found that around 90% of fresh taro shipments to New Zealand were fumigated with methyl bromide due to detection of regulated pests, which incurs a cost, delays clearance, and reduces storage life. The study also found that buyers were concerned about product quality and consistency, with supermarkets rejecting or downgrading up to 30% of supplies.

Table 1: Three Tier Market Structure

Large Commercial Importers	• Turners & Growers Ltd., MG Marketing, Freshmax and Fresh Direct • Require consistency of supply and quality • Servicing supermarket chains and independent retailers • Have infrastructure and systems to supply customers on a national basis
Medium Commercial Importers	• Specialise in importing and distribution Pacific Islands produce • Deal in limited quantities and carry-out any necessary sorting and packing economically • May supply some speciality lines to supermarket chains or have their own retail outlet
Small Importers	• Consist of small family and church networks, referred to as the informal channel • Produce generally imported directly from their home community through family connections and supplied to local buyers (families and church groups) • May sell product through flea markets • Lower transaction costs but poor revenue collection compared to formal market • In addition to informal traders, there are a number of small commercial importers who operate intermittently, when market conditions are favourable

PTI/FAO identified the following options for developing/expanding the New Zealand taro market:

- Target the mainstream (i.e., non-Pacific Islanders) market through consumer education about how to cook taro and its nutritional and health advantages.
- Use of taro in frozen microwavable meals and value-added products such as taro chips.
- Target Pacific Island communities outside Auckland in areas where seasonal workers are concentrated.
- Transition from informal to commercial marketing pathways.
- Build long-term relationships between exporters and importers.
- In response to the changing consumption habits of young Pacific Islanders living in New Zealand, and the need to expand the market beyond Auckland, develop value added products, and reduce the cost of taro compared to substitute products such as rice, potatoes and bread.
- Increased demand for convenience food such as frozen prepared meals reflects the fact that many households have multiple members working and less time for food preparation.
- Pace emphasis on healthy diets and reducing consumption of sugars, salt and fats.
- In response to increase emphasis being place on certification schemes and standards such as NZGAP and HACCP, increase focus on quality, food safety and traceability. Build long-term relationships between suppliers and commercial importers.

[2] Pacific Islands Trade and Invest (PTI) and FAO (September 2012) Pacific Islands Exporting Taro to New Zealand

3 Sector Context – GEDSI and root crops sector

As part of this study, a rapid GEDSI analysis of the root crop sector was undertaken in June 2021. Several industry stakeholders in Fiji, Samoa, Tonga, and Vanuatu were interviewed to describe and validate existing literature and research that characterises roles and responsibilities of men, women, youth, and PWD within root crop value chains. Industry stakeholders, including government agencies and civil society organisations (CSOs) that work closely with agriculture sector, were also interviewed. A number of challenges and opportunities were identified and are summarised below.

3.1 Roles and responsibilities of men, women, youth and PWD

Roles and responsibilities within root crop value chains remain gendered. with men likely to be more involved in cash crop production, in particular land preparation, planting and the use of heavy machinery; and women being more involved in labour-intensive processing activities like cleaning, peeling, cutting and packing, and also playing key roles in the administration and marketing aspects of agribusinesses. In general, women in Vanuatu and Fiji, and elsewhere in Melanesia, are involved in root crop land preparation and planting whereas women in Tonga and Samoa tend to only be involved in the small-scale gardening, processing, administration, and marketing aspects of root crop value chains.

Root crop value chains depend heavily on youth labour in all four countries. Young men are generally responsible for clearing and ploughing the land, planting, maintenance and harvest of root crops, often as unpaid workers at the family and community level, or as paid workers for commercial and export-oriented agribusinesses. Similarly, young women play a supporting role in these production activities within the family unit and at the community level and are heavily involved in the postharvest processing.

There is minimal to no involvement of PWD in the root crop sector across all four countries with most respondents highlighting that they had not considered that PWD would be able to play roles due to the physical nature of work. However, in Fiji and Samoa, there are examples of PWD participating in the administration, marketing and retail side of root crop agribusinesses.

3.1.1 Key challenges

Roles and responsibilities within root crop value chains are strongly influenced by socio-cultural norms and traditions that change slowly.

- Women's involvement in planting and other labour-intensive farming activities varies from place to place, even within countries, depending on factors such as hierarchical structure in communities, education levels and affiliations of community members to social and political groups. One Tongan exporter said, 'We tend to not see a woman's place as being in the farm'.

General lack of recognition among exporters of pervasive and differential barriers facing women, youth and PWD in accessing formal employment or starting their own businesses.

- Pervasive barriers to access and control of land resources with many women-led enterprises relying on family status to guarantee security of land tenure, leaving others vulnerable.
- Barriers to accessing formal business and agriculture networks, which tend to be male dominated and where women and young people may feel uncomfortable voicing their needs. This means that women, youth and PWD tend to be more involved in informal (and less profitable) root crop marketing arrangements.
- Poor access to financial products and services, technology, information, training opportunities and extension services for marginalised groups. Power often resides with male-led, established enterprises who are prioritised for access to opportunities. Technology can help to transform this, provided women and youth have access.
- Barriers to accessing markets and equitable value chain opportunities with women's and marginalised groups are not taken seriously during negotiations with intermediaries and/or government officials.

Women shared examples of discomfort in participating and exclusion from business networks, barriers to accessing information, finance and advice, and in some cases, sexual harassment.

Common perception of agriculture being the 'last resort' for young people.

- Despite the reliance on young people for labour, youth-led enterprises tend to be small and constrained by cultural norms. The Samoa Farmers Association reported that youth participation in root crop value chains is largely influenced by power structures at the household and community levels and many are obligated to contribute to communal activities at the village/community level.
- Parents within farming households tend to encourage their children towards a career in the fields of education, medicine, law and other white-collar job opportunities. Farming is often viewed as the 'last resort' (Samoa Farmers Association) and a young exporter in Tonga shared that of all of the students in his class, he was the only one who wanted to work in his family farming business.

Lack of recognition of the business case for inclusion.

- While some progress has been made in demonstrating productivity gains from stronger workplace policies on health and wellbeing, including addressing issues of violence, there remains few documented case studies of the business case for employment of persons with disabilities and few formal agricultural employment opportunities as a result.
- There are few formal partnerships between industry associations, farmer organisations and rights-based civil society groups working on gender equality, disabilities and marginalised groups.

3.1.2 Key Opportunities

There are some general opportunities to promote inclusion within root crop value chains; as well as specific opportunities to promote inclusion within PHAMA Plus activities that are mentioned in different sections of the report.

Short term opportunities

- Improve access to market information to unlock business development opportunities for marginalised groups. Develop information and communication strategies for reaching marginalised value chain actors that can support them to develop new business partnerships and products. Ensure consideration is given to barriers in accessing technology where digital platforms are used as part of the strategy to improve access.
- Ensure that information relating to food safety and quality standards is made available to marginalised groups. Relevant GEDSI training (including the development of codes of conduct and workplace policies) should be provided to support intermediaries involved in providing extension services and purchasing root crops at the farm gate (e.g., drivers) to ensure their behaviour is not a barrier to inclusion.
- Support agribusinesses and exporters to strengthen workplace health and domestic violence policies and referral systems through partnerships with civil society groups and learning from agribusinesses that have demonstrated success. SolTuna and Lami Kava have documented experiences with strengthening workplace policies.
- Women are highly regarded in processing root crops, with exporters describing excellent work ethic, reliability, and better attention to detail. Opportunities to utilise these skills can be developed to advance women's leadership within the managerial, marketing and supervisory functions, and as part of strengthening HACCP processes.
- Market development programs need to create incentives and partnerships for adopting more inclusive approaches. This includes improving communication products and examples of the business case for promoting women, youth and PWD leadership, including examples of tax incentives where they exist (e.g., Fiji).
- Partnership agreements between agribusinesses and market development programs should include requirements to examine opportunities to strengthen women's leadership and responsibilities as part of the adoption of new technology or processes (e.g. HACCP), provide training to those involved in strengthening value chains to make the business case for adopting inclusive approaches, promote

access to business networks for marginalised groups and ensure information and communication strategies are adopted to address barriers to information.

Medium-Long term

- Agribusiness education can be made more attractive and relevant through stronger partnerships between root crop exporters and educational providers. Tutu college in Fiji has demonstrated some success in providing holistic education opportunities that recognise the importance of workplace and business skills to succeeding within root crop export and value addition markets. Educational institutions and root crop exporters could be supported to develop structured internship/ apprenticeship programs that address industry needs and provide opportunities for youth career progression and business start-up.
- Seasonal worker programs are contributing to a shift towards older agricultural workers, but also creating new opportunities for women and youth. A stronger partnership between the seasonal worker programs and exporters as part of a structured approach to train women and youth to fill labour shortages created by seasonal worker programs and to support reintegration of returning labourers could be a useful way to drive improvements in quality and standards.
- More work is needed to identify the invisible roles PWD play, and profile good examples of PWD as value chain actors. Some exporters have invested in making their facilities accessible, but this has not resulted in significant employment PWD. Further efforts are required to connect PWD to suitable opportunities in conjunction with disability rights groups.

4 Sector Context – production, trade and value

4.1 Global production of tropical root crops

Root crops are a vital element of food security and an important cash crop across the PHAMA Plus countries. They are significant export crops in Fiji, Tonga and Samoa. However, production in the PICs is a very small percentage of the global total as, indicated by FAO statistics.

Figure 1: Global Production of Tropical Root Crops 2000-2019 (million tonnes)

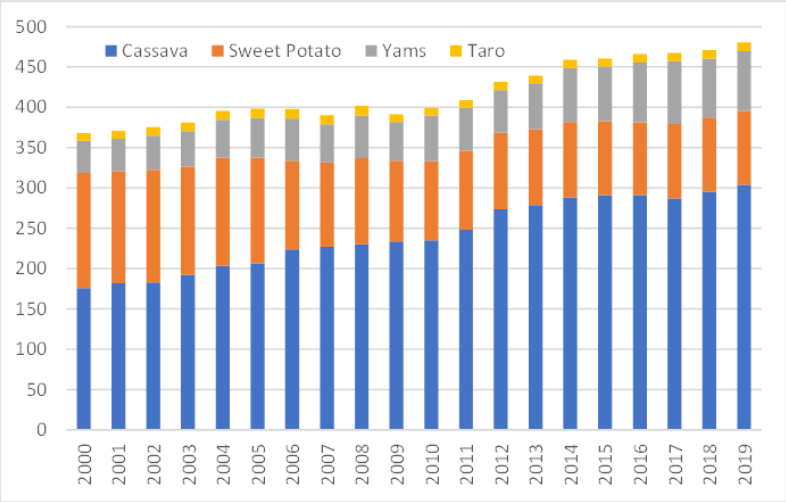


Figure 1 shows that World production of the four main tropical root crops (cassava, sweet potato, yams and taro) is around 470 million tonnes, increasing steadily over the last 20 years.

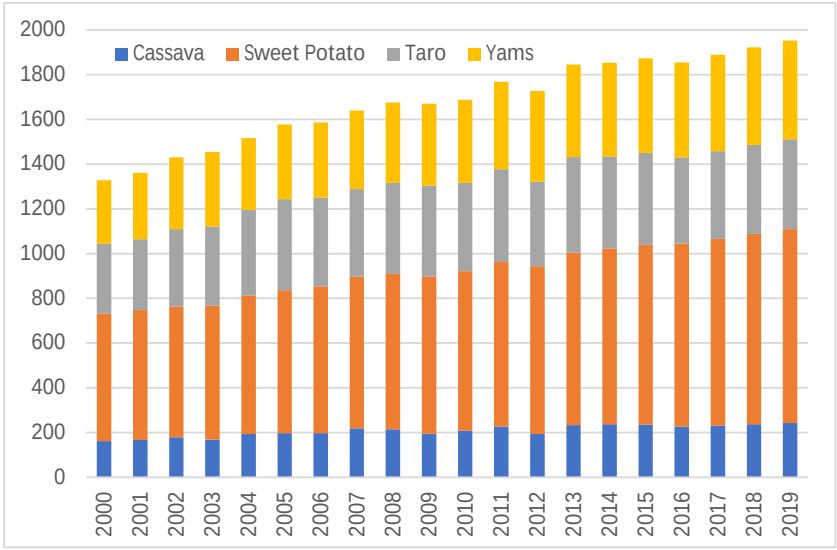
Table 2: Topical Root Crops - Producing Areas and Crop Types

	Cassava	S/Potato	Yams	Taro	Total	Percent
Africa	177.8	26.7	71.6	7.5	283.6	60.5
Asia	86.8	60.1	0.2	2.4	149.6	31.9
Americas	28.5	3.9	1.2	0.1	33.8	7.2
Oceania	0.2	0.9	0.4	0.4	2.0	0.4
Europe	0.0	0.1	0.0	0.0	0.1	0.0
Total	293.4	91.7	73.4	10.4	469.0	100.0
Percent	62.6	19.6	15.7	2.2	100.0	

Pacific Island Countries account for just 2 million tonnes or 0.4% of global production. Over 60% of tropical root crop production is cassava and over 69% comes from Africa.

4.2 Root crop production in the PICs

Figure 2: Total production of root crops in PHAMA Plus countries 200-2019 (tonnes '0000)



- Total root crop production in the six PHAMA Plus countries has increased at an annual average rate of 1.5% per annum since 2000 to reach almost two million tonnes (Figure 2).
- 80% of production in PHAMA Plus countries comes from PNG, of which 50% is sweet potato (Figure 3).
- Amongst the study countries of Fiji, Samoa and Tonga, the total production of root crops is approximately 190,000 tonnes of which 70% is produced by Fiji (Figure 4).
- In terms of root crop production per capita, Fiji, Samoa and Tonga produce between 150 and 200 kg per person (Figure 5). There are no statistics on production for Vanuatu but it may bs similar to Solomon Islands and be in the ranger 250-300 Kg/capita.

Figure 3: Average production of root crops in PHAMA Plus countries 2015-2019 (tonnes '000)

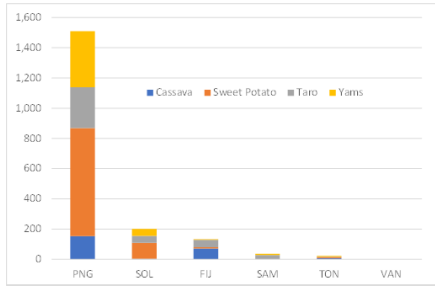


Figure 4: Average root crop production in study countries 2015-2019 (tonnes '000)

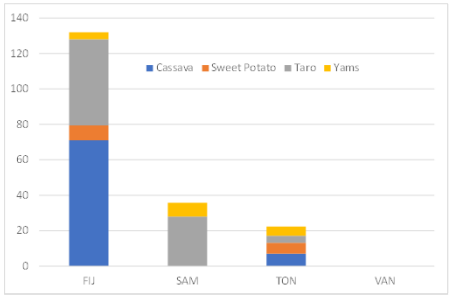
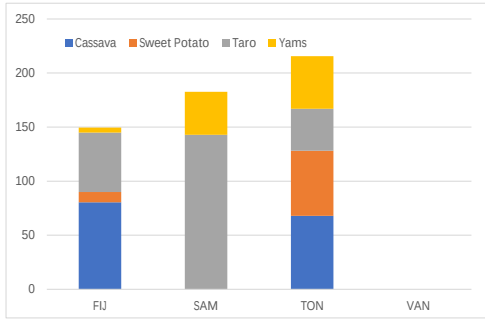


Figure 5: Average production of root crops per capita (2015-2019 (kg per annum)



4.3 Main importers of tropical root crops from Pacific Island Countries

The three main importing countries (New Zealand, Australia and USA) imported around 14,000 to 15,000 tonnes of tropical root crops from the PIC exporters during the peak period between 2006 and 2009. Since then, the volume has contracted somewhat, but remains around between 12-14,000 tonnes with New Zealand absorbing around 60% of this, Australia 30% and USA 10%. It is not clear whether the smaller volumes are driven by weakening demand, competition from other suppliers or supply shortages. However, the fact that import prices have been increasing suggest that supply constraints explain at least part of the trend. There have also been significant changes in the market share of the three exporters, with Samoa increasing from a very low base, and Tonga also gaining market share, whilst Fiji's exports have been declining. Opportunities to grow the number of root crop suppliers are constrained by inequitable access to key farming inputs including land, training and extension services, decision making and business networks. Women and young people may have the skills as producers but lack control over assets such as land and transport and their voices are not necessarily heard as the sector is dominated by players that are predominantly male. The Family Farm Team approach employed by PHAMA Plus aims to create opportunities to involve more diversity within some businesses. For example, USO Agrifoods in Samoa feels that the approach will enable them to facilitate outreach to their suppliers and involve more women.

Root crops are priority sectors for PHAMA Plus in Fiji, Samoa and Tonga, and have been identified as a possible new export for Vanuatu. Each of these countries is driven by its own strategies, (Intervention Plans) which guide PHAMA Plus investment. Whilst there are common marketing issues across all countries, there are also differences that are reflected in the Intervention Plans. Tonga is focusing on improving production and quality of root crops whilst Samoa is working on new market access for fresh taro into Australia, improved export pathways to New Zealand and general quality improvement. Fiji and Samoa are exploring value adding opportunities for taro-based products. Vanuatu does not currently export root crops in significant quantities but is looking for opportunities. Several exporters prefer women as workers in their processing plants due to higher attention to detail and reliability, but this does not appear to have resulted in employing more women as quality controllers and managers. Women's groups supplying exporters in Fiji complained of not being taken seriously as producers.

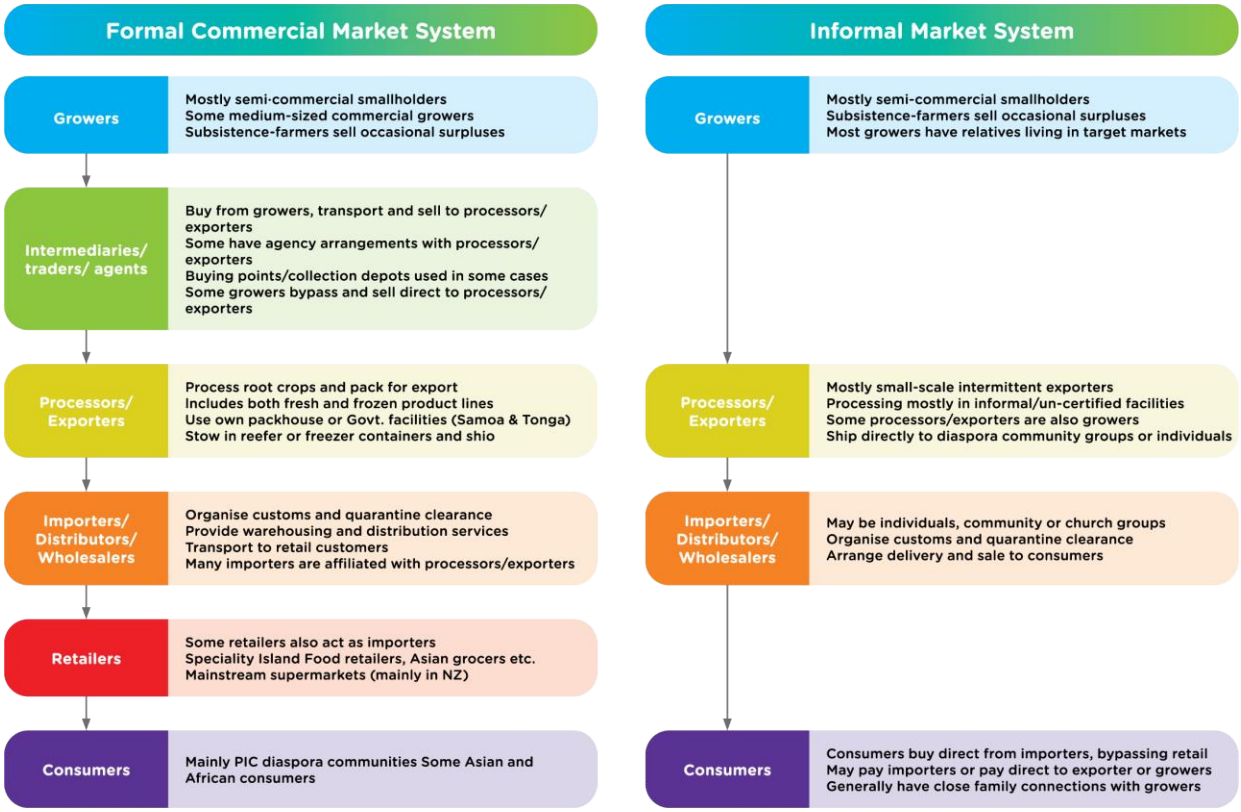
PHAMA Plus could encourage existing agricultural networks including the Market Access Working Groups (MAWGs) to be more inclusive and promote opportunities for women and PWD to assume increased responsibility for quality control. Partnerships with rights-based civil society organisations in each country could support this approach.

4.4 How exports from PIC countries reach the market

Figure 6 provides a generic overview of the export marketing system for root crops in the PICs. In each country, this operates in parallel with the domestic market system which, in all cases, handles much higher volumes than the export pathways. There are two different export market pathways: (1) Formal/Commercial Market; and (2) Informal Market, with the latter being prevalent for Tongan exports and existing to some extent in Fiji and Samoa. There are many variations between and within countries, and between the different types of root crops, but the great majority of exports pass through one or other of these two market pathways.

In general, the formalisation of value chains tends to exclude those already marginalised even further. (Fiji Agricultural Census 2020). Care must therefore be taken to ensure that as PHAMA Plus supports the formalisation of businesses and export pathways, that smaller and women-led suppliers are not displaced.

Figure 6: Generic overview of the export market system



4.5 Export trading patterns

There have been significant changes in trading patterns over the last decade, with Fiji losing market share, and Australia and USA expanding their imports, the latter from a low base. Non-PIC suppliers are dominant in the USA and are increasing their market share in Australia and New Zealand. Across all three markets, PIC exports are predominantly consumed by Pacific Island diaspora communities. Latin American exports mostly go to Latin American communities, and Asian products mostly to Asian communities.

Table 3 summarises the major market trends by comparing the average tonnages for the last five years (2016-2020) with the preceding five-year period (2011-2015) [3]. The key conclusions that can be drawn from these comparisons are:

- Root crop trade between Fiji/Samoa/Tonga and Australia/NZ/USA grew by 13%; with volumes going to the USA rising by 35%, Australia by 16% and New Zealand by 8%.
- Between the two periods Tonga increased its exports by 132%, and Samoa by 104%, whilst exports from Fiji declined by 23%. However, Fiji remains the dominant supplier of taro with 66% of the market overall and almost 95% of the Australian market.
- In volume terms taro remains the most important product category accounting for 57-58% of the total. Yams increased from 4% to 9% of the volume traded, and cassava from 17% to 22%; whilst the "other" category declined from 21% to 8%.

Table 3: Total root crop trade between Fiji/Samoa/Tonga and NZ/Australia/USA, averages 2011-2015 and 2016-2020 (tonnes)

	NZ		AUS		USA		Total	
Cassava	2012-15	2016-20	2012-15	2016-20	2012-15	2016-20	2012-15	2016-20
Fiji	488	395	740	344	279	200	1,507	939
Tonga	248	1,067	131	643	104	206	483	1,916
Samoa				2			0	2
Total	736	1,462	870	988	383	406	1,989	2,856
						Percent	17.3	22.0
Sweet Potato								
Fiji	6	4	2				8	4
Tonga	26	94	1	53		8	27	155
Samoa							0	0
Total	32	98	3	53	0	8	35	160
						Percent	0.3	1.2
Yams								
Fiji	3	4	13	1			16	5
Tonga	186	595	238	401	19	207	443	1,203
Samoa	0	11	13	1			14	12
Total	189	610	264	403	19	207	473	1,219
						Percent	4.1	9.4
Colocasia Taro								
Fiji	3,117	2,431	1,936	1,971	100	586	5,153	4,988
Tonga	609	601	53	76	54	123	716	799
Samoa	602	1,598	5	40	37	140	644	1,778
Total	4,327	4,629	1,994	2,086	191	849	6,512	7,564
						Percent	56.7	58.2
Xanthosoma Taro								
Fiji			1				1	0
Tonga	6	34	6	23			12	57
Samoa		2					0	2
Total	6	36	7	23	0	0	13	59
						Percent	0.1	0.5
Other								
Fiji	1,349	553	51	21	522	108	1,922	682
Tonga	172	69	17	137		6	189	212
Samoa	294	250		4	53		347	255
Total	1,815	872	68	163	574	114	2,457	1,149
						Percent	21.4	8.8
Total								
Fiji	4,963	3,387	2,743	2,336	901	894	8,606	6,617
Tonga	1,247	2,460	444	1,333	177	549	1,869	4,343
Samoa	896	1,861	18	47	90	140	1,004	2,047
Total	7,106	7,708	3,205	3,716	1,168	1,583	11,479	13,007

[3] Data on trade in tropical root crops have been extracted from the International Trade Centre (ITC) trademap database. https://www.trademap.org/Index.aspx An explanatory note on product categorisation under the harmonised tariff system used in the ITC database is provided in Annex 1.

Table 4: Summary of trade in tropical root crops, averages 2016-2020 (USD '000)

Value	NZ	AUS	USA	Total
FIJ	5,447	5,400	3,249	14,096
TON	746	831	406	1,983
SAM	2,228	92	261	2,581
Total	8,421	6,323	3,915	18,659
Percent				
FIJ	29.2	28.9	17.4	75.5
TON	4.0	4.5	2.2	10.6
SAM	11.9	0.5	1.4	13.8
Total	45.1	33.9	21.0	100.0

Table 5: Summary of trade in tropical root crops, averages 2016-2020 (tonnes)

tonnes	NZ	AUS	USA	Total
FIJ	3,387	2,336	894	6,616
TON	2,441	1,334	538	4,312
SAM	1,860	45	112	2,017
Total	7,688	3,714	1,544	12,946
Percent				
FIJ	26.2	18.0	6.9	51.1
TON	18.9	10.3	4.2	33.3
SAM	14.4	0.3	0.9	15.6
Total	59.4	28.7	11.9	100.0

- Tables 4 and 5 provide an overview of current trade patterns through a summary of the value and volume of between the three main PIC exporters and three main importers, based on averages over the last five years.
- Total trade averaged USD 18.7 million in value terms and 12,946 tonnes in volume terms. Fiji accounted for 75% of the value but only 51% of the volume of trade, reflecting the generally higher prices received for Fiji's exports. Conversely, Tonga exported 33% of the volume but received only 11% of the revenue.
- New Zealand remains the most important market, accounting for 59% of the volume and 45% of the value, and Fiji remains the largest exporter with 51% of the volume and 75% of the value.

Table 6: Domestic utilisation and exports of root crops (averages) 2015-2019 (tonnes)

	Domestic Utilisation	Exports	Total	% Export
FIJ	125,728	6,476	132,204	5
SAM	34,132	2,059	36,191	6
TON	17,925	3,520	21,445	16
Total	177,785	12,055	189,840	6

- The importance of domestic markets for root crops should not be overlooked.
- Exports account for only 5% of root crop production in Fiji and 6% in Samoa, the remainder being utilised domestically, including human consumption, livestock feed and waste.
- Tonga's root crop exports amount to around 16% of total production. Exports are increasing in importance in Samoa but declining further in Fiji which has a large domestic market.

- Taro, Cassava and the "other" category make up 90% of New Zealand tropical root crop imports from the PICs since 2012 with taro comprising more than half (Figure 7).
- Taro and the "other" category bring higher prices in New Zealand, around USD 1,300-1,700/tonne. Prices for yams and cassava have remained below USD 1,000/tonne since 2012 (Figure 8).

Figure 7: Volume of imports to New Zealand by HS product category, 2012-2020 (tonnes)

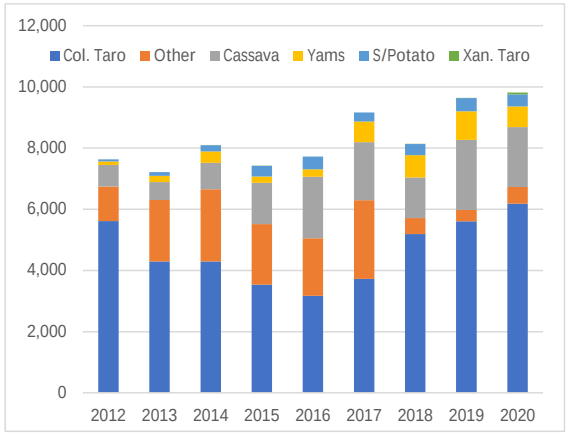
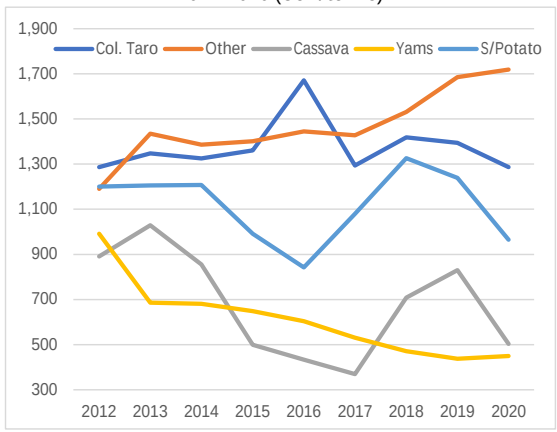


Figure 8: Value of imports to New Zealand by HS product category, 2012-2020 (USD/tonne)



- Australian imports also focus on taro and frozen cassava but include significant volumes of yams and sweet potato (Figure 9).
- In the Australian market, taro prices are generally higher than the other root crops and cassava generally lower. Other products are intermediate (Figure 10).
- Imported sweet potato prices have fallen significantly since 2015 (Figure 10) in the face of abundant local supplies.

Figure 9: Volume of imports to Australia by HS product category, 2012-2020 (tonnes)

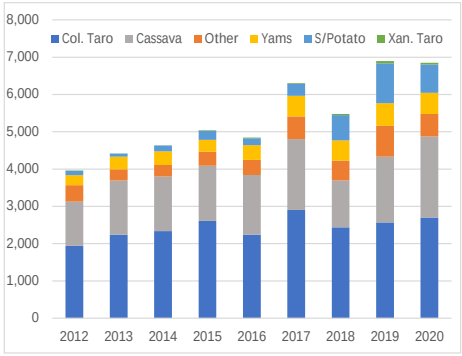
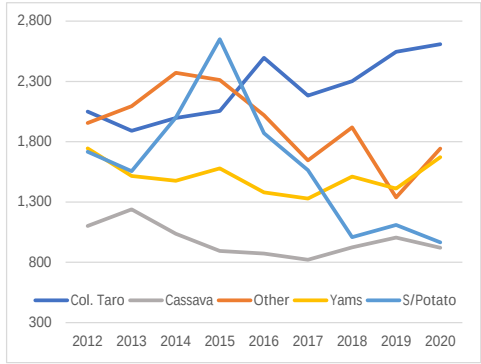


Figure 10: Value of imports to Australia by HS product category, 2012-2020 (USD/tonne)



Export trading patterns (Contd.)

- In the USA market, cassava comprises around 45% of imports, with yams, taro and other items each around 20% (Figure 11).
- The price of yams exported to the US market is well above other root crop products (Figure 12).
- In Australia and New Zealand importers consistently pay more per kg for taro than the other items, but in the US, yams bring the highest prices (Figure 12).

Figure 11: Volume of imports to USA by HS product category, 2012-2020 (tonnes)

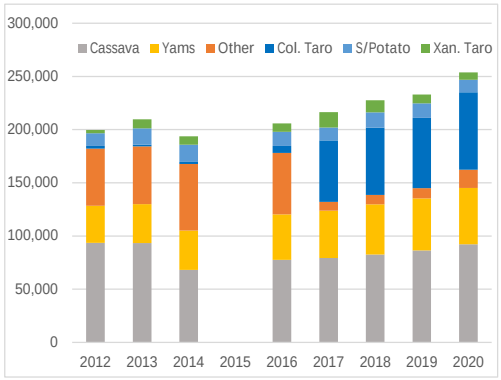
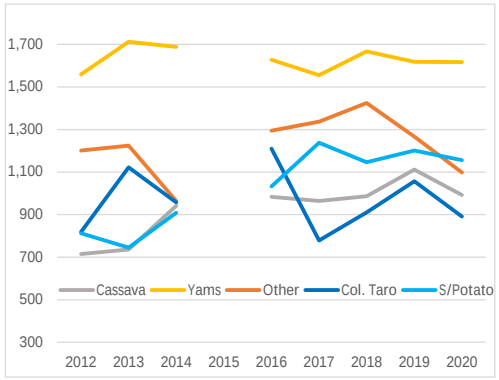


Figure 12: Value of imports to USA by HS product category, 2012-2020 (USD/tonne)



4.6 Export trends across study countries and primary export markets

Fiji, Tonga and Samoa are the three principal PIC root crop exporters. Vanuatu has exported small volumes in the past and is interested in becoming a regular supplier, along with Solomon Islands. Figure 13 shows that the total value of exports has increased steadily over the last 20 years, with Tonga and Samoa increasing market share since 2013-14 at the expense of Fiji. The total value of exports reached a record USD 20.4 million in 2020.

Figure 13: Value of root crop exports from Fiji, Samoa and Tonga, 2001-2020 (USD '000)

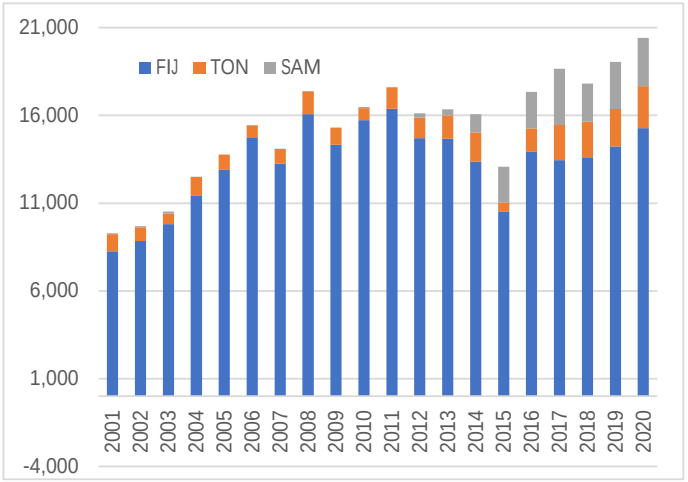
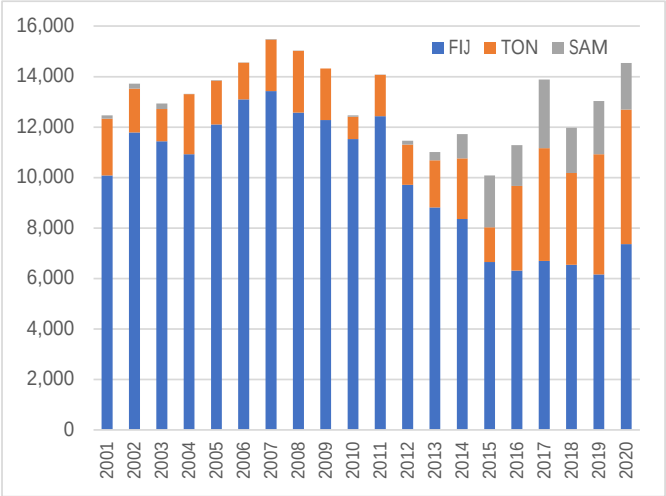


Figure 14: Volume of root crop exports from Fiji, Samoa, Tonga, 2001-2020 (tonnes)

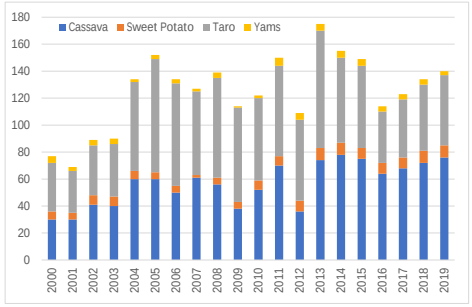


In volume terms, exports have increased by about 40% since the drought/cyclone affected 2015 but have not yet reached the peak level of 15,500 tonnes in 2007 (Figure 14).

4.6.1 Overall root crop production and volume of exports – country profiles

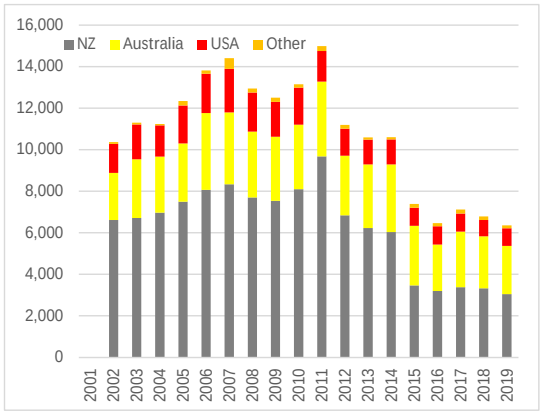
Fiji

Figure 15: Production of root crops in Fiji, 2000 to 2019 (tonnes '000)



- In Fiji, production (mostly cassava and taro) is currently around 120,000 tonnes, with a gradual long-term uptrend, but with large year-to-year fluctuations, mainly weather related.

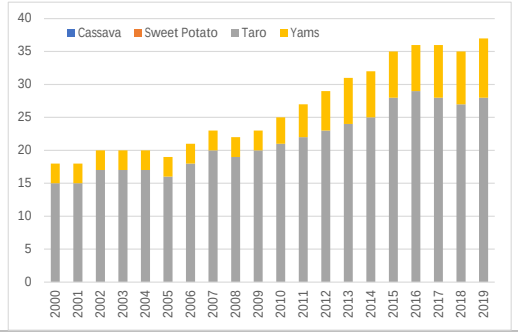
Figure 18: Volume of root crop exports - Fiji, 2001-2019 (tonnes)



- In volume terms Fiji's root crop exports have been in downtrend since 2007 with contraction of its New Zealand market share being the main contributor to this decline. Current export levels are around 6,000 tonnes p.a.

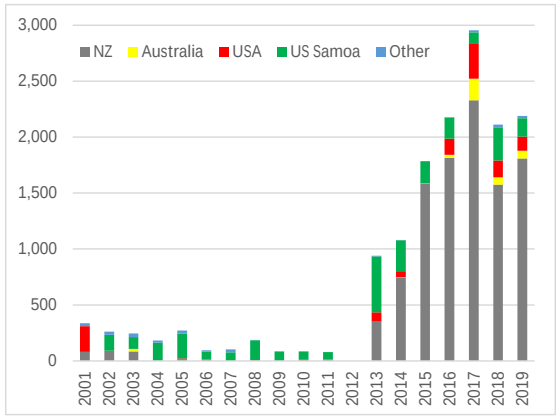
Samoa

Figure 16: Production of root crops in Samoa, 2000 to 2019 (tonnes '000)



- Production in Samoa has more than doubled in the last 20 years following recovery from the Taro Leaf Blight outbreak in the 1990s. Current production is around 35,000 tonnes, most of which is taro.

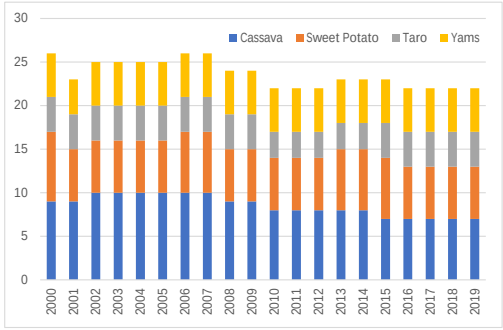
Figure 19: Volume of root crop exports - Samoa, 2001-2019 (tonnes)



- After recovery from TLB, exports grew rapidly from 2013 onwards.
- In volume terms exports have risen from a few hundred tonnes per annum to 2,000 to 3,000 tonnes, most of which goes to New Zealand.

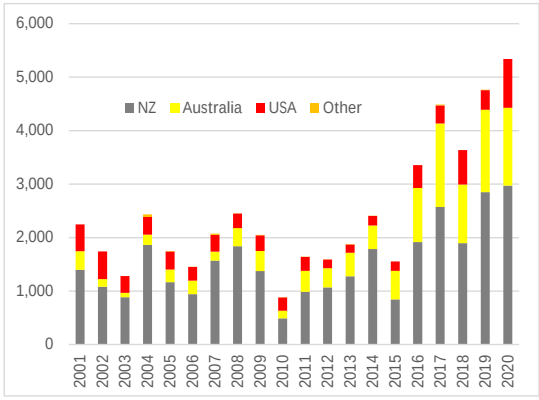
Tonga

Figure 17: Production of root crops in Tonga, 2000 to 2019 (tonnes '000)



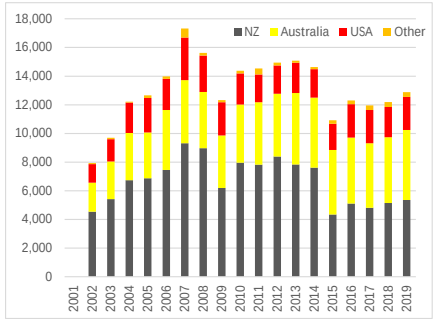
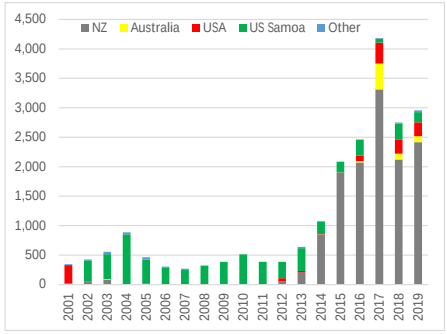
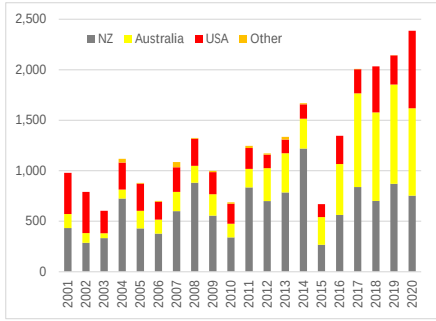
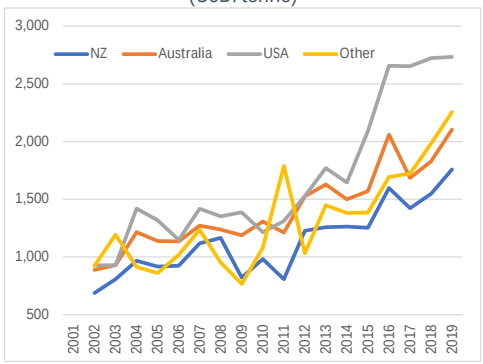
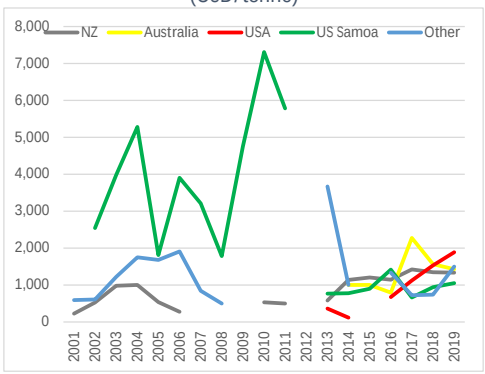
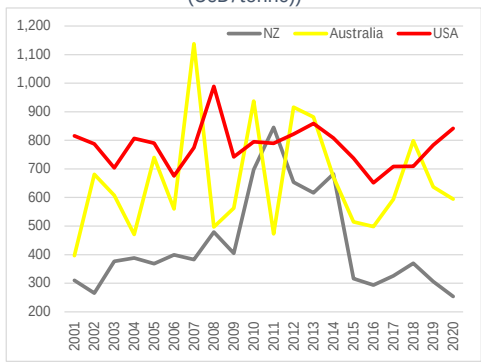
- Currently at 20,000 tonnes, production of root crops in Tonga has stagnated since 2000 (although exports have grown strongly in the last ten years). Production is more diversified among the four main crops than in the other countries.

Figure 20: Volume of root crop exports - Tonga, 2001-2020 (tonnes)



- Much of Tonga's exports growth is attributable increased exports to Australia, But New Zealand and USA remain important. Volumes reached a record 5,340 tonnes in 2020. About 60% goes to New Zealand, 30% to Australia and 10% to USA

4.6.2 Value and destination markets – Country Profiles

Fiji	Samoa	Tonga
Figure 21: Value of root crop exports, 2001 to 2019 (USD '000)	Figure 22: Value of root crop exports, 2001 to 2019 (USD '000)	Figure 33: Value of root crop exports, 2001 to 2019 (USD '000)
		
• Fiji is largest of the three exporters but lost market share over the last decade. Value of exports expanded from USD 8-10 m (in the early 2000s) to USD 12-14 m (2004-2014) but have stagnated at circa. USD 12 m over the last five years. Australia and New Zealand account for 40% of Fiji's exports by value each, and USA 20%.	• Trends in exports from Samoa are very different to Fiji. Following industry collapse in the '90s due to TLB, exports, mainly to American Samoa, remained at a low level until 2014 when exports to New Zealand begun to recover. The annual value of exports has increased 3-4 fold since then, with New Zealand remaining the main export destination.	• The value of root crop exports fluctuated between USD 0.5 and 1.4 million between 2001 and 2013 but has grown over the last five years to reach almost USD 2.5 million.
Figure 44: Value of root crop exports - Fiji, 2001 to 2019 (USD/tonne)	Figure 55: Value of root crop exports - Samoa, 2001 to 2019 (USD/tonne)	Figure 66: Value of root crop exports -Tonga, 2001 to 2020 (USD/tonne))
		
• Fiji receives the highest prices for its exports to the US, followed by Australia and New Zealand. Prices in all markets have trended upwards over 20 years.	• American Samoa paid very high prices for taro exported from Samoa between 2000 and 2011. Since then, prices been roughly the same in all export markets.	• Prices are highest in the US market, followed by Australia and New Zealand. However, due to the prevalence of informal/non-commercial trade, prices received by Tongan exporters in all of these markets are significantly lower than for other exporters.

4.6.3 Fiji – specific supply and market characteristics

Industry structure

Fiji has 11 registered exporters. All active exporters report that they are seeking additional products to supply existing and potential new markets. Most of them report un-filled orders due to inadequate supply of good quality produce and express a willingness to work with stakeholders to improve production and quality management systems along the supply chain to provide stronger incentives for farmers to grow taro and cassava. All registered exporters are male-led enterprises with women's groups involved in producing root crops for exports, but report that they are not always take seriously by intermediaries or exporters.

Changes in export trade patterns

- The Fiji Sector Concept Note (SCN) attributes the decline in taro exports to New Zealand to multiple factors including: (i) shortages and high prices in the domestic market due to supply disruptions caused by climatic extremes – cyclones and droughts; (ii) producers choosing to cultivate more kava and less export variety taro; (iii) increasing competition from Samoa, following the revival of taro production and exports related to the TLB problem dating back to the 1990s; and (iv) logistic and cost issues in the Fiji taro value chain which make it more expensive to deliver taro to New Zealand. However, the observed trends of declining exports volumes and increasing price suggests that Fiji's constraints are related to domestic supply and logistic/cost issues rather than softening demand. This conclusion is supported by the observation that Tonga and Samoa have been increasing exports to New Zealand while Fiji's exports have been declining. The availability of root crops for export could also be improved by connecting interested and organised women's and youth groups to exporters and supporting them to understand the quality requirements.
- Whilst Fiji's market share has declined in volume terms, it has been successful in obtaining significantly higher prices for its root crop exports than either Samoa or Tonga. This is because taro makes up the majority of Fiji's exports, with taro attracting premium prices in both the Australia and New Zealand markets, especially for the fresh product. This is seen as an example of focusing on niche a market for high value products, compared with high volume/low value markets for cheaper items such as frozen cassava.
- Taro importation into Australia is about half that of New Zealand despite a larger population. Fiji is the largest supplier of taro into Australia, followed by Tonga, China, Taiwan and Vietnam, with the Asian exports mainly targeting Asian communities. Australia has its own domestic taro industry and maintains strict quarantine protocols, more demanding than those of New Zealand. This accounts for the predominance of frozen product shipments from the Pacific Islands to Australia. However, imported fresh Fijian taro achieves premium prices in both Australia and New Zealand compared to all other root crops.
- A key challenge for Fiji exporters to Australia is the introduction in February 2021 of mandatory pre-shipment methyl bromide fumigation for fresh taro, taro leaves, cassava and other leafy products. This requirement was introduced in response to concerns over high levels of biosecurity non-compliance and will remain until significant improvements are made. The reduced storage life after fumigation means that: (i) all exports of fresh taro to Australia are now by air freight; and (ii) frozen products have become a more attractive option to avoid the fumigation requirement. It has also caused some exporters to cease supplying Australia completely.
- The USA market for Fiji taro is smaller than that of Australia and New Zealand and is mostly in frozen form because of the longer shipping times. Discussions with exporters suggest there is an opportunity to increase exports to the USA market which is much larger that Fiji's traditional markets and currently mainly supplied from Central and South America.

Factors influencing export demand

- Demand for taro is generally constant throughout the year, but with an increase in demand by both domestic and export markets late in the year around Christmas. Different Pacific Island communities have different preferences for taro relating to taste, texture and appearance. Fiji pink (Tausala ni Samoa) is the preferred variety for fresh taro exports, and is favoured by the Samoan community, but is not as popular in the domestic market. Traditional varieties can have a shorter shelf life, making them better suited for sale in the local market or for export as frozen product.

- Young members of the Pacific Island diaspora communities are reported to be increasingly interested in prepared taro that is easier and quicker to cook. It is also possible that there will be changes in variety preferences in this segment of the market as tastes and lifestyles change. Price competitiveness (versus other taro and other starchy foods) is also important, as is consistency of supply. Fiji often experiences disruptions in supply after damaging cyclones.

Factors influence supply levels and quality

In terms of supplying export markets, the PHAMA Dalo Quality Manual[4]:

a) Highlights the importance of being able to comply with the stringent biosecurity conditions applied by importing countries. Poor quality taro can cause difficulties in meeting biosecurity requirements and jeopardise relationships with importers.

b) Indicates that importing countries may test taro for pesticide residues and heavy metal levels.

c) Indicates that some export markets may require evidence that the taro being supplied is subject to a formal food safety management system based on HACCP principles and production systems where Good Agricultural Practices are being applied.

d) Refers to poor market information flows along the value chain back to farmers. This can leave farmers confused about the volumes of export varieties they should plant, confounded by inconsistent quality requirements imposed by exporters and middlemen. This is especially true for women and youth farmers that face additional barriers in accessing information and difficulties in accessing technology. For example, during peak production periods, traders and exporters tend to be more selective whereas during the off season they may accept smaller and immature product to fill orders. Several women's groups highlighted that they were often not taken seriously by intermediaries and exporters and not provided access to information to support them in improving their products to meet export requirements.

Although taro and cassava can both be harvested in less than a year after planting, many farmers compare the returns relative to those from growing kava. Even though kava takes at least three years to reach harvestable stage, soaring kava prices mean that this crop is extremely profitable and requires lower labour inputs, making it an attractive alternative. Farmers will continue to plant root crops for both domestic and export consumption, but as a cash crop it struggles to compete with kava. With an increasing number of men focussing cash crop efforts on kava, there is an opportunity to support women's groups to expand their production or to support kava nursery development to expand the availability of planting material.

PHAMA undertook a root crops value chain analysis in August 2017 which reached the following main conclusions:

- Analysis of the costs and returns incurred in two of the main root crop export marketing pathways, fresh/chilled taro to New Zealand and frozen cassava to Australia, confirmed that in 2017 both of these marketing pathways were marginally profitable, especially considering the risks incurred.
- Taro exporting was estimated to generate a gross margin (as a percent of costs) of around 12% and there have been long periods over the last few years when domestic taro prices were such that profitable exporting would have been impossible, which explains why export volumes have contracted.
- By far the largest cost incurred in the taro value chain is the purchase of taro from farmers. In total, taro purchase, ocean freight, packhouse costs and internal transport make up 95.4% of the costs.
- Frozen cassava exporting was also found to be marginally profitable. However, the cost structures are different to taro. The farmgate price represents only 33% of the total cost. The estimated gross margin was around 9% which is very marginal considering the risks involved.

The Fiji SCN identified the following key constraints within the Fiji taro marketing system:

[4] Fiji Dalo Quality Manual. First Published 2018. Available here

- Lack of access to farm inputs, especially a consistent supply of good quality planting material, disrupted from time to time by cyclone events.
- Limited access to technology for off-season production.
- Limited access to information to improve yields using sustainable farming practices, and information about export marketing opportunities, particularly for women's group who face challenges in being taken seriously.
- Lack of technical support on export varieties, value-addition, plant propagation etc.
- Inefficiency and low productivity along the value chain with taro becoming less profitable to exporters due to high-cost structures.
- Regulatory and compliance barriers in export markets.
- Lack of knowledge about markets.
- Lack of awareness about opportunities to strengthen and make root crop value chains more inclusive by those working to support sector growth including ministries of agriculture and civil society organisations.

Ongoing PHAMA Plus engagement in the Fiji root crops sector focuses on taro, since this the largest segment by volume, and even more so by value, reflecting the very high prices of Fiji taro on Australia and New Zealand. The work focuses on quality management systems, consistency of supply, biosecurity compliance and climate resilience through three intervention areas: IA1 increasing production by facilitating the supply of inputs; IA2 improving value chain efficiency by reducing costs; and IA3 improving market access through application of quality management systems.

PHAMA Plus signed a Letter of Agreement with the Australia Pacific Climate Partnership Support (APCP) Unit in May 2021 to test and demonstrate practices to minimise climate change impacts on productivity, income and market access and to engage communities in field testing taro varieties. The initiative will test the application of climate science products and information to assist farmers and agribusiness managers to make informed decisions to mitigate the impacts of climate change.

4.6.4 Samoa – specific supply and market characteristics

Industry structure

- Samoa has over 18,000 taro growers of whom and estimated 800 are suppliers to the export market (Samoa Agricultural Survey, 2015).
- Taro is one of the main export commodities with a growing share of export value indicating potential for more households to supply the export market. In addition, taro is Samoa's staple food so there is a strong income earning opportunity in the domestic market.
- Most labourers are young men, whilst root crop processing is dominated by women. Some parts of the industry are reliant on unpaid farm labourers.
- The Samoan export trade is dominated by small number of exporters.
- Compared to Fiji, Samoan root crop exporters benefit from good transport infrastructure and lower internal transport costs but face higher international shipping and port charges and less frequent services.

Changes in export trade patterns

- Samoa is currently unable to export fresh taro to Australia due quarantine restrictions, although it can export frozen product. However, Australian biosecurity authorities have agreed in principle to a new high pressure washing/hot water treatment (HPW-HWT) method that may allow exports to Australia once appropriate protocols are developed and approved. This method also has potential for exports to New Zealand to avoid the fumigation requirement.
- There are two distinct export pathways for Samoan root crops: fresh and frozen, both of which are expanding. The expansion is supported by several new varieties which are well accepted in the market (although less favoured than Tausala ni Samoa). The SCN also considered that there are good opportunities to diversify into new products and new markets.

Factors influencing export demand

- Both Fiji and Samoa focus on taro exports (with Fiji also exporting some cassava and Samoa some giant taro (ta'amu)), but the varieties are different. Most Fiji taro exports are of the pink (Tausala ni Samoa) variety which is favoured by Pacific Islander communities, including Samoans. The earlier Samoan TLB tolerant varieties were not well accepted in the market, although the consumer acceptance of the newer varieties is increasing.
- Biosecurity issues are critical to the future of Samoa's root crop exports. The majority of fresh taro exported to New Zealand currently receives remedial fumigation due to pest interceptions. This results in additional costs, reduced shelf-life and other quality issues. Moreover, from February 2022 New Zealand will require that methyl bromide used for fumigation is recaptured rather than released to the atmosphere, which is very difficult and expensive to achieve. This makes it vital to develop the HPW-HWT protocol to maintain access to the New Zealand market, as well as to achieve access to Australia for fresh taro.

Factors influence supply levels and quality

- The government (MAF and SROS) has been proactive in providing support to the industry in meeting the requirements of importing countries (e.g., packhouse facility with HACCP certification). Exporters have also invested in their own infrastructure needs and collaborated in research in partnership with Plant and Food Research New Zealand, MAF and SROS on post-harvest treatment treatments to manage biosecurity concerns.

Ongoing PHAMA Plus engagement in the Samoa root crops sector focuses on supply, diversification and biosecurity through three intervention areas: IA1 strengthening backward linkages to ensure consistency in supply of taro and climate/disease resilient planting materials; IA2 diversification to innovate and expand the range of value-added products and new markets; and IA3 quality export standards and procedures, particularly improved post-harvest practices to meet export compliance.

These interventions are being pursued through three partnerships. Farmer Joe, the leading root crop exporter has completed a trial on pre-export treatment of taro using HPW-HWT and preparation of operational procedures and a business plan to employ this method for exports to New Zealand. This has demonstrated the feasibility of HPW-HWT as an alternative to methyl bromide fumigation. Work is underway on the design of a commercial HPW-HWT treatment facility. A second intervention under the Farmer Joe partnership aims to mitigate the impact of COVID-19 through increased supply of new high-quality taro varieties. This involves distribution of planting material to registered growers and subsidies for selected farmers for fertilisers, planting material and other crop inputs.

A partnership with the Ministry of Agriculture and Fisheries is supporting: (i) development of a biosecurity protocol based on HPW-HWT for taro export to Australia; (i) development of MAF's capacity to manage the new protocol; and (iii) sensitisation and awareness raising about HPW-HWT and the regulatory role of MAF.

A partnership with USO Agrifoods is supporting the development of backward value chain linkages to achieve greater consistency in the supply of taro for export. The partnership is providing training materials and extension services to growers employing the Family Farm Team approach.

4.6.5 Tonga – specific supply and market characteristics

Industry structure

- The 2015 Agricultural Census found that the majority of Tongan households are involved in growing root crops (10,296 or 57% of all households), mainly for subsistence. Support for root crops has the potential to reach more households than any other sector.
- There are four key exporters of root crops in Tonga, including one women-led export and PHAMA Plus partner, Lotopoha Trading.
- The root crops sector is much smaller than either Fiji or Samoa in production terms but exports a much higher percentage of its production: 16% compared to 5% and 6% for Fiji and Samoa respectively.
- Production of root crops for export is concentrated on Tongatapu which has good growing conditions and transport infrastructure. Processing infrastructure is lacking however.
- The high numbers of Tongans on seasonal workers programs in New Zealand and Australia has shifted the gender division of labour in some Tongan households providing more opportunities for women to engage in primary production.

Changes in export trade patterns

- The volume of Tonga's root crop exports has grown strongly since 2010 whereas Fiji has declined and Samoa has staged a more recent recovery.
- The export product mix is more diversified, including significant volumes of cassava and yams.

Factors influencing export demand

- Exporters report that the demand for Tongan root crops is currently very high and that they are unable to meet demand, especially for cassava and at times, yams.
- However, the informal sector predominates, much more so than in the other two exporters, and prices (declared value for customs) tend to be much lower. It is estimated that only about 40% of exports are traded through the formal sector. The remaining 60% are exported to communities, churches, friends and families abroad. This informal trade is aimed at providing food supplies for Tongan diaspora communities, where there is limited or no island style food available.

Factors influence supply levels and quality

- PHAMA has supported HACCP accreditation for packing facilities in Tonga to ensure adequate food safety standards for market access. This work has supported improvements in quality and consistency of products and improved market confidence.
- The lack of good packhouse facilities is a major cause of quality and consistency issues, and constrains efforts to increase exports through formal channels. Most exporters use makeshift facilities or the Government packing facility at the wharf which is available on a partial user-pay basis but is not always available when needed by exporters. PHAMA Plus has supported the design of a multi-function/multi-user packing facility that is suitable for root crops. The Government of Australia has agreed to finance construction of the facility, expected to be completed in 2022. One exporter's packhouse has been constructed to meet PWD accessibility standards. Similar accessibility requirements will be included in the new packing facility.

Ongoing PHAMA Plus engagement in Tonga's root crops sector focuses on increasing consistency of supply and compliance with quality specifications in the formal market sector. The strategy is to improve the quality and quantity of root crops, connect a more reliable supply of export grade product with markets, seek processing and value-added opportunities and apply quality and standards along the value chain. This is being pursued through three intervention areas: IA1 providing information to growers about improved productivity, scheduling and the commercial potential of growing root crops for export; IA2 diversification and new export products and markets; and IA3 export standards and procedures including post-harvest processes to meet export compliance.

These interventions are being pursued through a partnership with Lotopoha Export Trading to increase supply by providing information to male and female growers on climate-smart good agricultural practices (GAPs), new

farming techniques and market requirements. Under this partnership Lotopoha is providing extension services, planting materials, and tractor services to contracted outgrowers.

PHAMA Plus is also supporting the design contractor for the new Central Packhouse Facility. When this facility has been completed it could create a service-hub around which a number of the suggested measures from this study could be initiated. Such services may include planting materials and input supply, grower advice, market information and prices, fumigation services, and opportunities to bring informal traders into the formal market.

4.6.6 Vanuatu – specific supply and market characteristics

Root crops are an important domestic industry, in Vanuatu, mainly as a subsistence crop, but root crop exports are in their infancy, unlike the other three study countries where the export sector is well-established. Root crops are not a priority sector for PHAMA Plus in Vanuatu, and statistical information on root crop production and exports is lacking. However, the Government of Vanuatu (GOV) has recently expressed interest in developing a root crop export industry. Women are more heavily involved in production of root crops in Vanuatu than in Fiji, Samoa and Tonga.

Root crops for both domestic and export markets are listed as a priority sector in Vanuatu's Agricultural Sector Policy (2015-2030). In addition, an ADB study[5] in 2019 concluded that there is potential for Vanuatu to export root crops in frozen form, since the biosecurity protocols for export of these commodities in frozen form to Australia, New Zealand and USA are un-demanding. However, the ADB study considered that there are significant biosecurity barriers to the export of fresh/chilled root crops to these markets, together with many quality, logistic and shipping challenges.

There have been occasional intermittent exports of root crops from Vanuatu over the years, mainly cassava and taro, and mostly frozen product through informal marketing channels targeting Ni-Vanuatu communities and church groups in Australia and New Zealand. In 2020-21 the Ministry of Trade has pushed for transitioning the informal trade into a commercial export-based industry. There have been some exploratory market visits by potential exporters in New Zealand, and proposals for a stakeholder workshop to prepare a development pathway, although this did not eventuate due to the COVID-19 pandemic. GOV is now advocating for expanding exports as part of the COVID-19 response and recovery program. GOV has requested PHAMA Plus support in developing the full pathway from strategy through to detailed operational requirements, including support for HACCP accreditation of the proposed Tagabe export packhouse, and developing export pathways for frozen root crops (island taro, Fiji taro, casava and kumala/sweet potato). These initiatives would fall under the proposed new National Export Development Program (2021-2025).

The Department of Industry (Agro-Industry R&D Division) has raised a number of key issues regarding the potential for root crop exports including:

- Current exports are in small consignments and mainly target the Auckland Pacific diaspora and seasonal workers in New Zealand through informal marketing channels.
- Exporters and potential exporters face a number of information gaps including market demand, prices, quality and quantity specifications, terms of payment, shipping arrangement and food safety requirements.
- Major marketing opportunities are seen to be: (i) product diversification and branding; (ii) identifying new market segments, particularly seasonal workers; and (iii) accessing formal market chains.

The key constraints/challenges identified by the Department include:

- Biosecurity and market access pathways/protocols.
- Satisfying export quality standards.
- Achieving and maintaining HACCP accreditation.
- Post-harvest handling.
- High port handling and shipping costs.

[5] Young D.F. (August 2019) Asian Development Bank TA-8378 REG: Pacific Private Sector Development Initiative, Phase III. Republic of Vanuatu Comparative Advantage Analysis (46510-001). Final Report.

- Accessing commercial quantities of raw materials.
- Export varietal selection and distribution of planting materials (particularly taro).
- Product quality grading and pricing.
- Production, logistics and distribution systems in the outer islands.
- Accessing wholesale and distribution systems in importing countries where Vanuatu products are not well known relative to other Pacific Islands.
- Transitioning from informal to formal marketing channels.

One commercial farmer who produces root crops expressed reservations about developing the sector due to; (i) the high cost of electricity; (ii) lack of feeder roads, machinery and equipment; (iii) lack of packhouse facilities; (iv) poor data recording and financial records; and (v) preference for local fresh produce marketing pathways.

As a late starter, Vanuatu clearly faces major challenges in establishing a viable root crop export industry. It does not have established exporters like Fiji, Samoa and Tonga, and the size of the Ni-Vanuatu diaspora is much smaller than for the established exporters. Internal transport and logistic challenges are also significant for a bulky/perishable and easily damaged commodity and the biosecurity challenges are significant, even for the established exporters in Fiji, Samoa and Tonga. However, importers in the key markets are keen to diversify their sources and would welcome a fourth exporter. This suggests that preparation of a detailed root crops export development program would be a worthwhile initiative to focus efforts on priority products and markets, most likely beginning with frozen product lines which largely avoid biosecurity and market access challenges.

4.7 Measures to address GEDSI challenges

Measures to address these challenges, organised by the GEDSI drivers within the PHAMA Plus GEDSI strategic plan, include:

Addressing adverse cultural norms:

- Encourage dialogue between exporters, industry associations and producers in understanding how existing practices limit the opportunities for youth, women and PWD to start their own root crop businesses.
- Create awareness to support marginalised groups in accessing land. This could include the development of key messages by country developed by the MAWGs in partnership with women's rights organisations. Document case studies of how women-led enterprises are accessing land for agriculture, barriers that they have faced and strategies to overcome them.

Strengthening visibility, voice and representation of women, PWD and youth:

- Work with industry support organisations on further documenting the power dynamics within root crop value chains. Where training is being conducted, ensure that agenda time is provided to groups that represent women, youth and PWD to highlight barriers in accessing opportunities.
- Expand training for PHAMA Plus National Facilitators to deepen their understanding of the barriers that women, youth and PWD face. This includes strengthening their engagement with CSOs in each country.

Changing business culture and practice:

- Work with exporters that are using the Family Farm Team approach and the provision of land to their employees to start their own businesses to document the results.
- Support digital literacy training for women in the root crop sector to develop their knowledge and skills on how to access information.

Building assets and access to assets, for women, youth and PWD in agricultural value chains:

- Explore the use of existing agritech products that connect actors along value chains and support improving access to agricultural news, market information and training content.
- Support women-led enterprises and Family Farming Teams with capacity building for negotiation skills.

- Design a pilot program to encourage the employment of PWD through PHAMA Plus's interventions. Work with exporters to identify those interested in piloting the employment of PWD in partnership with a disability rights organisation that can provide advisory support. Fiji has tax incentives for businesses employing PWD that could be promoted to Fiji partners.
- Partner with seasonal workers to connect them to business opportunities and exporters on their return.

4.8 Importing Country Profiles

4.8.1 Overview

Whilst the three main export markets are showing signs of maturity (especially New Zealand), they are likely to remain the largest and most important markets for Pacific Island root crop exports for the foreseeable future. Consultations with key importers, distributors and retailers in Australia and New Zealand during May - June 2021[6] identified a number of possibilities for Pacific Island exporters to maintain and possibly increase market volumes and profitability. These opportunities mainly focus on improving basic product quality and consistency of supply, issues that have been previously identified on numerous occasions, and are currently being addressed through the PHAMA Plus Intervention Plans in Fiji, Samoa and Tonga.

Figure 27 shows that the value of the export trade to Australia, New Zealand and USA increased from around USD 10 million in the early 2000s to a record USD 20 million in 2020, with Australia and New Zealand accounting for most of this.

Figure 27: Value of imports of tropical root crops from PICs to NZ, Australia and USA, 2001-2020 (USD '000)

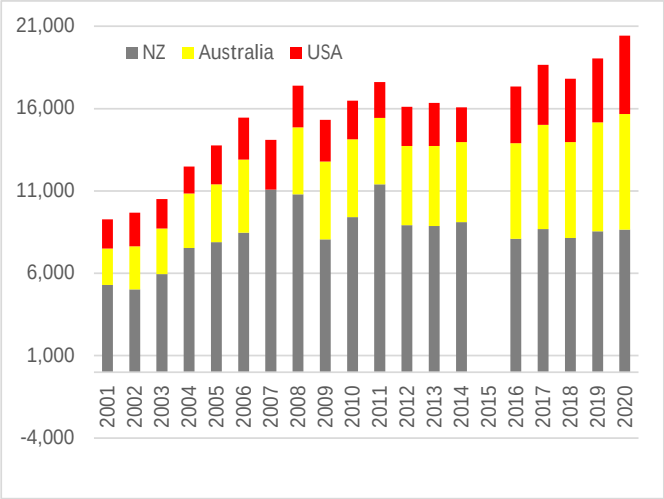
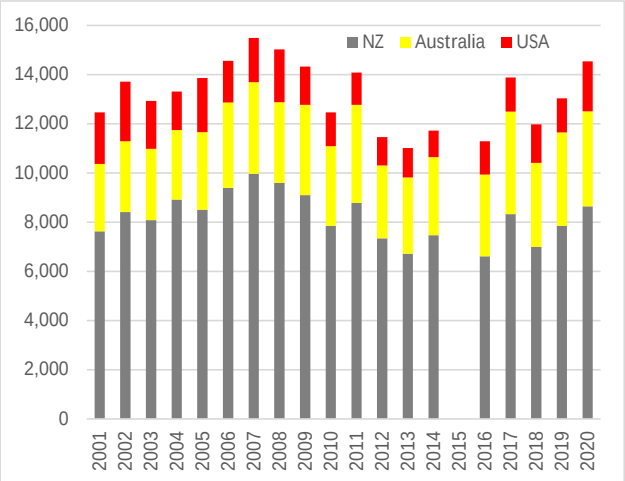


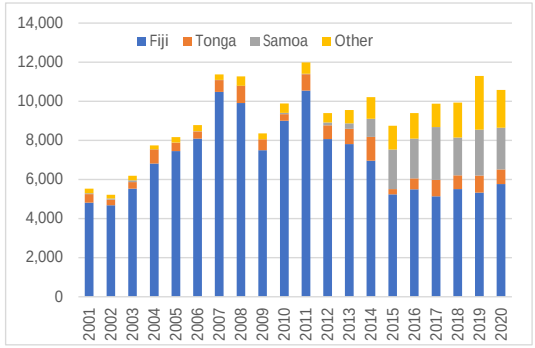
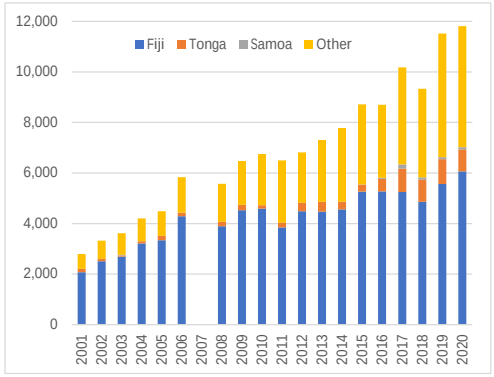
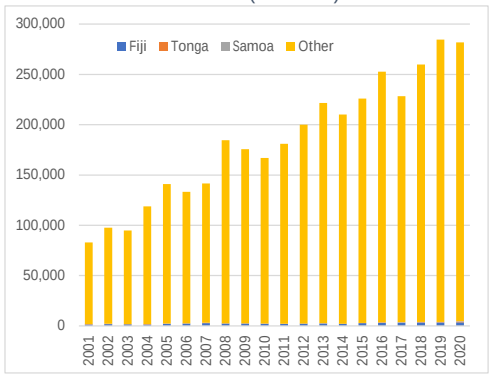
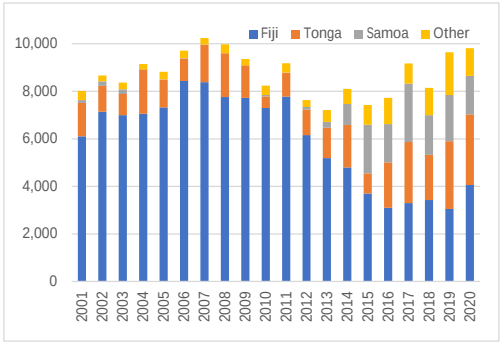
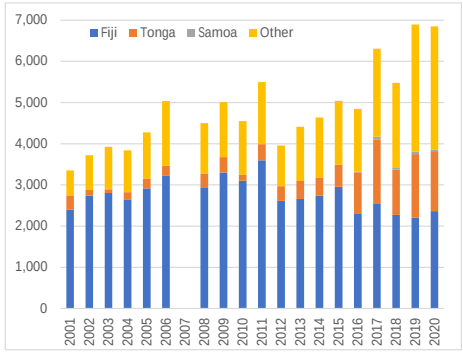
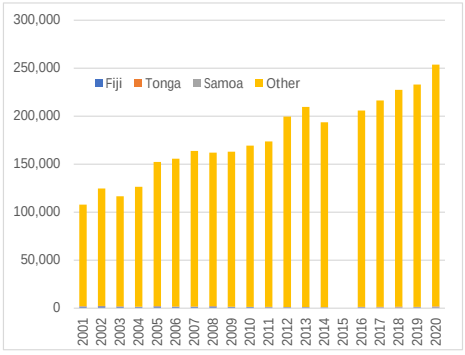
Figure 28 shows that in volume terms, the market peaked in 2007 and since then has declined to fluctuate between around 11,000 and 15,000 tonnes per annum and is currently near the upper end of that range. New Zealand is absorbing 60% of this, Australia 30% and the USA 10%. It is not clear whether the decline in volumes is driven by weakening demand, competition from other suppliers or supply shortages. However, the fact that import prices have been increasing suggest that supply constraints explain at least part of the trend. There have also been significant changes in the market share of the three exporters with Samoa increasing from a very low base, and Tonga also gaining market share, whilst Fiji's exports have been declining. The split between fresh and frozen products is unknown but it is generally believed that the frozen category is expanding its share.

[6] See selected photographs from market visits in Annex 3.

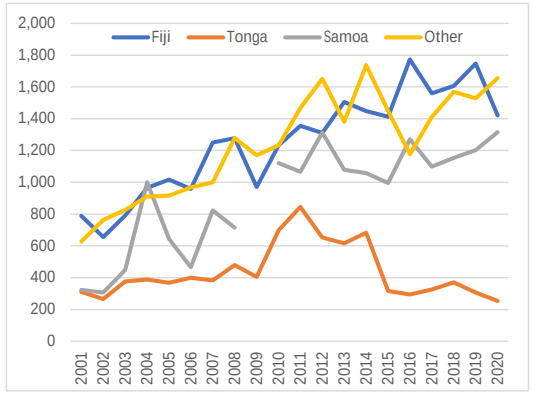
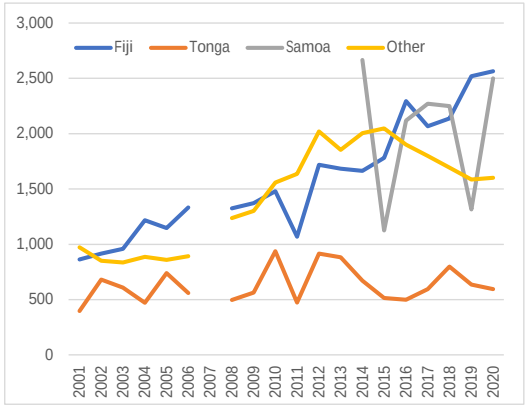
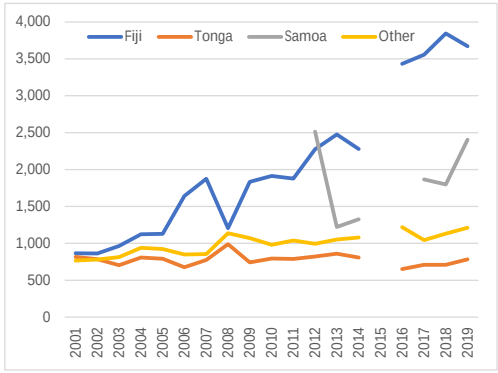
Figure 28: Volume of imports of tropical root crops from PICs to NZ, Australia and USD, 2001-2020 (tonnes)

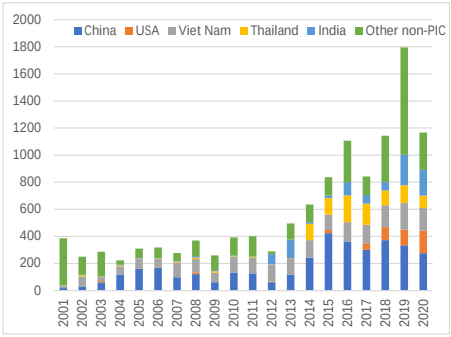
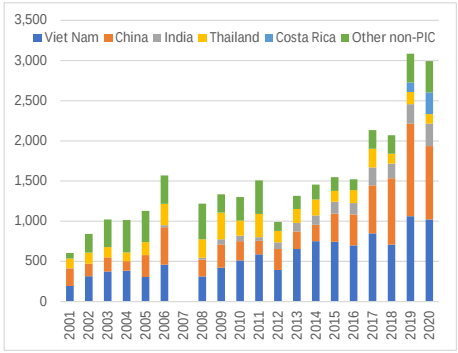
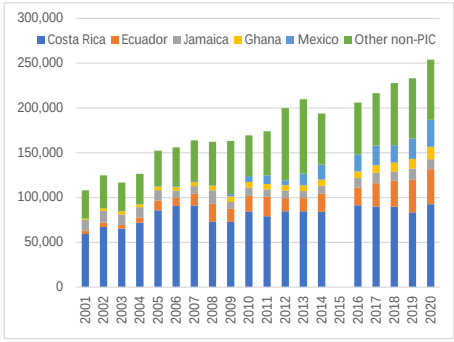


4.8.2 Value and volume of imports – importing country profiles

New Zealand	Australia	United States of America
Figure 29: Value of imports of root crops to New Zealand, 2001-2020 (USD'000)	Figure 30: Value of imports of root crops to Australia, 2001-2020 (USD '000)	Figure 31: Value of imports of tropical root crops to USA, 2001-2020 (USD '000)
		
• NZ is the oldest and largest market for Pacific exporters and will remain so for decades to come. • The value of NZ imports doubled between 2001 and 2011 to reach USD 12 million, but has averaged around USD 10 million per annum thereafter. Fiji was the dominant supplier until 2013 but has lost market share since then.	• A growing market, USD 2-3 million in the early 2000s to almost USD 12 million in the last two years. Compound annual growth rate of 3.3%. Now a larger market than New Zealand in value terms. • Fiji is the dominant supplier among the PICs with Tonga also establishing a market presence in the last few years. • Non-PIC suppliers increased their market share from 20% to 40%.	• Easily the largest of the three main markets, absorbing around USD 280 million worth of imports, thirteen times the value of Australia and New Zealand combined. • However PIC exporters supply a very small part of this volume.
Figure 7: Volume of imports of tropical root crops to New Zealand, 2001-2020 (tonnes)	Figure 38: Volume of imports of tropical root crops to Australia, 2001-2020 (tonnes)	Figure 94: Volume of imports of tropical root crops to USA, 2001-2020 (tonnes)
		
• Over the last 20 years New Zealand imports of tropical root crops have fluctuated between 8,000 and 10,000 tonnes per annum, and in 2020 were near the upper end of that range.	• In volume terms the Australian market is still smaller than NZ but has grown steadily since 2012. • Over this period, Tonga's share has expanded whilst Fiji has lost ground. Samoa's market share is still very small	• Imports have grown steadily from around 100,000 tonnes in 2001 to over 250,000 tonnes in 2020. The great majority of imports are from Central and Southern American countries, with PIC exporters having less than 2% market share.

4.8.3 Price and non-PIC competition – importing country profiles

New Zealand	Australia	United States of America
Figure 105: Value of imports of tropical root crops 2001-2020 (USD/tonne) 	Figure 116: Value of imports of tropical root crops, 2001-2020 *(USD/tonne) 	Figure 12: Value of imports of tropical root crops to USA, 2001-2019 (USD/tonne) 
• Average prices paid for New Zealand root crop imports increased from USD 600-800/tonne in the early 2000s to USD 1,200-1,600 in recent years. The value of Tonga's products (mainly informal/non-commercial trade) is consistently lower than other suppliers.	• Average prices paid for Australian imports increased from USD 800-1,000/tonne in the early 2000s to USD 1,700-2,400/tonne in recent years. The value of Tonga's is also lower than other suppliers.	• The US market pays premium prices for small volumes root crops from Fiji and to some extent Samoa. Prices for Tongan exports to the US are well below others.

New Zealand	Australia	United States of America
Figure 3813: Volume of imports of tropical root crops to NZ 2001-2020 (tonnes) - non-PIC 	Figure 3914: Volume of imports of tropical root crops 2001- 2020 (tonnes) non-PIC 	Figure 40: Volume of imports of tropical root crops to USA, 2001-2020 non-PIC 
• Non-PIC suppliers have increased from 500 tonnes in 2013 to 1,200 to 1,800 tonnes in recent years. • This generally targets Asian rather than Pacific Islander consumers.	• Non-PIC suppliers have increased volumes to about 3,000 tonnes, or 40% market share.	• Costa Rica is the largest supplier averaging around 90,000 tonnes over the last five years. Smaller amounts come from China. • Most imports consumed by Latin American community. PIC imports target Pacific Island diaspora.

4.8.4 New Zealand in-market research findings

Consultations undertaken in late May/Early June 2021 in conjunction with PTI New Zealand engaged with most of the key importers and distributors, as well as some of the major retailers, and a sample of speciality (Asian/Pacific Island) retail outlets. Most of these are well established in the sector, although generally Pacific root crops play a small part in much larger businesses. These key actors have been in the business for more than 20 years in most cases, although there are also a number of smaller semi-commercial and informal dealers, some of dubious reputation, who come and go according to market conditions. The key findings from the consultations are:

- New Zealand has around five experienced professional importers and distributors of Pacific Island root crops, that have well-established facilities for handling and distribution to Pacific Islander communities in the Auckland area, as well as smaller centres of demand around both the North and South Islands.
- Because of slow growth in market volumes (see Figure 32) nobody believes that the root crops business is likely to expand in any major way. Whilst many operators expressed a wish to increase turnover, this is interpreted as being more about winning market share from competitors, rather than growing the overall volume of the market. Opinions vary from "the industry is dying" to cautious optimism about modest turnover growth.
- The main reason for the generally cautious assessment of growth prospects is demographic. The average age of Pacific diaspora communities is increasing and food habits among the younger generations are becoming westernised, with dwindling preference for tropical root crops and increasing demand for convenience foods and value for money.
- Consistency of supply and quality is still seen as the greatest challenge, despite efforts to address this over many years. There are periods when supplies of good quality fresh product, taro in particular, are extremely tight and prices soar. At other times over-supply makes it difficult to move stock, margins are compressed and spoilage/wastage rates are high. Operators express frustration that this situation has persisted over many years, despite repeated calls to improve supply chain management.
- Fresh taro is regarded as a premium/luxury food item in New Zealand diaspora communities with prices well above conventional root crops (potatoes, sweet potatoes, carrots etc.) and other starchy staples such as rice, noodles, pasta and bread. Pacific Islanders in New Zealand seem ready to spend large amounts on fresh root crops, especially taro, for special occasions even though they tend to have relatively low incomes. However frozen products (including taro, cassava, yams, giant taro etc.) are reported to be gaining market share and are more affordable and more convenient.
- The major (Tier 1) supermarket food retailers generally source tropical root crops from importers/distributors rather than importing directly. They stock these items in areas where there are significant concentrations of Pacific Islanders: for example, Countdown offers fresh taro in only 35-40 of its 187 stores. This company would consider increasing the number of stores offering taro to some extent if good quality material of the preferred variety (Fiji pink/Tausala) was consistently available, but it will remain a speciality rather than a mainstream offering.
- The major retailers are nervous about food safety, maximum residue levels (MRLs), traceability and ethical (social practice) issues. They regard HACCP as a minimum standard for food safety and are likely to impose more stringent standards in future[7], including auditing for social practice such as workplace health and safety, child labour etc. Compliance with quality, food-safety and other certification requirements presents a major challenge for Pacific Island producers and exporters of root crops (and other horticultural products). Failure to keep pace with ever-increasing certification standards could result in Pacific Island root crops being discontinued by the major retailers. There are opportunities to improve the traceability of Pacific root crops to link the product to the community from which it was sourced and make the link to supporting Pacific producers and communities more visible.

[7] For example Safe Quality Food certification (www.sqfi.com), NZ GAP (https://nzgap.co.nz) and Freshcare (www.freshcare.com.au), HARPS (https://harpsonline.com.au), Fair Farms (www.fairfarms.com.au), and SMETA (www.sedex.com).

- The Tier 2 retailers and speciality Island and Asian food shops are also important outlets, most of whom buy from the key importers/distributors. They are less concerned about food safety, traceability and ethical issues, except compliance with legal minima; as well as product packaging and presentation standards. However, it is noted that among frozen products, imported products from Asia and Central America (e.g., Costa Rica) are much more attractively packaged and presented in the retail stores – see photographs in Annex 3.
- Whilst the market share of fresh versus frozen products is uncertain, there is general agreement that frozen products are increasing market share and will continue to do so. Although prices for frozen products are lower, the chances of biosecurity failures are greatly reduced, substantially reducing risks. Packaging and presentation standards for most of the Pacific frozen products are well below those of other suppliers. However, Pacific Islander consumers show little interest in the Asian products and vice versa.
- There are well-established business linkages between the key importers/distributors and their suppliers from Fiji, Samoa and Tonga. They are interested in diversifying supplies to Vanuatu, Solomon Islands or elsewhere to reduce vulnerability to supply fluctuations.
- PTI New Zealand provides ongoing support for existing and potential new importers/distributors as well as advisory and market facilitation services for Pacific root crop exporters. PTI's experience demonstrates that many PIC root crop exporters struggle to supply the volumes sought buy New Zealand customers, and to comply with their product specifications. The range of services provided by PTI is further elaborated in Box 1 below.
- Informal imports remain an important part of the New Zealand root crop marketing system, especially supplying Tongan communities and church groups. Commercial operators complain about the disruption when large informal consignments arrive, pushing prices down; and call for greater regulation of the informal trade to create a "level playing field".
- There are also calls for a mandatory system of quality standards to ensure that poor quality material does not reach the market. However, it is difficult to see how this could be enforced or how it would relate to the internal standards applied by the larger retailers.
- COVID-19 has caused major headaches for industry operators through disruptions to air and sea transport, increasing freight rates, and other supply continuity problems. This has seen prices skyrocket, particularly for Fiji fresh taro which commonly retails at NZD 6.00-10.00 per kg, sometimes more.

Box 1: Market Development Support Services offered by PTI New Zealand

- Market intelligence relating to retail and wholesale prices, market segmentation, windows of opportunity and market trends.
- Training programs in export marketing under the Business Mentorship Program to help Pacific businesses make the transition from being export capable to export ready.
- Funding assistance to help exporters with packaging, branding, labelling and marketing collateral.
- Path2Market: a webinar involving New Zealand buyers, importers, and distributors able to provide valuable information and guidelines to PIC exporters.
- Trade Promotion: support for companies to exhibit their products and industry food shows.
- The Pacific Hub investment platform to facilitate access to investment opportunities in PICs
- A COVID-19 freight subsidy which offers eligible businesses assistance to cover freight costs on a 50:50 cost sharing basis.

Source: www.pacifictradeinvest.co.nz

4.8.5 Australia in-market research findings

In May 2021, consultations were undertaken in partnership with PTI Australia with the major importers, distributors and retailers in Sydney and Melbourne. The key findings are:

- The market is segmented into Asian imports (mostly frozen) which go to Asian consumers; and Pacific product (fresh and frozen) consumed by Pacific Islanders. There is very little, if any, leakage between these two

segments due to different consumer preferences. Frozen cassava fries and wedges imported from Costa Rica have recently entered the market and are said to be selling well.

- The great majority of fresh taro in the market comes by air freight from Fiji and retails at very high prices (AUD 10-12/kg). Biosecurity regulations currently prevent fresh taro from Samoa entering the market, although it is possible that this restriction could be lifted once new protocols are developed and approved. However, shipping services from Samoa to Australia are far from ideal, normally requiring transhipment via Auckland.
- Australian-produced white taro is widely available through Asian food outlets in Sydney, Melbourne, Brisbane and elsewhere. This sells at high prices to mainly Asian consumers (AUD 10-15/kg) but is avoided by Pacific Islanders on the basis of taste and texture.
- The importing and distribution system in Australia is more fragmented than in New Zealand with a larger number of smaller operators, supplying retailers. Most of the importers/distributors are owned and operated by Australians of Indo-Fijian origin who maintain affiliations with family businesses in Fiji that organise procurement, processing and exporting. These businesses also handle mainly frozen product from Tonga and Samoa.
- There is one recently-established business owned by Samoan-Australians specialising in importing Samoan products and selling at retail and wholesale levels targeting Samoan diaspora communities. There are no Tongan equivalents, with Tongan product being handled by the Indo-Fijian operators.
- Demand for root crops is concentrated in the suburbs of Sydney, Melbourne and Brisbane where the main diaspora communities are concentrated. Distributors also supply smaller Pacific Islander population concentrations around the country, including seasonal worker groups in rural areas as far afield as Tasmania and the Northern Territory.
- Retail prices for both fresh and frozen products are higher than in New Zealand, but so too are transport and distribution costs.
- Informal trade supplies a large but un-quantified segment of the market, mainly for frozen products and mainly to Tongan and Samoan communities in the major cities. Like New Zealand, the commercial operators complain about the disruptive nature of the informal trade.
- Most retail outlets are speciality island or Fijian shops of small/medium size, and located in areas with concentrations of Indo-Fijian and other Islander populations. These also offer frozen products imported from India and other Asian countries, generally with much higher standards of packaging and presentation than the Pacific equivalent.
- Immigrants from Africa also purchase yams and cassava, but not taro.
- Pacific root crops are generally a small part of the importer/distributor businesses, which also handle a diverse range of Pacific and Asian (mainly Indian) products. The operators therefore have limited interest in investing in root crop market development. They are generally more interested in frozen products than fresh. Some who previously handled fresh product have now moved to 100% frozen because of lower risk.
- Unlike New Zealand, the Tier 1 retailers (Coles, Woolworths, Aldi etc.) do not generally stock tropical root crops in either frozen or fresh form. It would be difficult to break into this market sector. As seen in New Zealand, the supermarkets only offer tropical root crops in a small number of localities with concentrations of Pacific Islanders, and are increasingly concerned about food safety and social accountability standards for Pacific produce.
- Like New Zealand, importers and distributors are interested in diversifying their supply sources as a means of risk reduction, to address concerns about quality variability and weather-related disruptions to supply. They are prepared to consider importing from Vanuatu and Solomon Islands, particularly to supply Brisbane and Sydney. However, they recognise that there are no established exporters or export-oriented growers in these countries, and that it will take a long time to develop this opportunity.
- The importers and distributors are cautious about the prospects for growing the market due the generally flat volumes of PIC imports over several decades and changing food preferences in Pacific diaspora communities. However, they believe that some expansion is possible with better quality and consistency of supply, and improved packaging and presentation of the frozen product range.

5 Study conclusions and recommendations

5.1 General conclusions

Root crops are one of the Pacific Islands' oldest and most resilient food exports with three main suppliers, three main importers, and an expanding product range covering four species (taro, giant taro, cassava and yams) in both fresh and frozen formats. Vanuatu is a fourth potential supplier, but with much to do to establish commercially viable production and marketing pathways.

New Zealand market mature, Australian and US markets growing but demand driven by cultural affiliations

- Analysis of marketing systems has not identified any significant new/un-tapped opportunities in terms of products or markets. The three major export destinations are well-established and it is unlikely that any new markets will open up, at least in the short-medium term.
- The largest market (New Zealand) is showing signs of maturity; whilst the Australian market is expanding, but with most of the growth supplied by Asian exporters; and the smallest market (USA) is growing (from a low base).
- Knowledge about the New Zealand and Australian markets is readily accessible and has been documented in this and previous studies. However, less is known about the USA market, other than the fact that PIC exporters supply a small niche in a very large market, and that prices appear stronger than in the other two markets. Some exporters are optimistic about expanding this niche, recognising that it currently accounts for only about 10% of total PIC exports.
- Fiji, Samoa and Tonga supply at least 80% of the New Zealand market, and about 50% of the Australian market, but less than 2% of the USA market with the remainder supplied mainly by Asian exporters in New Zealand/Australia, and Central America/ Caribbean in the US. However, there is limited potential for Pacific Island exporters to win market share from the other suppliers (or vice versa) due to taste preferences and cultural affiliations in the target communities. Growing Asian populations have a strong preference for Asian-sourced products.

Limited volume growth opportunities, the main focus should be on quality, consistency of supply, biosecurity and food safety

- The longevity and resilience of the trade suggest that it will continue to provide opportunities for PIC exporters (existing and potentially new ones) in the long-term. However, root crops should be considered a mature market, with limited volume growth opportunities. Increasing volumes alone is unlikely to achieve much other than driving down prices.
- It is likely that the trade will remain heavily dependent on demand from Pacific diaspora communities whose food habits are becoming westernised, especially among the younger generations. The number of people prepared to pay high prices for imported (especially fresh) root crop products is likely to dwindle.
- Many of the issues identified in marketing studies conducted 9-10 years ago (see Section 2.1 and 2.2) remain current. These focus on quality and consistency of supply, biosecurity and food safety compliance, potential for value addition, post-harvest management, formalisation.

Continuing biosecurity and logistical challenges

- Significant biosecurity and logistic challenges remain, and COVID-19 has seriously disrupted supplies leading to shortages of fresh product in key markets. There appears to have been limited progress in improving compliance with biosecurity standards, despite heavy investment by PHAMA Plus and others in this area. Food safety and social accountability standards required by retailers in import markets are likely to become more stringent.
- The frozen sub-sector is likely to perform better over time because of biosecurity and logistic advantages and consumer preference for cheaper and more convenient products, as seen in mainstream frozen vegetable offerings.

Value-adding opportunities

- Value adding opportunities exist in both the fresh and frozen sectors. The best way to add value to fresh root crops is improved quality through good agricultural practices at all stages from primary producer to consumer, recognising that the highest returns can usually be obtained from premium quality fresh rather than frozen or processed products.
- Whilst processing is not the only way to add value, opportunities for processed products should not be overlooked, especially where surplus or downgraded produce can be used. Among processed products chips, and frozen fries and wedges offer value adding opportunities, as well as improved retail packaging and presentation, and smaller pack sizes. Opportunities for exporting gluten-free flour from taro have also been identified and should be pursued.
- Exporter and importer declarations that they are eager to source additional supplies need to be interpreted with caution. They generally prefer increased volumes on offer so that they can be more selective, push down prices and win market share from competitors.

Strengthening the participation of women, youth and PWD can open new market opportunities and support strengthening quality standards

- Improving access to market information (prices, demand, buyers) can support marginalised groups to enter or expand their market share.
- Women's recognised attention to detail and reliability in postharvest handling and administration suggests that attempts to strengthen quality and standards should be twinned with efforts to promote women's leadership in agribusinesses.
- Strengthening workplace health and domestic violence policies and partnerships for referrals can increase productivity and performance, particularly within processing facilities.

5.2 Recommendations

Re-focus on marketing fundamentals

Pacific Island root crop growers and exporters should re-focus on marketing fundamentals including quality and consistency of supply; attractive/convenient packaging and presentation; consumer convenience; food safety, traceability and social accountability; gender equality and social inclusion; and regulatory/biosecurity compliance. These are all issues that have been highlighted in previous studies and have been the subject of PHAMA Plus support since 2011. However, the findings of this study suggest that there is still work to be done.

Develop better understanding of the US market

More work is needed to develop a better understanding the potential of the US market, recognising that it has shown the best growth performance of the three main markets, although from a low base. PIC exporters are likely to remain niche players in this large market, but it needs to be better understood to inform exporters about its potential.

A sector business plan for Vanuatu

Vanuatu's aspirations to become a root crop exporter should be supported through the development of a comprehensive business plan for the sector, recognising that, as a late starter, this will require long-term commitment and investment framework.

A strategic approach to strengthening inclusion within agribusiness partnerships is required

The well documented barriers facing women, youth, PWD have not always been recognised by farmer organisations and those involved in providing support to strengthen value chains. Training, case studies and other resource materials that provide a deeper understanding of the lived reality of rural women, youth and PWD can enhance the ability of those involved in managing agribusiness partnerships and market development programs to strengthen inclusion. Partnerships between PHAMA-Plus and rights-based civil society groups could support the development of skills among National Facilitators and exporters to recognise a missed opportunity.

Agribusinesses in partnership with PHAMA Plus should be required to develop strategies to address key barriers facing women, youth and PWD. This includes communication strategies to ensure that information about export standards is accessible, delivering training for women, youth and PWD to support improved access to information and digital

skills, adopting strong codes of conduct and workplace policies, and promoting access to business networks and industry groups including the MAWGs for a greater diversity of stakeholders. Over the longer-term partnerships with seasonal agricultural worker programs should also be developed.

Annex 1: Product Categorisation in International Trade Statistics

The trade statistics extracted from the International Trade Centre (ITC) database and reported in Section 3 of the report are aggregated under the four-digit Harmonised System (HS) code 0714 covering all tropical root crops. It is possible to disaggregate this into six product categories using the HS six-digit coding system as follows.

Code	Description
0714	Roots and tubers of manioc, arrowroot, Jerusalem artichokes, sweet potatoes and similar roots and tubers with high starch or inulin content, fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets; sago pith.
071410	Fresh, chilled, frozen or dried roots and tubers of manioc "cassava", whether or not sliced or in the form of pellets.
071420	Sweet potatoes, fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets.
071430	Yams "Dioscorea spp.", fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets.
071440	Taro "Colocasia spp.", fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets.
071450	Yautia "Xanthosoma spp.", fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets.
071490	Arrowroot, Jerusalem artichokes and similar roots and tubers with high starch or inulin content, fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets, and sago pith (excluding manioc "cassava", sweet potatoes, yams, taro and yautia).

Until 2011 only three six-digit HS codes were used: 071410 (Cassava); 071420 (Sweet Potato) and 071490 (all others, including taro and yams). From 2012 onwards three new codes have been used; 071430 (yams); 071440 (Colocasia taro); and 071450 (Xanthosoma taro). The “other” category has been retained but no longer includes yams and taro and appears to be used where there are uncertainties about the identity of the item, or for mixed consignments. Because of the changes in the coding system in 2012, it is only possible to conduct a meaningful analysis over the nine years from 2012 to 2020.

Annex 2: PHAMA Documents Relating to Root Crops

2011	Technical Report 1: Report to the Fiji Market Access Working Group Outlining Export Issues for Taro to Australia and New Zealand
2011	Technical Report 3: Report to the Samoa Market Access Working Group Outlining Export Issues for Taro to Australia and New Zealand
2011	Technical Report 10: Response to Biosecurity Australia: Draft Report of Import Conditions for Fresh Taro Corms
2012	Technical Report 14: Developing Exports of Samoan Taro to New Zealand
2012	Technical Report 20: Samoan Taro Export Development – Workshop Outcomes
2012	Technical Report 26: Determination of the Quarantine Status of Nematodes on Fijian Taro Exports
2012	Technical Report 28: Determination of the Quarantine Status of Nematodes on Samoan Taro Exports
2013	Technical Report 27: Development of and Training on Taro Production Pack House Standards
2013	Technical Report 45: Feasibility Study to Determine Infrastructure Requirements for Processing and Packing Horticultural Products for Export
2013	Technical Report 51: Substantiation of Australia's Requirements for Devitalisation of Taro Imports
2015	New Access for Samoan Taro to Australia – Samoa Visit, September 2015
2015	Technical Report 103 New Access for Taro to Australia
2015	Tonga Eastern District Packing Facility Draft Business Plan
2016	Technical Report 109: Kingdom of Tonga: Infrastructure Requirements for Processing and Packing Horticultural Products for Export
2018	Fiji Dalo Quality Manual
2018	Technical Report 116: Infrastructure Requirements for Horticultural Exports from Tonga
2018	Technical Report 118: Cost Analysis of Root Crop Exports – Fiji
2018	PHAMA Plus Intervention Design Document Annex 3-5: Indicative Intervention – Exporting Root Crops from Fiji, Samoa and Tonga
2019	Proposed Tonga Centralised Multipurpose Packing Facility
2019	Sector Concept Note Fiji – Root Crops
2019	Sector Concept Note Tonga – Root Crops
2019	Sector Concept Note Samoa - Taro
2020	Intervention Plan: Fiji – Root Crops
2020	Intervention Plan: Samoa – Root Crops
2020	Intervention Plan: Tonga Root Crops
2020	Kingdom of Tonga: Feasibility Study for Establishing a Multi-User Export Packhouse Facility
2020	Managing the Impacts of Climate Change on Root Crop Production and Value Chains in Fiji. PHAMA Plus and Australia Pacific Climate Change Partnership
2021	Market Evaluation of the Taro High Pressure Washer and Hot Water Treatment System

Key Points Arising from PHAMA/PHAMA Plus Documents

2011 Technical Report 1: Report to the Fiji Market Access Working Group Outlining Export Issues for Taro to Australia and New Zealand

- There are significant impediments to realising expanding export opportunities.
- Major quality and phytosanitary issues in the supply chain continue to hinder current access.
- (PHAMA), along with two current ACIAR projects, is concentrating on resolving these issues through complementary and systematic research into the underlying issues.
- Two quarantine export staff should attend taro inspections in New Zealand and Australia to gain an understanding of inspection protocols.

2011 Technical Report 3: Report to the Samoa Market Access Working Group Outlining Export Issues for taro to Australia and New Zealand

- Following the devastation caused by TLB in 1993, Samoa's taro production has recovered to the stage where exports can be considered.
- However, there are significant impediments to be overcome.
- Samoa is currently excluded from exporting fresh to Australia because of TLB.
- Consumers are reluctant to purchase the newly developed export varieties of taro.
- There is strong competition from other suppliers in the Australian and New Zealand markets.
- Quality and phytosanitary standards need to be improved along with supply chain infrastructure.

2011 Technical Report 10: Response to Biosecurity Australia: Draft Report of Import Conditions for Fresh Taro Corms

- The draft report has correctly assessed the risks posed by many of the pests and diseases. However, some estimates of risk are significantly over-estimated.
- A full and rigorous pest and disease survey of the Australian taro industry should be conducted, and reported before the review is finalised.

2012 Technical Report 14: Developing Exports of Samoan Taro to New Zealand

- Samoa has now produced a range of TLB-tolerant taro varieties and is now seeking to re-establish a position in the New Zealand market.
- Supply constraints include access to planting materials, limited knowledge about export opportunities with most farmers preferring to supply the local market, low export prices, transport limitations and pricing and payment systems.
- Exporters face continual supply problems and strong competition from Fijian exporters. Supply side issues must be addressed first and foremost. Farmers need to be paid cash on delivery, not wait weeks for payment.
- New Zealand importers are wary of engaging with Samoa due to concerns about quality and continuity of supply.
- The requirement for fumigation increases costs and decreases storage life.
- MAF's post-harvest facility is too small to handle large export volumes.
- Consumers, including the New Zealand Samoan community, are not familiar with the new Samoan varieties.
- Distribution systems in the New Zealand market require a consistent supply in order to be developed.

2012 Technical Report 20: Samoan Taro Export Development – Workshop Outcomes

- Two workshops were held to build consensus of what needs to be done to build sufficient export volume to enter the New Zealand market.
- Farmers are interested in pursuing export opportunities, but consistently high prices in the domestic market continue to hold their attention.
- Government is doing its best to provide technical support, but is hampered by resource constraints.

- Exporters are unlikely to become proactive until a more stable supply situation has developed.
- Exports need to be organised on a reliable and consistent basis with high quality product, and supported with a planned and active marketing program.
- Lack of planting materials was again raised as a constraint.
- There is some support for the concept of a taro export cooperative.

2012 Technical Report 26: Determination of the Quarantine Status of Nematodes on Fijian Taro Exports

- The main quarantine issue associated with Fiji taro exports to New Zealand is the presence of nematodes.
- Detection of nematodes requires fumigation which adds to costs and reduces storage life.
- However, there is limited information available on the nematodes that affect taro, and New Zealand MAF does not provide a list of regulated and non-regulated organisms associated with taro.

2012 Technical Report 28: Determination of the Quarantine Status of Nematodes on Samoan Taro Exports

- Detection of nematodes by New Zealand biosecurity requires fumigation or incurring the cost of identifying the nematode species. Most exporters opt for fumigation.
- Providing information of the species occurring in association with taro in Samoa may enable a re-assessment by New Zealand officials, possibly removing the need to fumigate.

2013 Technical Report 27: Development of and Training on Taro Production Pack House Standards

- Version 1 of a taro production and processing operational guidelines document for use by the taro export supply chain was issued in May 2013 and delivered to supply chain participants through an introductory workshop.
- Biosecurity Authority of Fiji (BAF) has taken ownership of the document and holds responsibility to ensure it is amended and controlled as needed.
- BAF and the extension services will work ensure that training for the taro export supply chain incorporates the information provided in the guidelines document.

2013 Technical Report 45: Feasibility Study to Determine Infrastructure Requirements for Processing and Packing Horticultural Products for Export

- The Tonga MAWG requested PHAMA to assess the adequacy of processing and marketing infrastructure for horticultural produce including root crops.
- Tonga does not have the required infrastructure for hygienic and efficient processing of root crops in the required quantities.
- The New Zealand market has the capacity to absorb increased exports of root crops, and there are also markets in Australia and North America with considerable potential, especially for frozen product. Processing infrastructure limitations constrain access to these markets.
- Root crop exporters have expressed a preference for access to decentralised processing facilities to process root crops hygienically and efficiently in the rural areas.
- 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 packhouse facility.

2013 Technical Report 51: Substantiation of Australia's Requirements for Devitalisation of Taro Imports

- Biosecurity Australia has proposed that fresh taro corms be permitted into Australia from Fiji subject to specific pest risk management measures.
- Proposed quarantine treatments involve "topping" to remove leaf petioles and growing points and scraped to remove dormant buds. However, these treatments seriously reduce storage life.

2015 New Access for Samoan Taro to Australia

- The objective of was to develop management measures TLB in support of achieving access for fresh taro to Australia.
- A substantial research effort is required to answer Australian biosecurity questions, with no certainty that success can be achieved.
- Samoa's MAF pathology laboratory is poorly resourced and plant pathology expertise is limited. SROS has good laboratory facilities but not plant pathologists on staff.
- The TLB program should be a collaborative SROS/MAF research project based at SROS but supported by MAF pathologists and external specialist pathology expertise.

2016 Technical Report 109: Kingdom of Tonga: Infrastructure Requirements for Processing and Packing Horticultural Products for Export

- Nishi Trading has plans to upgrade its HACCP certified packhouse facility to process root crops in addition to its current use for processing cucurbits for export.
- The viability of the proposed new root crop processing facility needed to be reconsidered in light of new information available since TR 45 was completed.
- It was recommended that that a new packhouse facility be established according to the design features and operating model described in the draft business plan.
- Australian DFAT indicated that it would be prepared to contribute to the financing the project subject to a comprehensive feasibility study and business plan.

2018 Fiji Dalo Quality Manual

- The manual provides a one stop shop of technical information for farmers. It highlights best practices of growing the finest product with quality that is maintained along the value chain, for both domestic and export markets.
- The aim of the manual is to ensure that dalo grown in Fiji is: (i) produced, harvested and processed according to good handling standards to maintain its quality; (ii) safe and healthy to consume; (iii) locally and internationally renowned and recognised as a quality product; and (iv) complies with the biosecurity, quality and other requirements of target export markets.

2018 Technical Report 116: Infrastructure Requirements for Horticultural Exports from Tonga

- A number of steps have been taken towards implementation of earlier recommendations regarding establishment of a packhouse facility for processing root crops and other commodities.
- A review and update of the current situation and outlook for root crop exports re-confirmed the feasibility of the packhouse proposal, subject to certain risks.

2018 Technical Report 118: Cost Analysis of Root Crop Exports – Fiji

- Fiji has experienced declining export volumes of most horticultural commodities, including root crops, during the last five years.
- The Fiji MAWG requested that PHAMA undertake a value chain analysis for taro and cassava exports to identify reasons for declining exports.
- Taro and cassava exporting were also found to be marginally profitable at current prices.
- Fiji's root crop exporters have faced a number of headwinds in the last 3-4 years, when a series of natural disasters greatly reduced availability and increased domestic prices. Increasing prices in export markets have been insufficient to compensate for these events, and the volumes of taro and cassava have consequently declined from the peak levels by around 50% for taro and 70% for cassava.
- Fiji's competitors, Tonga and Samoa, have apparently been less affected by these trends and have managed to increase market share at Fiji's expense.

2018 PHAMA Plus Intervention Design Document Annex 3-5: Indicative Intervention – Exporting Root Crops from Fiji, Samoa and Tonga

- Root crops contribute significantly to the food security and incomes of large numbers of Pacific Island households.
- Significant export earnings are generated (in the case of Fiji taro) with potential to increase exports of other root crops from all countries.
- The processing of root crops to remove dirt/debris and skin (if product is frozen) creates employment opportunities within processing facilities especially for women and youth.
- Common areas requiring improvements to promote sustainable exports of root crops from Fiji, Tonga and Samoa include:
- A detailed understanding of the supply chains, key impediments and suggested areas for investment to increase quality and volume.
- Understanding the current status of production area soils and nutritional requirements to ensure sustainable production.
- Market research to better understand root crop varietal preferences for developing markets in Asia and the USA.
- Market research to understand potential returns on frozen root crops into specific markets.
- Facilitation of social inclusion in root crop supply chains.
- Improvements to processing, packaging, labelling and freezing techniques.
- Improving the performance of authorities to promote, monitor and certify production of root crops.
- Improving the ability of private sector to monitor crops, provide extension and identify any production related issues.
- Improving access to finance for producers, collectors/traders and processers.
- Rapid diagnostic services and response to pest and disease outbreaks and soil nutrition issues.

2019 Sector Concept Note Fiji – Root Crops, and 2020 Intervention Plan: Fiji – Root Crops

- Presents a market systems analysis on the key features in the Root Crops sector. Identified necessary market changes, the potential incentives for actors to change and contribute to the growth of the sector and the program goals of PHAMA Plus. This led to the following suggested interventions for PHAMA Plus:
- IA 1: Improving Production. Increase production by facilitating the supply of inputs: enhancing multiplication techniques; nursery development; and irrigation systems.
- IA 2: Improving Efficiency of Value Chain. Support industry stakeholders to reduce value chain costs: value chain analysis; rural collection centres; and biosecurity.
- IA 3: Improve Market Access. Support exporters and traders to improve quality management systems and improve market access: food safety accreditation; and public-private partnerships.
- Thematic Interventions: Quality systems and organic certification.

2019 Sector Concept Note Samoa – Taro, and 2020 Intervention Plan: Samoa – Taro

- Presents a market systems analysis on the key features in the Samoan Taro sector. Identified necessary market changes, the potential incentives for actors to change and contribute to the growth of the sector and the program goals of PHAMA Plus. This led to the following suggested interventions for PHAMA Plus:
- IA 1: Linkages and climate resistance inputs. Support industry stakeholders to strengthen backward linkage and ensure consistency in supply of taro and climate/disease resilient planting materials.
- IA 2: Diversification and new export markets. Support stakeholders to innovate and expand the range of value-added products and explore new markets for fresh and processed taro products.
- IA 3: Quality export standards & procedures. Work with industry stakeholders and government agencies to develop relevant standards in consultation with importing countries and introduce improved post-harvest processes/practices to meet export compliance.
- Thematic Interventions: Quality systems and SCHS.

2019 Sector Concept Note Tonga – Root Crops, and 2020 Intervention Plan: Tonga – Root Crops

- Presents a market systems analysis on the key features in the Root Crops sector. Identified necessary market changes, the potential incentives for actors to change and contribute to the growth of the sector and the program goals of PHAMA Plus. This led to the following suggested interventions for PHAMA Plus:

- IA 1: Access to Market and Good Agricultural Practice (GAP) Information. Market study on export potential; Improve GAPs for root crop producers to meet market demand; and scale up production.
- IA 2: Access to More Efficient Tools. Root crop growers support services (land preparation).
- IA 3: Maintain Use of Export Facilities (e.g., packhouse). Support for exporters/packing facilities on compliance.

2020 Kingdom of Tonga: Feasibility Study for Establishing a Multi-User Export Packhouse Facility

- Final feasibility study updating earlier versions of a design and business plan for a multi-user/multi-purpose packhouse to process root crops and cucurbits for export.
- Proposes a package of measures to stimulate primary production of key commodities based on partnerships between exporters, growers and service-providers; and to provide the infrastructure needed to prepare these for export, and in particular to increase the proportion of trade flowing through formal marketing pathways.
- Business plan demonstrates that establishment of the packhouse is a viable proposition under a PPP model, subject to the availability of finance, within a well-defined ownership structure incorporating strict governance measures.

2020 Managing the Impacts of Climate Change on Root Crop Production and Value Chains in Fiji. PHAMA Plus and Australia Pacific Climate Change Partnership

- Summarises the findings of the Fiji consultations and provides strategies and adaptation options for consideration and implementation by the PHAMA Plus program with farmers.
- Of greatest concern for farmers were: unstable, fluctuating and/or low market prices; poor infrastructure; high input costs; declining quality and yield of crops; declining soil fertility; and changing seasons/unpredictable weather patterns.
- There was general recognition among root crop farmers that climate change is a critical issue, creating a desire for greater awareness and information.
- Solutions that were identified present real promise at enhancing climate resilience include agro-forestry, organic farming and greater use of traditional farming practices.

2021 Market Evaluation of the Taro High Pressure Washer and Hot Water Treatment System

- The aim was to develop a system for meeting NZ MPI quarantine requirements without Methyl Bromide (MeBr) fumigation.
- Trials demonstrated that the HPW+HWT system can satisfy NZ MPI requirements provided it is accompanied by careful grading and packing, and with some quality improvements.
- There is potential to use HPW+HWT treatment for export of fresh taro to Australia if control of taro leaf blight (TLB) can be proven effective

Other Key Documents

1. FAO (2010) Pacific Food Security Toolkit: Building Resilience to Climate Change – Root Crop and Fishery Production. Module 4 Pacific Root Crops
2. McGregor A. et al (March 2011). Pacific Island Taro Market Access Scoping Study
3. Pacific Islands Trade and Invest (PTI) and FAO (September 2012). Pacific Islands Exporting Taro to New Zealand
4. Taylor M, McGregor A and Dawson B eds. (2016) Vulnerability of Pacific Island Agriculture and Forestry to Climate Change. Chapter 4: Vulnerability of Staple Food Crops to Climate Change
5. Fiji Ministry of Agriculture (2017) the Strategic 5-Year Plan for an Economically and Environmentally Sustainable Fiji Taro Industry

Annex 3: Root Crop Study Photographs

Sydney

2kg pack of Samoan frozen taro in Western Sydney speciality Samoan food store

Shop front display in speciality Samoan food store in Western Sydney

Fiji frozen cassava, Western Sydney retail shop

Samoan taro chips, Western Sydney retail stop

Pacific/Asian food importer/distributor's warehouse in Western Sydney


Cooked taro in take-away food store in Western Sydney


Fresh Fiji taro retailing for AUD 8.99 in Western Sydney shop


Fresh yams – unknown origin – for sale in the same shop

1

Attractively packaged cassava chips from Costa Rica – seen in Sydney, Melbourne and Auckland

Two brands of frozen grated cassava in Western Sydney shop

Frozen Fiji cassava selling in Sydney for AUD 3.50/kg

Frozen Fiji taro in Western Sydney shop

Unbranded frozen purple yam in Western Sydney shop

Fiji fresh taro and yams selling in Western Sydney alongside sweet potato and noodles at much lower prices

15 kg packs of fresh taro in S-W Sydney shop

Tongan frozen yams, cassava and taro in S-W Sydney shop
All in 1.0 kg packs

Cooked taro in S-W Sydney take-away food shop

Australian white taro (AUD 10/kg) and baby taro (AUD 13/kg) in Asian food retail market in inner city Sydney

Sweet potato selling for much lower prices in the same market

Baby taro selling for AUD 16/kg

Australian white taro (AUD 12/kg) in Sydney Asian food market

Pallets of frozen root crops and other items in importer's coldstore

Melbourne

Retail shop in S-E Melbourne servicing Pacific Island and New Zealander communities. Fresh and frozen root crops on offer

Fresh taro and yams for sale in shop shown on left

4

Frozen Samoan ta'amu (gian taro) on sale at store above. 2.0 kg pack

Fresh Fiji taro and Tongan yams at Island food shop in Western Melbourne

Poor quality taro selling for AUD 9.50/kg in Melbourne

Example of unattractive packaging and reail desplay (in meat cabinet)

Mixed wholesale/retail island food outlet – also MoneyGram agency

Superior packaging and presentation of imported Asian freezer lines, including root crops

5

Auckland

2kg packs of frozen cassava, whole and grated, in South Auckland retail store
Origin not stated on pack

Low quality point of sale posters for frozen product. Taro price double cassava

Fiji fresh taro, medium sized supermarket, Mangere Town Square, Auckland

Frozen Fiji puruple taro and yams, medium sized supermarket Mangere Town Square, Auckland

2kg packs of unbranded (NZD 4.99) and branded (NZD 6.99) cassava selling in same Mangere supermarket

Frozen Tonga yams in Mangere supermarket. NZD 14.99/3kg

Freezer cabinets in Shop and Save, Mangere containing root crops

Attractively packaged imported Asian frozen products in Mangere retailer

Frozen taro leaves in Mangere supermarket

New Zeland potatoes and kumara selling much cheaper than Pacific root crops

Indian cassava in smaller supermarket in Mangere "Pacific Crown" label, NZD 5.99/2kg

French fries (potato chips) Competing product at NZD 2.50/kg

Large and diverse offering of frozen goods in Mangere supermarket

Fresh and frozen taro in warehouse of a major Auckland importer and distributor

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