



# Pacific Horticultural and Agricultural Market Access Program (PHAMA)

Technical Report 37: Potential for Exporting Pineapples,  
Ornamental Foliage, and Lemons from Samoa to New Zealand  
(SAMOA12–14)

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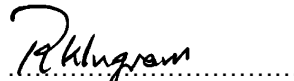
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## Abbreviations

Abbreviation	Description
ADB	Asian Development Bank
ALW	Ah Liki Wholesale
AUD	Australian dollar
CTAHR	College of Tropical Agriculture and Human Resources, University of Hawaii
FCL	Full container load
FDL	Fresh Direct Ltd
FJD	Fiji dollar
FOB	Free on board
LFC	Less than full container load
MAF	Ministry of Agriculture and Fisheries (New Zealand)
MAWG	Market Access Working Group
NZD	New Zealand dollar
PHAMA	Pacific Horticultural and Agricultural Market Access Program
PIC	Pacific island countries
SFA	Samoa Farmers Association
SK	Smooth Cayenne pineapple variety
T&G	Turners and Growers Company
UNDP	United Nations Development Programme
URS	URS Australia Pty Ltd
USD	United States Dollar
WST	Samoa Tala

## Exchange rate per unit of foreign currency (mid-rate 23 October 2012)

	1 Samoan tala (WST)
New Zealand Dollar (NZD)	0.538
Fiji Dollar (FJD)	0.780
Australian Dollar (AUD)	0.429

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## Summary and Recommendations

The Samoan Market Access Working Group (MAWG) identified three products to be considered by the Pacific Horticultural and Agricultural Market Access Program (PHAMA) in terms of facilitating market access to New Zealand. These included:

- Pineapples – Samoa currently does not have market access to New Zealand
- Meyer lemons – Samoa currently does not have market access to New Zealand
- Foliage (principally dracaena and cordyline) – Samoa currently has restrictive market access to New Zealand.

The purpose of this study was to determine if the economic benefits arising from obtaining market access for these products are likely to justify the cost involved. The study involved evaluating New Zealand market opportunities for the three products and Samoa's ability to take advantage of these opportunities.

### Pineapples

Samoa's advantages and disadvantages in exporting pineapples to New Zealand were identified as:

#### Advantages

- The involvement of a major agribusiness entity and favourable backloading opportunities into New Zealand at favourable freight rates.
- A pineapple variety mix similar to the other Pacific island countries that already have market access to New Zealand.
- A significant number of growers in place – including a few larger commercial growers.
- Suitable agronomic conditions for the production of high quality pineapples.
- The participation of the Samoan Farmers Association (SFA) in providing extension outreach for smallholder growers.

#### Disadvantages

- High farmer price expectations.
- Relatively low yields.
- Absence of year round production.
- Shortage of 'Ripley Queen' variety planting material.

At a farm gate price of around 1 tala/kg (ex-western Savai'i), it is considered that Samoa could develop an export market of around 600 tonnes per year. This would represent a market share of approximately 10%. However, this will depend on achieving year-round production and increasing yields.

#### Recommendations

- 1. Proceed with seeking New Zealand market access for Samoan pineapples.**
- 2. Investigate the feasibility of developing a protocol that would allow Samoan pineapples to be shipped with their tops on.**
- 3. Source funding for a 'farmer to farmer' exchange to introduce off-season pineapple production and rapid planting material techniques.**



**4. Seek advice and liaise with Ah Liki Wholesale on the market opportunity for minimally processed pineapple products.**

## **Ornamental foliage**

Samoa's advantages and disadvantages in exporting ornamental foliage to New Zealand were identified as:

### **Advantages**

- The identified leaves are robust, simple to pack, easy to clean for quarantine purposes and have an efficient air-freighting weight:volume ratio.
- Samoan village women have a longstanding tradition of household garden beautification – which potentially provides a substantial supply base.
- A number of SFA members are actively involved in ornamental horticulture – which provides an immediate supply source.
- Foliage has not been planted with income generation in mind – which means village suppliers do not have unrealistic price expectations.
- The identified importer is keen to receive Samoan foliage and made the initial enquiry to the expected exporter (SFA).
- The marketing channel is already in place – allowing an initial trial shipment to be “piggy backed” on existing exports of Tahitian limes.

### **Disadvantages**

- Commercial exports of foliage are currently not practical because of the additional declaration required that Samoa foliage is free of a long list of pests and diseases.

It is considered that Samoa is well placed to establish a small but viable export trade in foliage to New Zealand.

### **Recommendations**

- 1. Proceed with the development of the required pest list for the identified foliage products.**
- 2. Obtain funding for a SFA Field Officer to meet with the identified New Zealand buyer to discuss the specifics of exporting foliage to New Zealand and to test market samples of Samoan foliage. This activity should proceed in parallel with recommendation 1.**
- 3. Facilitate quarantine clearance for samples of Samoan foliage to be taken to New Zealand by a SFA Field Officer.**

## **Meyer lemons**

The likely landed price for lemons in New Zealand is too low to justify airfreight exports from Samoa. Thus the allocation of PHAMA resources to securing market access for lemons is not justified.

### **Recommendation**

***It is highly unlikely that exporting Meyer lemons would be commercially viable. This option is currently not recommended to be pursued.***

# 1 Pineapples

## 1.1 The New Zealand Market for Pineapples

### 1.1.1 Scene Setting – Looking Back a Decade

The last comprehensive study of the New Zealand market for Pacific island pineapples was conducted in 2003. The study was undertaken for the Asian Development Bank (ADB), as part of preparation for the *Alternative Livelihoods Project* for the Fiji sugar industry (Lincoln International 2003).<sup>1</sup> The Lincoln International Market Report summarised the situation:

*“In 2002 New Zealand imported 4,200 tonnes of pineapples (cif value of NZD4.4 million). This represented a fourfold increase over the last decade. In the past Fiji was a major supplier of pineapple to New Zealand, today its market share is miniscule (456 kg in 2002).*

*Dole pineapples from the Philippines overwhelmingly dominate the New Zealand pineapple market. The sole importer of Dole pineapples is Market Gardeners Ltd, who in turn exclusively sell their pineapples to the Progressive supermarket distribution chain. Dole pineapples ‘piggy back’ on vessels carrying bananas and thus enjoy favourable freight rates. The exclusive relationship between Dole and Market Gardeners Ltd means that the other major produce importers are denied access to pineapples from the Philippines. These companies are anxious to fill this major gap in the product line they can offer to customers.*

*In the past, Turners and Growers have imported pineapples from Australia. However, there was considerable consumer resistance due to high prices and poor quality. More recently Turners and Growers imported pineapples from Ecuador (shipping on banana boats) and Thailand. Both sources encountered major quarantine problems in the form of weed seed, which meant the tops had to be cut off before they could be released from quarantine.*

*Dole have recently introduced ‘gold’ pineapples into the New Zealand market. This new ‘variety’ (probably a Smooth Cayenne selection with superior nutrition applied) commands a significant price premium. ‘Gold’ pineapples retail from NZD4.99 to 5.95 per fruit (1.5 kg) at Fruit World stores (January 2003) compared with \$2.95 per fruit for a standard Dole pineapple. Importers indicated that they would be very interested in sourcing an equivalent quality pineapple from Fiji at a comparable price.*

*There is also a small niche market available for rough skinned ‘Ripley Queen’ pineapples. Turners and Growers import by air small quantities of rough skinned pineapples from Vanuatu for cruise ship companies. While ‘Ripley Queen’ pineapples have a superior flavour, they are unknown to the general market. Consumers tend to regard these pineapples as poor value for money because of their significantly smaller size.*

*In total it is estimated that the readily available market for high quality Fijian pineapples in New Zealand is around 600 tonnes per annum.”*

<sup>1</sup> Lincoln international (2003), *Alternative Livelihoods Project*, Mid-Term Report, TA No. 3887-FIJ, Ministry of Agriculture, Sugar and Land Resettlement, Asian Development Bank, Appendix 2: Agricultural Markets and Marketing, March 2003

### 1.1.2 Current Situation – The New Zealand Pineapple Market Today

In 2011, New Zealand imported 5,972 tonnes of pineapples for a landed value of NZD7.5 million. This represents nearly a 40% increase in volume compared with 2002, although well below the peak of 8,366 tonnes in 2007.

**Table 1-1 New Zealand pineapple imports, 2006–2011 (kg)**

	2006	2007	2008	2009	2010	2011
Australia	0	75	20,440	0	4,200	0
Ecuador	941,000	1,639,575	1,460,038	149,839	0	0
Fiji	0	0	256	0	0	0
New Caledonia	0	0	0	0	3,444	492
Philippines	6,435,000	6,726,231	6,179,762	5,151,446	5,819,346	5,852,968
Singapore	0	0	0	0	0	19,344
Vanuatu	0	0	0	0	0	8
<b>TOTAL</b>	<b>7,376,000</b>	<b>8,365,881</b>	<b>7,660,496</b>	<b>5,301,285</b>	<b>5,826,990</b>	<b>5,872,812</b>

Source: Statistics New Zealand, Overseas Trade

**Table 1-2 Value of New Zealand pineapple imports, 2007–2011 (NZD land value for Customs purposes)**

	2007	2008	2009	2010	2011
Australia	427	38,933	-	7,600	-
Ecuador	770,240	957,390	129,311	-	-
Fiji	-	199	-	-	-
New Caledonia	-	-	-	9,097	1,090
Philippines	8,450,310	7,017,188	7,264,709	7,862,963	7,456,779
Singapore	-	-	-	-	21,063
Vanuatu	-	-	-	-	15
	<b>9,220,977</b>	<b>8,013,710</b>	<b>7,394,020</b>	<b>7,879,660</b>	<b>7,478,947</b>
Philippines pineapple price \$/kg	1.31	1.04	1.18	1.53	1.28

Source: Statistics New Zealand, Overseas Trade

Over the last decade, Philippines pineapples have assumed even greater market dominance (Figure 1-1).<sup>2</sup> The drop in overall pineapple imports after 2008 can largely be attributed to the departure of the other significant players, specifically Ecuador and Australia, from the market. Pacific island exporters (Fiji, New Caledonia and Vanuatu) have become even more insignificant. In 2012, there was a small revival in Fijian pineapple exports, with Turners and Growers' Fiji branch recommencing air freighting of small volumes to the parent company.

<sup>2</sup> Interviews with importers indicated that Dole currently accounts for about 97% of imports from the Philippines, with the other large multinational banana/pineapple company Delmonte making up the balance.

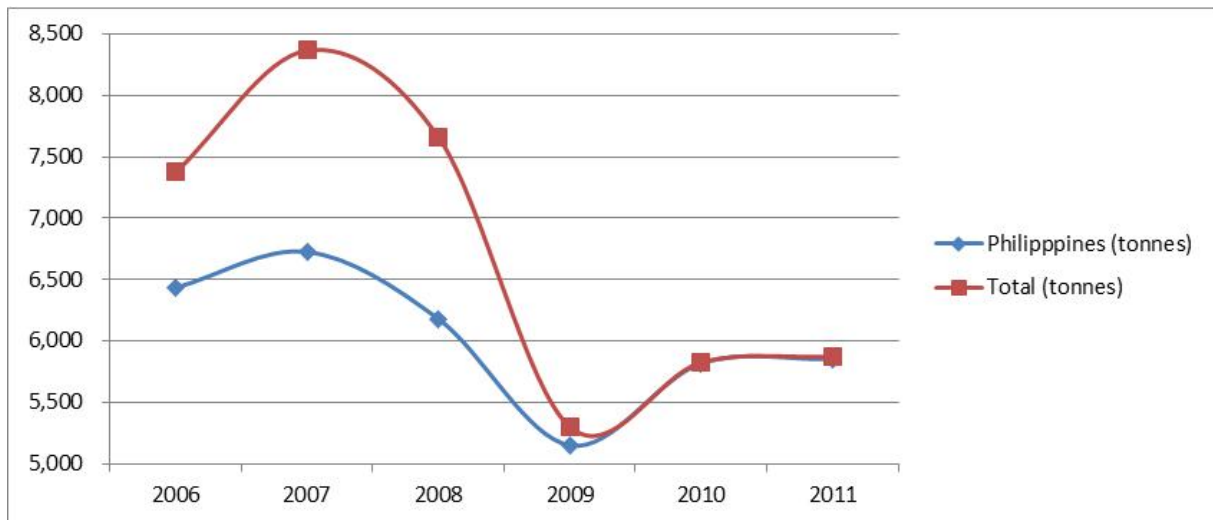


Figure 1-1 Philippines pineapple New Zealand market share, 2006–2011

The major change to the New Zealand pineapple market over the last decade has been the transformation of the Dole ‘Gold’ variety from a higher priced speciality pineapple to a market standard.



Figure 1-2 The attractive branding of Dole “Gold” pineapple

From the viewpoint of the New Zealand consumer, the ‘Gold’ pineapple is very acceptable in terms of taste, appearance and keeping quality. This has been supported by excellent labelling and promotion. The dominance of Dole ‘Gold’, however, does not mean that there is no room in the market for pineapples from other sources. The sole importer of Dole pineapples from the Philippines remains Market Gardeners Ltd. This means that other fruit importers remain at a major disadvantage for not being able to offer a popular fruit in their product line. Three major fruit importers – Turners and

Growers (T&G), Fresh Direct Ltd (FDL) and Tropical Fresh – were interviewed as part of this current study. All three companies expressed strong interest in importing pineapples from Samoa (Appendix A). This interest is reflected in T&G’s recent willingness to airfreight pineapples from Fiji to re-establish a foothold in the market, despite the unsustainable high cost of airfreight.

All three companies listed four conditions that Samoan pineapples would need to meet to secure a worthwhile market share:

- Comparable or preferably better quality relative to Dole ‘Gold’;
- Product differentiation from Dole ‘Gold’;
- Wholesale prices need to be guided by those of Dole ‘Gold’ – although they can be somewhat higher for a superior differentiated product; and
- Reliable and consistent supply of product available to the market.

These conditions are discussed below.

### 1.1.3 Conditions to be Met for Samoan Pineapple to Compete with Dole ‘Gold’ Pineapples

#### *Quality and product differentiation*

Over the past decade, the quality of pineapples available to New Zealand consumers has improved significantly, making it more challenging for Pacific islands pineapples to be differentiated in the market in terms of quality. The reason for this is the introduction of Dole ‘Gold’ and superior selected ‘Smooth Cayenne’ line.

The agronomic conditions under which pineapples are grown in Samoa produce high quality sweet fruit. However, it is unlikely that Samoan ‘Smooth Cayenne’ pineapple (*Fala uli*) will be intrinsically superior to that of specially selected ‘Gold’ lines from the Philippines. There will also be scope for Samoa to select, over time, its own superior ‘Smooth Cayenne’ lines.

A significant quality advantage for Samoa lies with the shorter voyage time from Samoa to Auckland compared with the Philippines to Auckland – approximately 7 days compared with 21 days. Thus, a Samoan pineapple could be harvested at a later stage of maturity (a higher level of sweetness) than pineapples from the Philippines. The Samoan product could be further differentiated in the market by good labelling that promotes a positive Samoan image. Considerable thought needs to be given to developing a good marketing name to match Dole ‘Gold’. The name ‘Smooth Cayenne’ should not be used for marketing purposes. In the New Zealand market, this name is associated with inferior quality Australian pineapples of yesteryears.

There are good opportunities for Samoa to grow and market quality organically certified pineapples, particularly from Savai’i. Together with Fairtrade certification, this could provide a mechanism to differentiate the Samoan product in the market.

All pineapples that currently enter the New Zealand market have their tops removed. This is to meet quarantine requirements with respect to transmission of weed seeds. If Samoan pineapples could be shipped and then sold with the top on, this would afford a major marketing advantage. The possibility of developing a protocol that allowed for the shipment of Samoan pineapples with their tops on should be explored. However, it is likely that the quarantine protocol for the export of Samoan pineapples to

New Zealand will at least initially require the removal of the tops. Preliminary work is being proposed on the use of low cost Ozone (O<sub>3</sub>) as a quarantine treatment for weed seed on pineapples.<sup>3</sup>

The smaller 'Ripley Queen' (*Fala Samoa*) variety probably provides the best opportunity to differentiate Samoan pineapples from the Dole 'Gold'. 'Ripley Queen' is a distinctly sweeter and more flavoursome pineapple (high brix/acid ratio) variety than Smooth Cayenne. 'Ripley Queen' is well known to New Zealand's sizable Pacific island population.<sup>4</sup> Thus, a substantial 'taste of home' niche market would exist. T&G are currently importing the 'Ripley Queen' variety from Fiji using airfreight, as a trial.



Figure 1-3 Smooth Cayenne pineapple (*Fala uli*)



Figure 1-4 Ripley Queen pineapple (*Fala Samoa*)

A fruit size in the range of 1–1.5 kg is optimum for sale in the New Zealand market, where pineapple is sold by the fruit and not by weight. 'Ripley Queen' grown under good conditions is likely to have a much higher percentage of fruit in this range. 'Smooth Cayenne', on the other hand, grown under Samoan conditions yields a high percentage of fruit in excess of 2 kg.

From a commercialisation perspective, there are a number of negative attributes of the 'Ripley Queen' (*Fala Samoa*) variety that Samoa would need to try and resolve. In summary:

- In Samoa, there is a relative shortage of *Fala Samoa* planting material compared to *Fala Uli*. A concerted program of planting material multiplication would be necessary to develop an export market.
- There is a reported resistance among Samoan farm workers to weed *Fala Samoa* due to its sharp serrated leaves. This problem would seem to be readily resolvable through the provision of protective clothing (i.e. long sleeved shirts, trousers and gloves).
- The significantly shorter shelf life of 'Ripley Queen' pineapple compared with Dole 'Gold'. This has been the experience of T&G with its imports of Ripley Queen pineapple from Fiji.

<sup>3</sup> Personal communication with quarantine treatment specialist Dr Jack Armstrong (armstrong.jack@xtra.co.nz)

<sup>4</sup> According to the 2006 population census, New Zealand's Samoan population was 131,000, up from 115,000 in 2001 (a 14% increase). This represented 47% of New Zealand's Pacific Island population and around 7% of New Zealand's total population.

## Prices

Over the last five years, the average annual landed price for Dole pineapple in New Zealand has varied between NZD1.04–1.53 per kg, with no discernible trend (Table 1-2). In 2011, the average annual landed price was NZD1.28 per kg. In October 2012, the retail prices for Gold pineapples ranged from NZD3.99–5.99 per pineapple at an average weight of 1.5 kg per fruit.

Fiji Ripley Queen pineapple imported by T&G in September 2012 was landed for NZD4.00 per fruit, wholesaled for NZD5.00 per fruit and retailed for NZD6.99 per fruit. The small volumes involved were able to clear at these prices. However, these prices are far too high to capture any worthwhile market share. The high price of Fijian pineapple is not surprising given the airfreight rate for loose cargo is FJD3.92 (NZD2.70) per kg. The airfreighting of pineapples to New Zealand is not seen as a viable option.

Patrick Corson (T&G's Imports Manager) suggests as a 'rule of thumb' that the landed price for imported fruit in New Zealand is approximately 50% of the retail price. Wholesale margins in New Zealand are around 15%, with retail margins being in the range of 35–40%. However, it is reported that during promotional specials, the price of Dole pineapples can fall as low as NZD1.99 per fruit. Tropical Fresh Ltd's Bobby Kumaran indicated that for fresh pineapple exports to be feasible, the 'product needed to land in New Zealand for less than NZD2.00 per fruit and ideally around NZD1.50 per fruit' (pers. comm, Oct 2012). This price, he suggested, 'would provide for a reasonable margin to build volume'.

## Continuity of supply

Dole Gold pineapples are available in New Zealand year-round. As noted by Bobby Kumaran, it will take considerable upfront effort and expenditure for a Pacific island pineapple exporter to become established in the market. Thus, it would be pointless to make this effort during the main pineapple season and then leave the market for some seven months. Samoa currently only has one main season for pineapple production – with the season extending from early October through to January.

Achieving year-round pineapple production requires the introduction of a well-known and relatively simple technology and management system. This essentially involves phased planting in combination with an ethylene-based fruiting hormone. It is recommended that exports should not commence until reasonable year-round supply base can be assured. Having off-season pineapple production would also make pineapple growing for the local market a much more profitable enterprise.<sup>5</sup>

<sup>5</sup> The importance of consistency of supply for local market development is reflected in the case of the Aggie Grey Hotel. Several years ago they entered into a contract with a larger pineapple grower to supply 90 fruit per week year round. However, the contract lapsed when the hotel's year round requirement could not be met.



Figure 1-5 Auckland retail prices for pineapples, October 2012

It is recommended that 'farmer-to-farmer' off-season pineapple production technical assistance be provided to Samoa. Two experienced pineapple farmers in Fiji have been identified that could provide this assistance. It is proposed that this assistance be channelled through the Samoan Farmers Association (SFA).

#### 1.1.4 The Realistic Export Market Size for Samoan Pineapples

Exporters and distributors interviewed as part of this study (T&G, FDL and Tropical Fresh) all demonstrated strong interest in buying Samoan pineapples, provided quality and product



differentiation, price and continuity of supply conditions were met. Each of them commented that the realistic volume that would make the trade worthwhile would be a 20 foot reefer container (approximately 10 tonnes) provided to each of the three importers every 10 days. Tropical Fresh is also looking at the possibility of importing drinking coconuts from Samoa, via SFA. This could offer an opportunity to ship a mixed consignment of coconuts and pineapples.

The shipment of six containers a month of pineapples is seen a realistic medium term objective. This would result in around 600 tonnes of pineapples being exported per year. This would represent a market share of approximately 10%.

## 1.2 Samoa's Comparative Advantage in Pineapple Production and Marketing

Samoa's advantages and disadvantages in exporting pineapples to the New Zealand market can be listed as follows:

### Advantages

- A pineapple variety mix similar to other Pacific island countries (i.e. Fiji, New Caledonia and Vanuatu) that already have market access to New Zealand.
- Suitable agronomic conditions for production of high quality pineapples.
- A significant number of existing growers in place – including a few larger commercial growers.
- The involvement of a major agribusiness entity.
- The involvement of the SFA, which provides for an effective extension outreach for smallholder growers.
- Favourable freight rates.

### Disadvantages

- High farmer price expectations.
- Relatively low yields.
- Absence of year round production.
- Shortage of 'Ripley Queen' planting material.

### 1.2.1 Advantages

#### *Pineapple varieties that already have market access to New Zealand*

Samoa has two pineapple varieties – Smooth Cayenne and Ripley Queen. There are likely to be natural crosses between the two, as is the case with Fiji's *veimama* variety. Fiji, New Caledonia and Vanuatu already have market access protocols in place for these two varieties. This is based on non-fruit fly host status of pineapples. Samoa has undertaken fruit fly host status testing for pineapple and verified that pineapple is not a host for local fruit fly species of economic concern.<sup>6</sup>

#### *Suitable agronomic conditions<sup>7</sup>*

Samoa is generally well suited to pineapple production in view of its climatic and soil conditions. Pineapples do best (in terms of flavour, colour, and resistance to bruising) when grown in areas of

<sup>6</sup> Laiti FT, Williams C, Enosa B, Fotoni P (undated), Fruit fly hosts and non-host. Fruits and vegetables of Samoa.

<sup>7</sup> The contribution of Samoa-based soil scientist Dr Nat Tuivavalagi is gratefully acknowledged.

high sunlight (2,500 hours per year or above) coupled with a cooler night temperature. They also prefer well drained and somewhat acidic soils, flourishing at a pH level between 4.5–5.5.<sup>8</sup> Samoan soils are acidic and well drained. The stoniness/rockiness of the soil is a disadvantage in that this precludes mechanised land preparation. However, it also brings with it advantages, particularly as it helps in weed control and the continual release of minerals as the stones and rocks undergo weathering. While Samoa's average rainfall is adequate, its distribution can be an issue, hence appropriate management (e.g. mulching) should be considered during the dry season, especially towards the western end of the main islands. The high potassium (K) requirement of pineapple as opposed to the low K status of Samoan soils is an issue that would need to be addressed by appropriate management techniques, particularly via the addition of organic and/or inorganic fertilisers. See Appendix B for detailed discussion of the suitability of Samoa's agronomic conditions for pineapples.

### ***A significant number of existing growers in place***

The fact that a significant portion of the agricultural areas in Samoa is well suited to pineapple is supported by the fact that many farmers in Upolu and Savai'i are currently growing pineapple successfully on a subsistence, semi-commercial and commercial basis. Also, the Agriculture Component of the Integrating Climate Change Risks in the Agriculture and Health Sectors in Samoa Project has produced maps of Upolu and Savai'i identifying areas suitable for pineapple production.

A survey conducted by the Ministry of Agriculture in October 2012, in preparation for the annual Agricultural Show, found that 80 Upolu farmers and 45 Savai'i farmers had pineapple plantings of ¼ acre or more. Among these, there are some considerably larger plantings, including:

- Tanumapau Farm, Upolu – approximately 10,000 pineapples (10 acres).
- Lueli Te'o, Tapatapao, Upolu – 10 acres.
- Tali Muliaina, Tapatapao, Upolu – 10 acres.
- Fata Leatuafi, Afega, Upolu – 50 acres.
- Gisa Aleaga, Tufutafoe, Savai'i – 10 acres.
- Aiolupo Peresia, Falealupo Savai'i – 10,000 pineapples (50 acres).

<sup>8</sup> Samson, JA 1986, Tropical Fruits, New York: Longman. CTAHR (College of Tropical Agriculture and Human Resources, Department of Tropical Plant and Soil Science, University of Hawaii at Manoa), undated, Farmer's Bookshelf: Pineapple (Information system of tropical crops in Hawaii). Available online at: <http://www.ctahr.hawaii.edu/fb/pineappl/pineappl.htm>. Downloaded 20 October, 2012.



**Figure 1-6** A larger pineapple plantation at Tapatapao, Upolu

At a national level, the current total area under bearing pineapples is estimated at around 130 acres. In Fiji, the average pineapple yield is approximately 7 tonnes per acre (Agricultural Commodities Committee, Pineapple Profile, p. 6). Samoan yields can be assumed to be somewhat similar. Thus, total pineapple production is thought to be in the order of 900 tonnes annually.

This current level of production probably does not provide a sufficient base to develop an export industry. However, there is scope to substantially increase production in a reasonably short time period. Charlie Westerlund of Tanuapau Farms indicated he has sufficient planting material (*fala uli*) available to plant an additional 20 acres. Tanuapau Farms indicated that they could increase production ten-fold if the market was available. The plant spacing for Samoan smallholders is far wider than optimum levels – particularly in the rocky lava soils of western Savai'i. Average plant spacing for Upolu growers would seem about the same as in Fiji (around 32,000 plants per hectare) – with even smaller planting densities observed on Savai'i. In Hawaii, 58,700 plants per hectare is recommended (Bartholomew et.al 2002).<sup>9</sup> In Africa, Samson reports populations of around 70,500 suckers per hectare producing the highest yields for West African producers.<sup>10</sup> Higher planting densities will result in higher yields. It should also result in a smaller proportion of fruit being over 1.5 kg, which is too large for export.

<sup>9</sup> Beds 122 cm from centre to centre, rows 55–60 cm apart within beds, and plants 28 cm apart within rows.

<sup>10</sup> Samson, JA 1986, Tropical Fruits, New York: Longman.



**Figure 1-7 Exceptionally wide spacing at Savai'i's largest pineapple farm at Falealupo Savai'i**

There is sufficient Smooth Cayenne planting material currently available for reasonable production expansion. However, a major expansion in a short time frame would require the introduction of rapid multiplication techniques. There is, however, currently a shortage of Ripley Queen (*fala Samoa*) planting material. The SFA is proposing a program to bulk up *fala Samoa* planting material.

It is reasonable to assume that within five years Samoa would be capable of producing 3,000–5,000 tonnes of pineapples – if there is year-round pineapple production and an export market becomes available.

### ***The involvement of a major agribusiness entity***

The push for pineapple export market development is largely driven by Tanumapua Farm / Ah Liki Wholesale. Ah Liki Wholesale (ALW) is a leading business entity that operates a number of integrated agro-enterprises. ALW's core business is the distribution of consumer goods to village stores throughout Samoa and to the Farmer Joe supermarket chain. ALW is Samoa's largest poultry producer and maize grower. Tanumapua Farm's pineapple plantation is located adjacent to poultry sheds, with poultry manure being the source of fertiliser. ALW has a meat cannery and will open a brewery at the end of 2012. It is envisaged that brewery waste will also be used as fertiliser for pineapples.



**Figure 1-8 Tanumapua Farm's pineapple farm adjacent the poultry shed**

ALW imports fresh and frozen food products from New Zealand in 20 foot reefer containers. On average, twenty containers are imported each month. Virtually all of these containers return to New Zealand empty, providing an outstanding back-loading opportunity. ALW also has links with Polynesian Shipping Line.

This significant agribusiness interest in the development of the pineapple industry sets Samoa distinctly apart from the other Pacific island pineapple-exporting countries (i.e. Fiji, New Caledonia and Vanuatu).

### ***The involvement of the Samoan Farmers Association***

The SFA is actively involved in the development of the pineapple industry. Among the SFA's core functions are:

- Improving the linkages between small commercial farmers and produce marketers
- Planting material production and distribution
- Facilitating the transfer of appropriate technology to farmers.

The SFA Strategic Plan<sup>11</sup> lists its role in pineapple development as an example of the implementation of these core functions.

Tanumapua Farm / ALW is a member of the SFA. The SFA plans to operate as an extension outreach program for smallholders supplying pineapples to ALW. The specific focus is on off-season pineapple production, which is planned to involve 'farmer to farmer' technology transfers from a 'sister' farmer association in Fiji. SFA's 2013 work plan also includes a program of bulking-up *fala Samoa* planting

<sup>11</sup> Samoa Farmers Association (SFA): A Strategic Plan for a Sustainable Future, November 2011

material, which is in short supply. It is proposed that the technology of rapid planting material multiplication be included in the ‘farmer to farmer’ exchange.

### ***Favourable freight rates***

The New Zealand companies interviewed for this study all cited the high freight rates from Pacific island countries as a major disadvantage when compared to countries such as the Philippines. For Fiji, the current cost of a 20 foot reefer container is USD2,300. However, Samoa is currently well placed in terms of freight costs. The cooler containers coming from New Zealand return empty. Thus, the cost of getting the empty container back to New Zealand is factored into the inward freight charge. The base rate for bringing a reefer container from Auckland is currently on average around NZD5,000. Thus, attractive outward freight rates back to New Zealand are on offer. Charlie Westerlund, Chairman of ALW, cites development freight rates of NZD1,000–1,500. Once the exports have been established, outward freight rates could be expected to increase. However, Westerlund doubts if these would exceed NZD2,000 for the near future. There are currently two vessels servicing New Zealand from Samoa – with a vessel departing on average every 10 days.

## **1.2.2 Disadvantages**

### ***High farmer price expectations***

Most farmers interviewed had relatively high price expectations for their pineapples. Current farmgate prices range from 3–15 tala per fruit, depending on the size of the fruit. These prices are far too high for significant market development in New Zealand.

An exception to high price expectation was found with Savai’i’s largest pineapple grower, located at Falealupu. From October–March, this grower sends small truck loads (average 300 fruit) of pineapples to Apia for sale to traders. Two loads a week are sent from October–November through to February–March, with three loads a week sent in December through to January. For small pineapples (<1.5 kg), the wholesale price in Apia is 0.5 tala per fruit; for large pineapple (>1.5 kg), the wholesale price is 1 tala. This grower has been selling to traders in Apia for over a decade and has found it be a financially worthwhile enterprise. At these prices, it would be feasible to establish a significant export market. There is also considerable scope for improving the profitability of growing pineapples in western Savai’i (and elsewhere in Samoa) by improving yields (closer planting) and achieving year-round production. Gross margin analysis shows that good grower returns can be achieved at these prices (Table 1-4).

### ***Relatively low yields***

As discussed above, pineapple yields in Samoa are quite low – which is a factor contributing to the generally high price expectations of farmers. Yields could be significantly improved through closer plant spacing. Closer plant spacing would bring with it additional benefits in the form of smaller average fruit size (necessary for exports), improved weed control and thus reduced costs and better soil conservation outcomes from planting in rows.



Figure 1-9 Pineapples sold road side at Salelavalu, Savai'i



Figure 1-10 Pineapples for sale at 50 sene at Falealupo, Savai'i

### ***Absence of year round production***

A fundamental constraint to the development of the Samoan pineapple industry, for both domestic and export markets, is the lack of year round availability. The SFA is proposing to address this constraint by bringing to Samoa “farmer to farmer” technical expertise from Fiji. This constraint needs to be resolved before significant export market development can occur.

### Shortage of Ripley Queen planting material

The New Zealand market investigation indicated greater initial scope for developing a differentiated niche market for Ripley Queen (*Fala Samoa*) pineapple than for Smooth Cayenne (*Fala vuli*). While there is a reasonable supply of Smooth Cayenne planting material available, there is currently a shortage of Ripley Queen planting material. The bulking up of *Fala Samoa* has been identified as a priority by the SFA.

## 1.3 Likely Returns to Growers from Selling Pineapples for Exports

Over the last three years, the average landed price (for customs purposes) of pineapples in New Zealand has been NZD1.33 (WST2.47) per kilogram (Table 1-2). It could be expected that a high quality, differentiated Samoa pineapple capturing a niche market could receive a modest price premium. A price premium of 10% would have translated to an average landed price of NZD1.46/kg (WST2.72/kg) over that three year period. At that price, a Samoan exporter could afford to pay a relatively isolated pineapple farmer in western Savai'i a farm gate price of around 1 tala/kg (Table 1-3).<sup>12</sup> A price of 1 tala per kilogram is significantly below the current price expectations of most Upolu growers – although Upolu growers could expect a somewhat higher farmgate price for export pineapples because of their lower local transportation costs. A farmgate price of 1 tala/kg would, however, meet the current price expectations of the largest Savai'i pineapple farmer.

**Table 1-3 The estimated farm gate price per kg payable to a Savai'i grower for export pineapples**

	NZD	SAT
<b>New Zealand landed price per kg</b>	<b>1.46</b>	<b>2.72</b>
Freight and discharge charges (NZD 1,785/container)	0.22	0.41
<b>Samoa fob price</b>	<b>1.24</b>	<b>2.31</b>
<b>fob marketing costs</b>		<b>1.32</b>
Marketing margin for exporter @ 10% of fob price	0.12	0.23
Containing loading and quarantine charges (SAT 350/container)		0.04
Cartons (SAT 3.50/9 kgs)		0.39
Cleaning, grading and loading (8 tonnes 4 days x 10 people x SAT 24/day)		0.12
Utilities (water/electrical/telecommunications)		0.12
Transport from western Savaii (1 tonne pineapple, truck hire SAT 250, ferry charge SAT 170)		0.42
<b>Farm gate price payable to western Savaii grower per kg</b>		<b>0.98</b>

The returns to a farmer receiving a farm gate price of 1 tala per kg could be substantially improved by increasing yield (increasing planting density). Table 1-4 presents an estimated budget for a 3 acre pineapple farm.<sup>13</sup> This farmer plants an acre each year, which comes into production in the second year. There is at least one ratoon before replanting on new land. The planting density is 20,000 pineapples per acre (about 50% higher than the average planting density observed in Samoa). Although Samoan farmers tend not to use fertiliser, the budget allows for the application of fertiliser. As Dr Nat Tuivavalagi notes in Appendix B of this report: “The high K requirement of pineapple as opposed to the low K status of Samoan soils have been mentioned, but this is an issue that could be

<sup>12</sup> The budget is based on the freight rates indicated by Charlie Westerlund of Ah Liki Wholesale.

<sup>13</sup> This budget is derived from budgets presented in the Fiji Agricultural Commodities Committee: Pineapple Profile: A Programme for the Development of the Pineapple Industry 1985. An effort has been made to adjust the budget to Samoan conditions. In particular, it is not possible to use tractors in land preparation because of the rocky conditions. It is recommended that resources be devoted to preparing farm management budgets specifically for Samoan conditions.



addressed by appropriate management techniques, especially via the addition of organic and/or inorganic fertilisers”.

Over a ten year period, the average annual gross margin from this enterprise is around WST30,000. If this enterprise was operated by an extended family utilising its own labour, the return to person day of labour is estimated at nearly WST160.

**Table 1-4 Estimated farm budget for 3 acre pineapple farm (2 acres bearing)**

Year	1	2	3	4	5	6	7	8	9	10	total
Area planted (acres)	1	2	3	3	3	3	3	3	3	3	
Area bearing (acres)		1	2	2	2	2	2	2	2	2	
Plants	20,000	40,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	
Production kgs (average weight per fruit 1.2 kgs)		24,000	48,000	48,000	48,000	48,000	48,000	48,000	48,000	48,000	408,000
<b>Revenue (1 tala/kg)</b>		24,000	48,000	48,000	48,000	48,000	48,000	48,000	48,000	48,000	408,000
<b>Costs</b>											-
<b>Labour inputs</b>											-
<b>Clearing and planting</b>											-
labour inputs (person days)	40	40	40	40	40	40	40	40	40	40	400
Cost (24 tala/day)	960	960	960	960	960	960	960	960	960	960	9,600
<b>Weeding (3 x year @ 15 person days/acre planted)</b>											-
labour inputs (person days)	45	90	135	135	135	135	135	135	135	135	1,215
Cost (24 tala/day)	1,080	2,160	3,240	3,240	3,240	3,240	3,240	3,240	3,240	3,240	29,160
<b>Fertiliser application (10 days/acre planted)</b>											-
labour inputs (person days)	240	480	720	720	720	720	720	720	720	720	6,480
Cost (24 tala/day)	10	20	30	30	30	30	30	30	30	30	270
Cost (24 tala/day)	240	480	720	720	720	720	720	720	720	720	6,480
<b>Hormone application (2 days/acre bearing)</b>											-
labour inputs (person days)		48	48	48	48	48	48	48	48	48	432
Cost (24 tala/day)		2	4	4	4	4	4	4	4	4	34
Cost (24 tala/day)		48	96	96	96	96	96	96	96	96	816
<b>Harvesting and grading (@ 20 person day per acre bearing)</b>											-
labour inputs (person days)		20	40	40	40	40	40	40	40	40	340
Cost (24 tala/day)		480	960	960	960	960	960	960	960	960	8,160
Total labour inputs (person days)	95	172	249	249	249	249	249	249	249	249	2,259
Total labour costs (tala)	2,280	4,128	5,976	5,976	5,976	5,976	5,976	5,976	5,976	5,976	54,216
<b>Purchased in puts</b>											-
Planting material (@ 15 sene/sucker)	3,000	3,000									6,000
Fertiliser											-
Quantity (50 gms/plant/year) kgs	1,000	2,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	27,000
Cost (1 tala/kg)	1,000	2,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	27,000
Fruiting hormone (epherphon)											-
Quantity (1mm/10 pineapples) litres		2	4	4	4	4	4	4	4	4	34
Cost (100 tala /litre)		200	400	400	400	400	400	400	400	400	3,400
Implements, tools and protective clothing (SAT)	2000	1000	1000	2000	1000	1000	2000	1000	1000	2000	14,000
Total non-labour costs	6,000	6,200	4,400	5,400	4,400	4,400	5,400	4,400	4,400	5,400	50,400
<b>Total costs</b>	<b>8,280</b>	<b>10,328</b>	<b>10,376</b>	<b>11,376</b>	<b>10,376</b>	<b>10,376</b>	<b>11,376</b>	<b>10,376</b>	<b>10,376</b>	<b>11,376</b>	<b>104,616</b>
<b>Cash flow</b>	<b>- 8,280</b>	<b>13,672</b>	<b>37,624</b>	<b>36,624</b>	<b>37,624</b>	<b>37,624</b>	<b>36,624</b>	<b>37,624</b>	<b>37,624</b>	<b>36,624</b>	<b>303,384</b>
<b>Average annual gross margin</b>	<b>30,338</b>										
<b>Average annual return to labour (tala/person day)</b>	<b>158</b>										

## 1.4 Benefits vs. the Costs of Securing Market Access for Pineapples

Samoa could reasonably expect to export around 200 tonnes of pineapples annually within two to three years. This projection is based on suitable agronomic conditions, grower interest and a high level of agribusiness involvement. The income generated from these exports would be in the vicinity of WST400,000, which would make pineapples Samoa’s largest agricultural export earner. However, the necessary private investment in the development of the industry will only be forthcoming if market access is in place.

New Zealand market access for Samoan pineapples would seem assured with the application of a relatively modest effort. Samoan pineapple varieties are not a fruit fly host. Fiji, New Caledonia and

Vanuatu already have market access for the same varieties. ***It is recommended that the Pacific Horticultural and Agricultural Market Access Program (PHAMA) helps Samoa to pursue market access for pineapples to New Zealand as a matter of priority.*** The potential benefits from this effort will exceed the costs involved.

## 1.5 Other Options for Pineapple Exports

ALW has expressed interest in investing in pineapple processing. This stems particularly from ALW's operation of a meat canning enterprise. Such an investment would have major implications for the development of Samoa's fresh pineapple export industry. A brief scoping was undertaken on the potential market opportunities in New Zealand for processed pineapples. Interviews were held with two processed pineapple importers – Service Food Ltd and Davis Trading Ltd (see Appendix A for interview notes).

### 1.5.1 Canned Pineapples

The consensus of those interviewed is that canned pineapples are a low value product – the price of which has been falling in recent years. The main suppliers are Thailand, Indonesia, India and Australia (Golden Circle). Australia is now finding it difficult to compete with Asian suppliers. Canned product from Thailand sells for USD15.50 free on board (FOB) for a carton of six A10 cans (3 kg/can – drained weight 1.97 kg pineapple). It is difficult to see how a new entrant Samoan canned product could be competitive and justify the capital cost of setting up a pineapple cannery.

### 1.5.2 Minimally Processed / Fresh Prepared Pineapple

There was trial production of minimally processed pineapple products in Fiji in the early 1990s. This occurred under the auspices of the European Union-funded Micro Pineapple Project at Seaqaqa on the northern island of Vanua Levu. Technical assistance was provided by Dr Richard Beyer from the University of Otago – who at that time held the patent for the process.<sup>14</sup>

Two minimally processed pineapple products were produced:

**Pouched fresh whole fruit:** This is a peeled pineapple with its core retained. The product is blanched and placed in a clear plastic pouch (sizes 1 kg and 750 g – packed 20 to a carton). It is a fresh product with no additives. It can be held for 12 months under refrigeration (2–4 degrees C) – but two months is recommended.

**Cubes:** A semi-processed product (a longer heat treatment because of the greater mechanical damage involved) – still no additives, preservatives or colouring added. 1 cm cubes (or to buyer specifications) sitting in juice packed in a clear plastic pouch. It can be held for 12 months under refrigeration (2–4 degrees C) – but two months is recommended.

An extensive project-funded market study for these products was undertaken in 1995, covering Australia, New Zealand, the United States, Canada, Japan and Korea.<sup>15</sup> At that time, these were innovative products that attracted considerable market interest. The consultant who undertook the study returned 'with a book full of orders'.

<sup>14</sup> This patent has now lapsed.

<sup>15</sup> McGregor, Andrew (1995): A marketing study for pineapple and other tropical fruit from Fiji; with particular emphasis on the Seaqaqa Pineapple Micro Project

Unfortunately, these orders were never realised for three primary reasons:

- The isolation of Seaqaqa from an international port<sup>16</sup>;
- The lack of sustainability of the farmer's cooperative established to manage the enterprise; and
- The absence of agribusiness involvement in the project.

These constraints do not apply to the emerging Samoan pineapple industry. Thus, the current status of the 'freshly prepared / minimally processed' pineapple market in New Zealand was investigated as a part of this market access study.

For most New Zealand consumers, the peeling of pineapples is seen as an onerous task. Thus, they are prepared to pay a significant price premium for this service. Companies interviewed indicated increasing demand for fresh prepared products. As Jack Lum of Jack Lum's Fruit Store notes, "the market demand trend is for pre-packed fresh produce – particularly at the top end of the market".



**Figure 1-11 Fresh prepared pineapples at Jack Lum's Fruit Store – these products account for more than 50% of pineapple sales**

Enquiries were made with two food service companies (Service Food Ltd and Davis Trading) regarding minimally processed pineapples of the type described above. Both companies participated in the 1995 minimally processed pineapple market study. Seventeen years ago, minimally processed food products were a new innovative concept – today, the products are far more common place. Thus, it is not surprising that current interest in minimally processed pineapples is not as great as it was in 1995. Pouched pineapples are now readily available in New Zealand – although these do not appear to combine the attributes of extended shelf life with freshness that was a feature of the produce from Seaqaqa. Davis Trading Ltd did express interest in trialling such a product. Davis Trading's Commercial Sales Manager Rob Hammond commented: "There could be real interest in pouched

<sup>16</sup> An assessment of the Project at the time noted: the existing transportation arrangements are far from satisfactory and must be improved for the long term sustainability of pineapple development in Vanua Levu – despite viability exporting to New Zealand. Currently pineapples are shipped out of Nabuawalu to Suva for transshipment to New Zealand. It is a two hour trip from the Seaqaqa packing facility to Nabuawalu.

*fresh pineapple (whole pineapple and pizza cut); the juice bars we supply particularly come to mind. You would need an actual product to test this market”.*

A relatively small capital investment would be necessary to produce sufficient product to test the market, along the lines suggested by Davis Trading. This contrasts with the situation for canned pineapples, where substantial initial capital investment would be required to test the market.

ALW is seen to be particularly well placed to develop minimally processed pineapple products, due to a combination of factors:

- There are other Samoan products, such as breadfruit, that are amenable to minimal processing.
- ALW already operates ‘processing type’ facilities (e.g. a brewery) and could be used to undertake minimal processing product trials.
- ALW would have a ready initial market for pouched pineapples through the company’s supermarkets.
- Technical assistance in establishing the minimal processing facility would be available from Fiji-based Dr Richard Beyer. Dr Beyer is currently actively involved in other Samoa projects through the Scientific Research Organisation of Samoa.

## **1.6 Recommendations with Respect to Pineapples**

- 1. Proceed with seeking New Zealand market access for Samoan pineapples.**
- 2. Investigate the feasibility of developing a protocol that would allow Samoan pineapples to be shipped with their tops on.**
- 3. Source funding for a ‘farmer to farmer’ exchange to introduce off-season pineapple production and rapid planting material techniques.**
- 4. Seek advice and liaison with ALW on the market opportunity for minimally processed pineapple products.**

## 2 Meyer Lemons

### 2.1 Background

During the 1990s, the Samoa Ministry of Agriculture United Nations Development Programme (UNDP) funded Fruit Tree Development Project introduced a range of improved citrus into Samoa (Table 2-1).

**Table 2-1 Citrus introduced into Samoa by the Ministry of Agriculture, Forests, Fisheries and Meteorology UNDP Fruit Tree Development Project**

Type	Variety
Sweet orange	Pineapple, Parson brown, Late Valencia, Cadenera, Rarotonga, Kona, Ruby, Shamouti, Frost Valencia, Tarocco, and Sanguinelli
Grapefruit/pummelo	Red blush, Marsh seedless, Shambar, Star Ruby, Siamese acidless, Asahikan, Termat, Oroblanco, Melogold, Thong Dee, Chandler, Rhein King, K4, K12, K13, K14, K15
Mandarin/tangerine/ X – tangor, tangelo	Kinnow, Clementine, Malvasio, Emperor, Commune, Dancy, Ponkan, Kara, Ellendale, Neapolitana, Wilking, Murcott, Temple, Ortanique, Osceola, Orlando, Minneola, Page, San Jacinto, Fairchild
Limes/lemons	Tahitian, Mexican (West Indian), Bearss, Persian, Niue, Meyer, Villa Franca

Source: Ministry of Agriculture, Forests, Fisheries and Meteorology, Fruit Tree Development Project: Growing and marketing new fruit for Samoa Citrus, May 2001

The Fruit Tree Development Project identified limes (Tahitian and West Indian) and Meyer lemon as good candidates for obtaining a fruit fly non-host quarantine treatment protocol for export to New Zealand. In 1999 and 2000, non-host testing was conducted for these three citrus varieties against Samoa’s two economically important fruit flies (*Bactrocera kirki* and *B. xanthodes*.) All were shown to be a non-host following the test guidelines outlined in the New Zealand Ministry of Agriculture and Fisheries (MAF) Regulatory Authority standard for laboratory cage trials.

A market study, undertaken in 2001 for the Fruit Tree Development Project, identified only limes as having realistic export market potential. To quote:

*“With the exception of limes, there is unlikely to be a place for Samoan citrus in the New Zealand market, even if quarantine constraints could be overcome. Limes, and particularly the West Indian lime, are best suited to growing in tropical conditions. This is not true for most other citrus products. The temperate climate of the New Zealand North Island is well suited to growing most citrus and imports when required can be sourced from large efficient producing countries such as Australia and the United States. For example, New Zealanders consume around 13,500 tonnes of fresh oranges annually, of which 5,500 tonnes are grown locally (Grandison and Atkinson 2000 p, 44). The balance is imported from Australia, California and Mexico. Similarly 6,000 tonnes of mandarins are consumed of which 4,000 tonnes are produced locally, with the balance coming from Australia and California. In case of lemons, New Zealand is a net exporter. Thus there would be little point in Samoa trying to export Meyer lemons to New Zealand, even if non fruit fly status can be secured.”<sup>17</sup>*

The West Indian lime was also not given export market development priority, due to production problems associated with the *Tristeza* virus.

<sup>17</sup> Ministry of Agriculture, Forests, Fisheries and Meteorology, Fruit Tree Development Project: Growing and marketing new fruit for Samoa Citrus, May 2001.

Samoa finally received approval from New Zealand MAF to export limes to New Zealand in September 2009, with exports commencing in August the following year. There are now a couple of companies exporting limes to New Zealand. The SFA is the exporter selling to FDL, and is involved along the entire marketing chain, including:

- Supplying grafted planting material to farmers;
- Providing training to farmers in grafting;
- Harvesting the fruit from the farmers' trees;
- Cleaning the fruit to meet the requirements of the bilateral quarantine agreement;
- Grading the fruit to ensure that it meets market and New Zealand quarantine requirements; and
- Transporting packed fruit to the airport and arranging the documentation for the shipment.

Air freight exports have been during the New Zealand off-season (August–February) and are now averaging around 300 kg per month. The shipments have been well received by the importer and have secured a price premium over lime from other sources (Table 2-2).

**Table 2-2 Samoa's lime exports to New Zealand, 2010**

	Aug	Sept	Oct	Nov	Dec
Samoa imports (kgs)	344	0	449	778	418
Total imports (kgs)	5,812	17,744	20,387	44,436	33,941
Samoa imports as a % of total	6%	0%	2%	2%	1%
cif value Samoan (NZD)	4,361	0	5,263	9,117	4,690
NZD Samoan imports (NZD/kg)	12.68		11.72	11.72	11.22
Average value of import (NZD/kg)	9.97	7.40	7.56	7.30	8.12

Source: Pacific Islands Trade and Investment Commission from Statistics New Zealand

An interview with FDL in October 2012 indicated that the company is happy with the way lime imports from Samoa are developing, although they *"would certainly like a lot more supply and some improvement in the grading"* (see Appendix A).

Many of the SFA members who are supplying limes for export also have Meyer lemon trees. As with Tahitian limes, Meyer lemons thrive in Samoa. Thus, there is now interest in also securing New Zealand market access for Meyer lemons.

## 2.2 The New Zealand Market for Imported Meyer Lemons

The overall market situation for Meyer lemons has not changed since the 2001 Fruit Tree Development Project market study. New Zealand imports lemons from September through March, sourced almost entirely from the United States. In 2011, 584 tonnes of lemons were imported (Table 2-3).

Lemons, compared with Tahitian limes, are a low price product. In 2011, the average landed price of lemons for customs purposes was NZD1.82/kg, compared with NZD7.26/kg for limes. In October 2012, New Zealand-grown lemons were retailing for NZD3.95/kg, compared to NZD29.95/kg for imported limes.

**Table 2-3 New Zealand lemon imports: 2007–2011 (kgs)**

	2007	2008	2009	2010	2011
Australia	4,760	2,142	-	1,500	905
Hong Kong	-	-	-	42	45
India	-	-	50	-	-
Iran	36	-	-	-	-
Somalia	-	-	200	-	-
Syria	-	-	-	150	-
Thailand	-	-	5	-	-
United Arab Emirates	-	-	-	-	740
United Kingdom	-	-	-	5	-
United States of America	721,615	485,271	660,251	493,628	583,694
<b>TOTAL</b>	<b>726,411</b>	<b>487,413</b>	<b>660,506</b>	<b>495,325</b>	<b>585,384</b>

Source: Statistics New Zealand, Overseas Trade



**Figure 2-1 Retail price comparison between Tahitian limes and Meyer lemons**

Neither of the companies interviewed – T&G or FDL – expressed interest in importing lemons from Samoa. FDL noted that occasionally they run out of imported lemons from the United States. At such times, it could be convenient for them to include some Meyer lemon cartons with the consignment of Tahitian limes from SFA. Whether the price and logistics from such *ad hoc* shipments could be justified is another matter.

### 2.3 Likely Returns to Growers from Selling Meyer Lemons for Export

In 2011, the average landed price of lemons for customs purposes was NZD1.82/kg. Samoa does not have the volume to contemplate sea-freighting lemons. Based on the experience with Tahitian limes, the airfreight costs alone would amount to WST2.50/kg (NZD1.35) for shipments up to 1,000 kg.

## **2.4 Benefits vs. the Costs of Securing Market Access for Meyer Lemons**

The benefits from securing New Zealand market access for Meyer lemons are seen as minimal – with exports confined to occasional opportunist sales accompanying Tahitian limes.

Host status testing for Meyer lemons, along with Tahitian and West Indian limes, was conducted in 1999–2000. If re-testing was required by New Zealand, this could not be justified in terms of potential benefits. It would be difficult to even justify the re-submission of 1999/2000 data, as this would divert New Zealand MAF attention away from higher Samoan priorities.



### 3 Ornamental Foliage (Cordyline/Dracaena Leaves)

#### 3.1 Background

Samoaan villagers grow an impressive range of ornamental foliage and other floriculture products. Ornamentals have unique place in the Samoan village context. As Kalara McGregor noted in her thesis<sup>18</sup>:

*“At one level, the house plot provides an opportunity for individual expression. While the matai has the administrative power to decide what is planted in the plantation lots, his jurisdiction does not extend to planting in the house lot. In accordance with traditional roles, the women of the household are generally free to plant as they see fit. In this sense, the house lot is a personal place. A place of one’s own to shape and give form to. It is a place to express creativity and to enjoy the experience of creating something. This creative expression is often fairly competitive. Women will go to great lengths to possess an exotic ornamental. The outward appearance of the garden to neighbours and passers-by is also held in high regard.” (p. 29)*



The leaves of the cordyline/dracaena family (*ti* and *lauti*) are a common feature of the village household garden plot.

These tropical leaves are also an export opportunity for Samoan village women. As noted by the 2008 Australian Centre for International Agricultural Research Scoping Study ‘Developing the ornamentals industry in the Pacific: an opportunity for income generation’:

*“Exotic leaves, particularly some belonging to the cordyline (ti leaf) family, were identified as the best starting point for floriculture exports. These leaves are robust and easy to pack. They are reported to be in strong demand and yield a very efficient weight volume ratio for air-freighting.” (p. 94)*

A number of SFA members are actively involved in ornamental horticulture. They would provide a supply base to develop an export market initially to New Zealand and later Australia. The SFA is now exporting Tahitian limes to FDL, which is also one of New Zealand’s largest floriculture product importer and distributors.

New Zealand, in 2002, published an Import Health Standard for cutflowers and branches of Cordyline and Dracaena species from all countries. Subject to fulfilling the stipulated import conditions, any country would be eligible to export species belonging to these two plant families to New Zealand. Potential exports from Samoa, however, have been rendered impractical by the requirement to declare Samoa free of a long list of pests. A comprehensive pest survey of Cordyline and Dracaena species is required to enable Samoa to sign the required Phytosanitary declaration. The purpose of the current study is to determine if it is worthwhile to devote resources to the required pest survey work.

<sup>18</sup> Kalara McGregor, “The Garden Plot: A Reflection of Samoan Community” Honours Thesis, Bachelor of Landscape Architecture, University of New South Wales, 2001



Figure 3-1 Samoan cordyline (*ti*) leaves

Figure 3-2 Samoan pandanus leaves

### 3.2 The New Zealand Foliage Market

Interviews were conducted with New Zealand's two leading floriculture companies (Appendix A):

- FDL
- Floramax Flower Auctions Ltd (Floramax).

FDL supplies 160 stores (130 stores in the North Island, 30 in the South Island) with retail flower and foliage arrangements. These include the Progressive & Foodstuffs chains.



Figure 3-3 FDL preparing flower arrangements for the distribution to retail markets

Floramax Ltd (a division of T&G) operates Auckland's Dutch System flower auction. The company accounts for approximately 45% of New Zealand's wholesale flower trade and makes 3,000–4,000 sales per auction, which are held three times a week.



Figure 3-4 Floramax flower auction



Figure 3-5 Leather fern imported from the United States by FDL

The global financial crisis has not affected the demand for floriculture products. The demand for flowers and foliage in New Zealand is strong and growing. Roses command the largest volume component of the New Zealand market. Heliconias, gingers and anthuriums are largely for the corporate sector, while the demand for foliage is mainly for the retail flower arrangement sector. During the New Zealand winter months, there tends to be a shortage of foliage as well as flowers.

Foliage is a relatively small but significant market in New Zealand. There is a limited variety of locally grown foliage, due to New Zealand's temperate climate. The dominant local foliage is magnolia –

together with some wax flowers and flax. The main imported foliage is leather fern (from the United States) and Monstera (mainly from Malaysia). Some Dracaena and Cordyline leaves are also imported from Malaysia and Singapore. In 2011, the value of imported foliage<sup>19</sup> was NZD386,000, down from 616,000 in 2007 (Table 3-1).



**Figure 3-6 New Zealand magnolia bunches at FDL**

Some prices observed in October 2012 were:

- Dracaena purchased by FDL from current importers at NZD3.50–4.00 per 10 stem package
- Monstera, auction prices for around NZD6.50 per 5 stem bunch
- Flax – auction prices around NZD2.30–3.60 per 5 stem bunch
- Magnolia – auction prices NZD2.40–3.50 per 5 stem bunch.

**Table 3-1 The landed value (for duty purposes) of New Zealand’s imported foliage (NZD)**

	2007	2008	2009	2010	2011
Australia	32,613	7,370	19,594	18,839	9,398
Canada	13,427	2,662	27,994	34,334	-
China, People's Republic of	66,356	140,523	76,774	6,559	14,037
Fiji	226	1,323	3,568	3,112	6,188
India	41,841	6,815	12,244	12,244	-
Korea, Republic of	1,649	3,345	784	2,598	1,188
Malaysia	343,572	150,739	251,154	334,349	344,448
Netherlands	1,765	-	-	-	-
Singapore	4,239	-	21,476	9,575	-
Thailand	1,495	5,656	1,212	3,329	1,232
United States of America	108,556	95,972	38,233	23,154	9,655
<b>Total</b>	<b>615,739</b>	<b>414,405</b>	<b>453,033</b>	<b>448,093</b>	<b>386,146</b>

Source: Statistics New Zealand, Overseas Trade

<sup>19</sup> Foliage, grasses, branches and other parts of plants without flowers or flower buds; those not elsewhere classified in item no. 0604.91, suitable for bouquets or ornamental purposes, fresh.

### 3.3 Specific Interest in Samoan Foliage

The SFA prepared a portfolio of some 30 foliage types now available in Samoa. This portfolio was presented to the two companies.

#### 3.3.1 Fresh Direct Ltd

FDL noted that to stay relevant with consumers they needed to try to change their 'recipe' (arrangements) every 6 months. For this, they need to introduce new leaves; hence the interest in leaves such as Cordyline and Dracaena from Samoa. Floral Trader Business Analyst, Krishna Avala, identified a range of foliage products on the SFA portfolio that they would be interested importing from Samoa. These foliage products include:

- *Calathea* sp (*makoyana*, *insignis*)
- *Dracaena* sp (*thaliodes*, *fragrans*)
- *Pandanus babtistsii*
- *Zamia furfuracea*
- *Lycopodium cernuum*
- *Cordyline fruticosa* (various colours)
- *Philodendron* sp (various types)
- *Monstera deliciosa*

Product images for these products are provided in Figure 3-7.

FDL expressed interest in other foliage types in the SFA portfolio – although they had no previous experience with these types.

FDL are keen to commence the process of importing foliage from Samoa using the already established links with the SFA. It was FDL that made the initial enquiry to SFA re: supplying foliage. It was recommended that this should commence with a visit by the SFA Field Officer (Tuaifaiva Lasa Aiono) to FDL in Auckland. A one week attachment with FDL is envisaged. She would bring with her samples of Samoan foliage for testing in FDL's retail flower arrangements. A special quarantine permit would need to be obtained for the foliage sample shipment.<sup>20</sup> It was suggested that Lasa Aiono should directly participate in the floral design process using the Samoan foliage. A major objective of the visit would be to acquaint SFA with FDL's grading and packing requirements and to gauge market opportunities. Cutflower and foliage exports from Samoa to New Zealand would be subject to airfreight. Currently, there are seven flights per week from Apia into Auckland, using both wide-bodied and narrow-bodied aircraft. Utilisation of available capacity is currently running at around 50% on wide-bodied flights, and at around 30% on narrow-bodied flights.

Samoa currently has market access into New Zealand for *Anthurium andraeanum*, *Alpinia* spp, *Heliconia* spp and *Zingiber* spp. Access for *Dracaena* spp and *Cordyline* spp. is subject to fulfilling Biosecurity New Zealand's import conditions, which in turn can only be determined by knowing the pest profile of *Dracaena* spp and *Cordyline* spp in Samoa. Therefore, a survey of species belonging to these two plant families in Samoa is inevitable. Despite New Zealand's import conditions for cutflower and/or foliage of *Dracaena* spp and *Cordyline* spp, there currently is no record of any country exporting these two products to New Zealand.

<sup>20</sup> There is precedence for such an arrangement. New Zealand MAF issued a special permit for Samoan floriculture products used at the "Cloud" during the 2011 Rugby World Cup.

Figure 3-7 Images of Samoa foliage products with which FDL had previous positive marketing experience



### 3.3.2 Floramax

Floramax is not involved in buying of floriculture products. The company's core business is the operation of an auction market. Some specific comments and recommendations made by Andre Van der Kwaak, Floramax General Manager:

- A trial shipment is required to test the market. Start with “gentle” trials before commercial shipments. You need to “find your niche”.
- Floramax will not be buying the product. They can guide and facilitate and provide feedback – “as we have done for Fiji's Golden Corrie who has supplied the auction market with small quantities of gingers, heliconias and anthuriums over the years”.
- 500 bunches a week and scaling up to 1000 bunches would be appropriate for selling through the auction system.

## 3.4 Samoa's Comparative Advantage in Exporting Foliage to New Zealand

Samoa's advantages and disadvantages in exporting foliage New Zealand market can be listed as follows:

### 3.4.1 Advantages

- The identified leaves are robust and simple to pack. It should be relatively easy to meet the quarantine requirement for no live insects, and have a very efficient weight:volume ratio for air-freighting.<sup>21</sup> This contrasts to the situation with gingers, where past attempts at exports from Samoa were unsuccessful.
- Samoan village women have a long-standing cultural tradition of household garden beautification – which potentially provides a substantial supply base of foliage for export.
- A number of SFA members are actively involved in ornamental horticulture – which provides an immediate source of supply for export. The SFA Field Officer has particular expertise and a passion for floriculture products.
- Foliage has not been planted with income generation in mind. Thus village suppliers do not have unrealistic price expectations, which can preclude competitive exports.
- The identified importer (FDL) is keen to receive the product and made the initial supply enquiry to the identified exporter (SFA).
- The marketing channel is already in place. SFA has an established business relationship through Tahitian limes with FDL, which is a major floriculture product distributor. SFA and FDL have now developed the mutual trust necessary to develop sustainable exports. FDL has shown a willingness to work with and mentor SFA in its export development endeavours. The family of the FDL founders have a long-term relationship with Samoa.
- Initial trial shipments can be “piggy backed” on the existing exports of Tahitian limes. This makes it practical and economic to start small and to grow exports in line with the development of the market.

<sup>21</sup> There are approximately 100 dracaena/cordyline leaves per kg, compared with 5 to 10 heliconia/ginger blooms per kg.

### 3.4.2 Disadvantages

- Commercial exports of *Cordyline* spp and *Dracaena* spp foliage are currently not practical because of the requirement for Samoan Quarantine to certify that Samoa is free of a long list of pests. An up-to-date pest list for these two plant families that is accepted by New Zealand is required to remove this constraint.

## 3.5 Likely Returns to Growers from Selling Foliage

FDL are purchasing a 10 stem package (bunches) of dracaena/cordyline for NZD3.50–NZD4.00. This translates to a New Zealand landed price of around NZD3.00. At this price, a Samoan exporter could afford to pay a village grower around 28 sene per leaf, allowing a 15% marketing margin for the SFA (Table 3-2).<sup>22</sup> This would seem to be an attractive reward for a villager whose initial motivation for planting the foliage was not income generation. However, serious consideration should be given to lowering the grower price (to say 20 sene) to make Samoan foliage more attractive to New Zealand buyers and thereby expand the market and increase the returns flowing to village-based growers.

**Table 3-2 Estimated farm gate price for 10 leaf bunches of foliage (dracaena/cordyline) payable to an Upolu grower**

	NZD	SAT
<b>New Zealand landed price per 10 leaf bunch</b>	<b>3.00</b>	<b>5.58</b>
Freight (500 bunches approx 110 kgs @ a freight and discharge rate of SAT 2.70/kg)		0.59
<b>Samoa fob price</b>		<b>4.98</b>
<b>fob marketing costs</b>		<b>2.12</b>
Marketing margin for exporter @ 15% of fob price		0.75
Ground handling and quarantine charges (@ 20 sene/kg plus 12 tala per shipment)		0.05
Cartons and other packing material (SAT 2.50/10 bunches)		0.25
Cutting cleaning, grading and loading (500 boxes - 2 persons for two days at 34tala/day plus 200 tala transport)		0.67
Utilities (water/electrical/telecommunications)		0.10
Transport to airport (@ 150 tala per trip)		0.30
<b>Farm gate for 10 leaf bunch</b>		<b>2.86</b>

## 3.6 Benefits vs. the Costs of Securing Workable Market Access for Samoan Foliage

Given the advantages described above, Samoa is well placed to establish a small but viable trade in the export of foliage to New Zealand. This builds on the success achieved with the development of Tahitian lime exports. As with limes, the value of foliage exports will be relatively small – likely to be in the vicinity of WST50,000 to WST100,000 per annum. However, given the size and structure of Samoan agriculture, an appropriate export development strategy would be “to do a number of small things well, with the sum of these activities adding up to significant income generation”. In the case of limes and foliage exports, there are a number of synergies that generate economies for both products that could enhance long term viability. Thus, it would be well worthwhile for the Samoan Market Access Working Group (MAWG) to consider devoting resources to develop the required pest list for cordyline and dracaena to enable export of foliage to New Zealand.

<sup>22</sup> The budget is based on the shipment of 500 x 10 leaf bunches. The weight of 5,000 standard cordyline/dracaena leaves is approximately 100 kg. The consignment will require 50 light weight cartons with an approximate weight of 10 kg. Consignments of up to 1,000 kg currently incur a freight rate of WST2.50/kg.



### **3.7 Recommendations with Respect to Foliage**

- 1. Proceed with the development of the required pest list for the identified foliage products.**
- 2. Obtain funding for a SFA Field Officer to meet with the identified New Zealand buyer to discuss the specifics of exporting foliage to New Zealand and to test market samples of Samoan foliage. This activity should proceed in parallel with recommendation 1.**
- 3. Facilitate quarantine clearance for samples of Samoan foliage to be taken to New Zealand by a SFA Field Officer.**

## 4 Limitations

URS Corporation Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of AusAID and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the Contract dated 20 January 2011.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared in October 2012 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Appendix A

Appendix A Consolidated New Zealand Meeting Notes Compiled by the Author and Joe Fuavao (Knowledge and Research Manager, Pacific Islands Trade & Invest, Auckland)<sup>23</sup>

Company/agency	Operations	Market Overview	Prices	Competition	Market Challenges and Opportunities
<b>PINEAPPLES</b>					
<p><b>TURNERS AND GROWERS</b>                      Paula Coombes – Sales Executive  <i>paula.coombes@turnersandgrowers.com</i>                      Patrick Corson – Imports Manager  <i>patrick.corson@turnersandgrowers.com</i></p>	<ul style="list-style-type: none"> <li>Currently importing pineapples from Fiji.</li> <li>Have been four airfreight shipments (Less than full container load [LFC] 30–40 loose cartons)</li> <li>These are the rough skin “Ripley Queen”. Quite large pineapples for Ripley Queen (approaching 1 kg in weight).</li> <li>Would like to import pineapples from both Fiji and Samoa to give a reasonable supply base.</li> <li>Would be good if a protocol could be developed to allow these pineapples to be shipped with their tops on.</li> </ul>	<p><u>Market preferences</u>                      Trend in the market is toward pre-packed fresh produce.                      For pineapples, size of the fruit needs to be about 1–1.5 kg. A 3 kg pineapple is too large. The Dole “Gold variety” has become the industry standard and is well accepted. Recommends staying away from smooth cayenne variety as there is no demand for it in the market (<i>doesn’t realise that “Gold” is a selected smooth cayenne – and for quarantine purposes is classified as SK – Samoa would need to do the same</i>).</p> <p><u>Biosecurity requirements</u></p> <ul style="list-style-type: none"> <li>In the past you could only import pineapples green at the time of shipment and they had to be 55% or more SK parentage. Now you can ship pineapples with a yellow shell colour and they are not restricted to 55% SK parentage. This has resulted in significant marketing advantages.                             <ul style="list-style-type: none"> <li>Good quality pineapples can now be imported from the Philippines.</li> <li>Rough skin (Ripley Queen) pineapple can now be imported from Fiji and presumably Samoa.</li> </ul> </li> <li>While pineapples are permitted to be imported with the crowns on, the issue is weed seeds, with which New Zealand MAF is particularly strict.</li> </ul> <p><u>Dole packaging the industry standard</u></p> <ul style="list-style-type: none"> <li>Pineapples are packed in a flat tray type with a lid</li> <li>Pineapples are laid flat</li> <li>8–10 kg corrugated cardboard carton depending on the size of the pineapple</li> <li>Small size = 10–11 count</li> <li>Medium size = 7–9 count</li> <li>Large size = 5 count</li> </ul>	<p><u>Wholesale prices</u>                      Dole: \$20.00–25.00 per tray                      Fiji: about \$5.00 each</p> <p><u>Retail prices</u></p> <ul style="list-style-type: none"> <li>Dole Gold: normally \$2.99–3.99</li> <li>Competes on the market by heavy discounting and promotion. Some times during promotion specials, prices fall to \$1.99 per pineapple.</li> </ul> <p>Over the 5-year period 2007 to 2011, the averaged landed price (value for customs purpose) for Philippines pineapple has ranged from \$1.04 to \$1.53 per kg. In 2011, the price was \$1.28/kg.</p>	<p><u>Market share</u></p> <ul style="list-style-type: none"> <li>Dole from the Philippines (around 97% market share), Del Monte around 3% (previously from Ecuador but now also from the Philippines).</li> </ul> <p>Over the 5-year period 2007–2011, 90% of imports came from the Philippines and 10% from Ecuador – all shipped on banana boats. In 2011, almost 100% of imports came from the Philippines. Imports in 2011 5,900 tonnes, down from 8,400 tonnes in 2007. Decline largely due to the withdrawal of Ecuador as an exporter.</p> <ul style="list-style-type: none"> <li>Market Gardeners Ltd is the sole importer of Dole pineapple.</li> <li>Freshmax is the sole importer of Del Monte. This creates a problem for companies like T&amp;G that don’t have pineapple in their product line.</li> </ul> <p><u>Philippines imports</u>                      Pineapples are brought in on a chartered vessel to ship bananas – pineapples and papaya piggy back on the banana boat. New Zealand imports around 50,000 tonnes of bananas annually, compared with around 6,000 tonnes of pineapples.</p> <p><u>Samoa</u>                      Cannot compete with Dole head on. In the market, the Samoan variety needs to be identified as something special, which it probably is. (<i>While it is a SK variety – just like Dole Gold is – it should be marketed with an attractive name associated with Samoa.</i>) It will probably take a little time for Samoan pineapple to be established in the market.</p> <ul style="list-style-type: none"> <li>Needs to be priced competitively against the Philippines. The price could be a little bit higher than the Philippines but not greatly different.</li> <li>Patrick Corson agreed to come back with an indicative landed price for Samoan pineapple</li> </ul>	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>There is a good opportunity for Samoan pineapples.</li> <li>Very interested in sourcing pineapples from both Fiji and Samoa. Provided Charlie Westerlund’s Ah Liki Wholesale contract details for them to follow-up</li> <li>This will depend on the variety shipped – it will be important to differentiate the product in the market from Dole Gold. Must be sweet with reasonable size, keeping quality and price. A good name and labelling will be important.</li> <li>The main demand will come from independent retailers and specialist fruit stores who are not tied to Dole.</li> <li>Suggests there would be a market for one 20 foot full container load (FCL) every 10 days from Samoa.</li> <li>Importing pineapples with the crown on could be a point of difference for Samoa. (getting a suitable and accepted quarantine treatment will be a challenge).</li> </ul> <p><u>Challenges</u></p> <ul style="list-style-type: none"> <li>T&amp;G experience in Fiji has been poor postharvest practices – this should be sorted out from the outset by Samoa.</li> <li>Poor packaging. The Pacific Islands should not skimp on packaging.</li> <li>Cost of freight from the Pacific Islands is high. However, they were surprised how low the freight rates being quoted by ALW were. Warned that freight rates can change abruptly.</li> <li>Stressed the importance of having year-round supply. No good just being in the market during the main season.</li> </ul>

<sup>23</sup> It should be noted that views expressed by the interviewed parties do not necessarily represent quarantine requirements.

## Appendix A

Company/agency	Operations	Market Overview	Prices	Competition	Market Challenges and Opportunities
<p><b>FRESH DIRECT LTD</b>                      Doug Hamilton – Import Manager  <i>dhamilton@freshdirect.co.nz</i>                      John Hunter – Produce Trader  <i>jhunter@freshdirect.co.nz</i>                      Krishna Avala – Floral Trader Business Analyst  <i>kavala@freshdirect.co.nz</i>                      Jeffery Turner – Chairman  <i>jturner@freshdirect.co.nz</i></p>	<ul style="list-style-type: none"> <li>Currently not importing fresh pineapples but very interested in finding a reliable source. Previously sourced pineapple from Australia, Thailand, New Caledonia, and Fiji.</li> <li>Looking to diversify into the frozen and semi-processed market. Expressed an interest in pouched minimally processed pineapples.</li> </ul>	<p><u>Market overview</u></p> <ul style="list-style-type: none"> <li>The market trend: toward prepack, fresh but ready-to-use food. The problem with pineapples is that they are quite inconvenient.</li> <li>No future in airfreighting pineapples; they must be sea freighted to be competitive.</li> </ul> <p><u>Packaging</u></p> <ul style="list-style-type: none"> <li>Dole packs their pineapples in 5–9 count.</li> <li>Supermarkets demand 8 count.</li> <li>Fruit World (speciality independent) demand 7 count.</li> <li>Jack Lum (speciality independent generally buys 5 count – but sometimes takes 9 count for specially occasions.</li> </ul>	<ul style="list-style-type: none"> <li>The landed price from Fiji was \$4 to \$5 per pineapple, which was too expensive to develop a worthwhile market.</li> <li>The approximate rule of the thumb for determining a competitive landed price is to take 50% of the retail price.</li> </ul>	<ul style="list-style-type: none"> <li>Dole is the standard and dominates the market – large shipments and from time to time large discounts. Have completely pushed Australia out of the market.</li> <li>FDL trialled product from Australia in recent years – quality regarded as good but size small.</li> <li>Fiji regarded as better flavour than the Philippines. However, price too high and supply too inconsistent to compete. If they could sea freight, they could compete for a niche of the market.</li> </ul>	<ul style="list-style-type: none"> <li>Biosecurity: weed seeds in the pineapple crowns. Also need to be cleaned from the main body of the pineapples.</li> <li>Philippines pineapples are now considered low cost product.</li> <li>Shipping schedules and costs for the Pacific islands problematic. While they look quite favourable from Samoa at present, these can suddenly change.</li> <li>Pacific island countries (PIC) challenges: price, brand and packaging.</li> <li>Incentive at the national level for packaging.</li> </ul>
<p><b>JACK LUM &amp; CO. LTD</b>                      Jack Lum</p>	<p>Operates a speciality high quality fruit shop. Previously was the manager for Fruit World – the largest independent fruit chain. Previously interviewed Jack Lum in 2003 re: the New Zealand pineapple market when undertaking the market study for the ADB Alternative Livelihoods Project for the Fiji Sugar industry.</p> <ul style="list-style-type: none"> <li>Has sourced both Fiji and Philippines pineapples. His customers like the Fiji pineapples but find them too expensive.</li> <li>Now buys fresh pineapples from Dole and then repack them using the Dole brand labels. Would be happy to include a full flavour Samoan pineapple in his line.</li> <li>Pre-packed pineapples sell better than fresh pineapples. The most popular are pineapple cuts and slices.</li> </ul>	<p><u>Market overview</u></p> <ul style="list-style-type: none"> <li>The market demand trend is for pre-packed fresh produce – particularly at the top end of the market.</li> <li>Ripley Queen from Fiji: does not have a good shelf life but has better eating.</li> </ul> <p><u>Packaging</u></p> <ul style="list-style-type: none"> <li>Dole packs pineapples in 5–9 count cartons.</li> <li>The supermarkets prefer 8 count.</li> <li>The independent Fruit World chain want 7 count.</li> <li>Jack Lum generally buys 5 count and 9 count for specially occasions. Thus he does buy larger and smaller fruit than the norm.</li> </ul>	<p>Wholesale prices</p> <ul style="list-style-type: none"> <li>Fiji: \$5.00–6.00 per pineapple.</li> <li>Dole: around \$4.00 per pineapple.</li> </ul> <p><u>Retail prices</u></p> <ul style="list-style-type: none"> <li>Dole: \$3.99–\$5.99, the latter being for a 5 count. 2–2.4 kg fruit.</li> <li>Fiji: \$6.99, consumer resistance to this price.</li> </ul>	<ul style="list-style-type: none"> <li>Philippines entered the market with “Gold” about 5–6 years ago. Although “Gold” was just starting to enter the market in 2003 when Jack Lum was previously interviewed.</li> <li>Has all year-round availability – which is a major advantage which would need to be matched.</li> <li>A feature of Gold is excellent shelf life (about 2 weeks). Good to start testing Samoan pineapples for their shelf life.</li> </ul> <p><u>Fiji</u></p> <ul style="list-style-type: none"> <li>Priced too high to be able to develop any significant market.</li> <li>Fiji pineapples come in full colour and go off quickly (poor shelf life).</li> <li>Much better flavour than the Philippines.</li> </ul>	<p><u>Challenges</u></p> <ul style="list-style-type: none"> <li>Fiji pineapples are expensive; more than double the price of the Philippines.</li> <li>Cost of freight from the Pacific Islands is high.</li> <li>Fiji: poor shelf life.</li> </ul> <p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>Good opportunity for Pacific Island pineapples based on flavour (might want to consider organic certification to differentiate the product in the market).</li> <li>Might sell better with the crowns on.</li> <li>PICs should aim for nothing less than half green (colour break).</li> </ul>

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Company/agency	Operations	Market Overview	Prices	Competition	Market Challenges and Opportunities
<p><b>TROPICAL FRESH LTD</b> Bobby Kumaran <i>bobby@tropicalfresh.co.nz</i></p>	<p>Tropical Fresh is a longstanding company that specialises in importing produce from the Pacific islands, particularly Fiji. Imports cocoa from Papua New Guinea and coconuts from Solomon Islands.</p> <p>Interested in importing from Samoa:</p> <ul style="list-style-type: none"> <li>Pineapples.</li> <li>Drinking coconuts – looking for one 20 foot FCL a month (has been in discussion with Afamasaga).</li> </ul> <p>Would be feasible to ship pineapples with coconuts – no ethylene released, temperature would be OK.</p>	<p><u>Market overview</u></p> <ul style="list-style-type: none"> <li>Consumers: Pacific Islanders who are looking for that familiar taste in the market. The taste of home. Certainly coconuts and probably pineapples could take advantage of this. This provides a significant niche market opportunity.</li> <li>Good market size for a pineapple is about 1.5 kg.</li> </ul>	<p><u>Pricing structure for fresh produce in New Zealand</u></p> <p>Wholesale margin is about 15%. Retail margin is about 35–40%.</p> <ul style="list-style-type: none"> <li>FOB prices for coconuts from Tonga – \$0.80–0.90 for drinking coconuts, \$0.70 for dried nuts</li> </ul>	<p><u>Philippines pineapples</u></p> <ul style="list-style-type: none"> <li>Ships at colour break – ripening controlled by the use of ethylene scrubbers.</li> </ul> <p><u>Fiji</u></p> <ul style="list-style-type: none"> <li>T&amp;G were bringing pineapples from Fiji about a month back. This has now ceased.</li> <li>The product was good, however the price was too high.</li> <li>Ran into quarantine problems with weed seeds. Were treated with high pressure air – previously water.</li> <li>Farm gate price: \$1.40.</li> </ul> <p>It will be necessary for PIC exporter to go head to head with Dole for about 1–2 months to become established in the market. This will involve having a comparable price.</p>	<p><u>Challenges</u></p> <ul style="list-style-type: none"> <li>Must be shipped at least colour.</li> <li>PIC exporters must be willing to accept a realistic competitive price.</li> <li>Must be able to supply year round.</li> </ul> <p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>For fresh pineapple exports to be feasible, the product need to land in New Zealand for less than \$2.00/fruit – around \$1.50 would be good. This price provides for a reasonable margin to build volume.</li> <li>Fiji or Samoa would need at least one 20 foot FCL every 10 days to provide a basis for reasonable competition with the Philippines.</li> </ul>
<p><b>SERVICE FOODS LTD</b> Aneil Balar – Director <i>aneil@servicefoods.co.nz</i> Deepak Prabhu – Business Development Manager <i>deepak@servicefoods.co.nz</i></p>	<p>Service Foods Ltd is one of New Zealand's larger food service companies. Customers range from the food service (restaurants and cafes) to the food manufacturers. Particularly interested in meeting company because they were the company that looked at sourced pouched pineapple from Fiji in the mid-1990s. The company has since changed ownership and moved its headquarters from Christchurch to Auckland.</p>	<p><u>Market overview</u></p> <ul style="list-style-type: none"> <li>Drive from food manufacturers for lower costs.</li> <li>Pineapple chunks demand from the Asian population. Chinese customers are looking for pineapple in heavy syrup for sweet &amp; sour dishes.</li> <li>Market for pizza cuts, and pineapple slices.</li> <li>The service foods market is price and labour sensitive.</li> <li>The market is for canned product rather than pouched. Sees the only advantage for pouched product is that it reduces waste disposal costs.</li> <li>Dole offers both a canned and pouched product. Dole is regarded at the top end of the processed pineapple market. Sees them as overpriced compared with competitors.</li> <li>Suggested that Pizza Hut could be willing to pay more for a better quality pouched product. They import directly.</li> </ul>	<p><u>Prices of pineapple chunks</u></p> <ul style="list-style-type: none"> <li>A standard A10 can (3 kg), in light syrup, landed price \$3.50/can.</li> <li>Prices have been falling in recent years.</li> <li>Main suppliers are Thailand, Indonesia, India and Australia (Golden Circle).</li> </ul>	<p><u>Competition</u></p> <ul style="list-style-type: none"> <li>Dole has trialed pineapple pouches – but mainly supply A10 cans. Dole regarded at the top end of the canned pineapple market along the Australian Golden Circle. A number of other cheaper brands.</li> <li>The main food service food importers are Service Foods, Davis Trading and Bidvest.</li> </ul>	<p><u>Challenges</u></p> <ul style="list-style-type: none"> <li>Canned pineapples are a low value product – their price has been falling.</li> <li>Difficult to see how a new entrant Samoan canned product could be competitive. High capital cost, low commodity prices. A good quality pouched product might be a possibility. The market for this “fresh” convenience product will largely lie in the retail segment and not so much in the food service industry.</li> </ul>

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Company/agency	Operations	Market Overview	Prices	Competition	Market Challenges and Opportunities
<b>DAVIS TRADING LTD</b> Rob Hammond, Commercial Sales Manager <i>rhammond@davis.com.nz</i>	Davis Trading Ltd is a food ingredient company. They would seem to supply a higher end of the market than Service Foods Ltd. The main reason for the meeting with them was to explore the market for minimally processed fresh pineapple. <ul style="list-style-type: none"> <li>Large supplier of ingredients to the food services and manufacturers.</li> <li>Customers include: Hells Pizza, and juice bars such as Tank Juice Bar (these tend to be the upper end of the market).</li> <li>Currently getting canned pineapples from Thailand.</li> <li>Supplying 3000 cartons of fresh pineapples to the juice bar.</li> <li>Supplying 3000 cases of pizza cut pineapples a month to Hells Pizza and Pizza Hut.</li> </ul>	<u>Market overview</u> <ul style="list-style-type: none"> <li>Market trends: movement away from canned to pouched (fresh flavour) – different perspective than Service Foods Ltd.</li> <li>Hawaiian Pizza (pineapple) is probably the most popular pizza among New Zealand consumers.</li> </ul> <u>Market interest</u> <ul style="list-style-type: none"> <li>Likely interest from gourmet pizza makers such as Hells Pizza for flavour and convenience (they would need to test the product).</li> <li>Thinks the juice bars could be particularly interested as the market trends are looking for something as close to fresh as possible (again, they would need to test the product). Such a fresh product could be less demanding on the juicing machines. Would need to explain the concept to the juice bars with an actual product to test.</li> </ul>	<u>Pricing</u> Canned product from Thailand. USD15.50 FOB, a carton of 6 A10 can (3 kg/can) <ul style="list-style-type: none"> <li>Drain weight 1.97 kg pineapple</li> </ul>		<u>Opportunities</u> Believes there would real interest in pouched pineapple (whole pineapple and pizza cut). You would need a product to actually test the market. However, product could not be way out of line with the price for better quality canned pineapple.
<b>MEYER LEMONS</b>					
<b>TURNERS AND GROWERS</b> Paula Coombes – Sales Executive <i>paula.coombes@turnersandgrowers.com</i> Patrick Corson – Imports Manager <i>patrick.corson@turnersandgrowers.com</i>	There is year-round production of domestic lemons available, with T&G occasionally supplementing from the United States. T&G not interested in finding another source of import.				
<b>FRESH DIRECT LTD</b> Doug Hamilton – Import Manager <i>dhamilton@freshdirect.co.nz</i> John Hunter – Produce Trader <i>jhunter@freshdirect.co.nz</i> Krishna Avala – Floral Trader Business Analyst <i>kavala@freshdirect.co.nz</i> Jeffery Turner Chairman <i>jturner@freshdirect.co.nz</i>	FDL are currently importing a small volume of limes from the SFA and are happy with the way this is developing – would certainly like a lot more supply and some improvement in the grading. <ul style="list-style-type: none"> <li>Main source of supply is local.</li> <li>In the local off season, 5 tonnes a week imported from the United States.</li> <li>Vanuatu started supplying 1 tonne a week.</li> <li>Samoa currently supplying around 300 kg/week.</li> </ul> Not really interested in importing lemons – plenty of local supply available. Might occasionally include some lemons with the SFA limes should they for some reason run out. But certainly not interested in a regular supply.				

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<b>FOLIAGE</b>					
<p><b>FRESH DIRECT LTD</b>                      John Hunter – Produce Trader  <i>jhunter@freshdirect.co.nz</i>                      Krishna Avala – Floral Trader Business Analyst  <i>kavala@freshdirect.co.nz</i></p>	<ul style="list-style-type: none"> <li>FDL supplies 160 stores (130 stores in the North Island), including Progressive &amp; Foodstuffs.</li> <li>FDL have a team of merchandisers who work on selling the flowers and foliage. FDL's arrangement with Progressive: the catch is that FDL owns the product until it is scanned at the counter.</li> <li>To stay relevant to consumers, FDL changes their recipe (arrangement) every month.</li> </ul> <p>6 months of the year we struggle to get flowers and foliage.</p> <ul style="list-style-type: none"> <li>Currently only import a small volume of foliage from Malaysia. Small amount imported direct. They also buy from another local buyer, for example the Monstera leaves.</li> <li>Imports leather ferns from Malaysia and the United States, 25 in a box.</li> </ul>	<p><u>Market volume</u></p> <ul style="list-style-type: none"> <li>Heliconia, gingers and anthuriums are for the corporate market. Foliage is for the retail flower arrangement market. Roses is where the volume is.</li> </ul> <p>Foliage small but significant market. Imports for Singapore (leather fern and monstera).</p>	<p><u>Monstera</u></p> <ul style="list-style-type: none"> <li>\$0.60 a stem, 50 cm (medium grade); however, this is through another buyer.</li> </ul> <p><u>Dracena/cordyline</u></p> <ul style="list-style-type: none"> <li>10 stem packaging.</li> <li>\$3.50–4.00, is what FDL buys from other importers</li> </ul> <p><u>Magnolia</u></p> <p>Locally sourced &lt;40c/stem wholesale</p> <p><u>Packaging standard for foliage</u></p> <p>10 stems to cellophane sleeve and 10 sleeves to box</p>	<ul style="list-style-type: none"> <li>The main imported foliage are leather fern and monstera. Leather fern available six months a year.</li> <li>The main local foliage is magnolia. Also some wax flower and flax.</li> <li>To be competitive, it must wholesale about \$0.40 a stem or less.</li> <li>Stems ideal length – min 45 cm; 55 cm is ideal.</li> <li>FDL stress the importance of consistency as well as price.</li> </ul>	<p><u>Challenges</u></p> <ul style="list-style-type: none"> <li>Keeping up with changing tastes and new offerings being offered by competitors (new hybrids coming on line).</li> <li>Getting packaging right from the outset: need a box that holds in transit. Industry standard for foliage sleeve of 10 pieces with 10 sleeves to a box.</li> <li>Freight is expensive. Of all floriculture products, foliage is the most cost effective in terms of freight (light, can be stacked with no wasted space).</li> <li>Price will be important.</li> </ul> <p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>Excellent opportunity to build on established business relationship with SFA with lime shipments. Opportunities to build on this without having to ship large volumes initially.</li> <li>Samoa has a range of leaves that FDL is specifically interested in (ones that have previously had a positive response in the market). A total of 17 of such foliage types were identified. These included:                             <ul style="list-style-type: none"> <li>— Calathea (velvet touch)</li> <li>— Calathea (makoyana)</li> <li>— Calathea (insignis)</li> <li>— Pandanus (babtists)</li> <li>— Pandanus (babtists variegated Hala)</li> <li>— Cordyline (frutiocosa) Ti leaf (a range of different colours and patterns)</li> <li>— Dracaena (frangans 'Massangeana')</li> <li>— Dracaena (thaliodes)</li> <li>— Dracaena (reflexa) (Pleomelele: 'Song of Jamaica')</li> <li>— Zamia (furfuracea – cardboard palm)</li> <li>— Lycopodium (cernuum)</li> <li>— Philodendron (various types)</li> <li>— Monstera (deliciosa).</li> </ul> </li> <li>Suggested that SFA's Operations Manager Tuaifaiva Lasa Aiono bring samples with her to show FDL exactly what Samoa has to offer and to discuss specific requirements from the New Zealand side.</li> <li>The SFA could then make a trial shipment to FDL with a range of foliage prior to requesting market access.</li> </ul>

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Company/agency	Operations	Market Overview	Prices	Competition	Market Challenges and Opportunities
<p><b>FLORAMAX FLOWER AUCTIONS</b>                      Andre Van der Kwaak – General Manager                      kawaaka@floramax.co.nz</p>	<p><u>Floramax Ltd</u>                      A division of T&amp;G.</p> <ul style="list-style-type: none"> <li>Operates the Dutch System flower auction. Three days a week.</li> <li>The Auckland Flower Auction operates on the Dutch system which is different from Australia. Historical link with the immigrant settlement.</li> <li>The system is all online so it allows other remote buyers to link in.</li> <li>About 3000–4000 sales per auction.</li> <li>6 months of the year (winter period) we struggle to get flowers and foliage.</li> <li>Currently only a small volume of foliage imported from Malaysia.</li> <li>Some imported directly and some goes through the auction system.</li> <li>Small volume of orchids imported from Singapore.</li> <li>Monstera from local suppliers.</li> <li>Imports leather ferns from Malaysia and the United States, 25 in a box.</li> <li>Growers who sell at the auction are paid weekly. The wholesalers that buy pay weekly.</li> </ul>	<p><u>Market overview</u></p> <ul style="list-style-type: none"> <li>The market is “On the day”. Buyers’ reactions are quick. Prices are high now because of the school holidays.</li> <li>The global financial crisis has not affected the flower market. Demand has remained constant.</li> <li>The market for fresh flowers and foliage is a very challenging market.</li> <li>Dracaena and coryline are the most common foliage.</li> <li>Foliage sells better in the summer and for special occasions – weddings etc.</li> </ul> <p><u>Market trends</u></p> <ul style="list-style-type: none"> <li>Worldwide toward pot plants.</li> </ul>	<p><u>Auction market prices</u>                      Prices affected by the reputation of the supplier. Floramax Commission 10 to 18%.</p> <p><u>Heleconias</u></p> <ul style="list-style-type: none"> <li>\$5.00–6.00 each.</li> <li>Prices can go up as far as \$8.00–9.00. All now supplied locally.</li> </ul> <p><u>Flax</u></p> <ul style="list-style-type: none"> <li>The market has plateaued. Generally \$1.50–3.00 per 5 leaves bunch.</li> <li>\$2.30–3.60 per bunch.</li> <li>Flax observed at the auction: \$1.50, \$1.80, \$1.90, \$2.20.</li> </ul> <p><u>Monstera</u></p> <ul style="list-style-type: none"> <li>\$6.50 per bunch (5 stem).</li> </ul> <p><u>Magnolia</u></p> <ul style="list-style-type: none"> <li>5 stem = \$2.40.</li> <li>Prices observed at the auction: \$2.40, \$2.70, \$2.90, \$3.10, \$4.10 per bunch.</li> </ul> <p><u>Anthuriums</u></p> <ul style="list-style-type: none"> <li>New Zealand supply.</li> <li>\$2.00, \$3.80 stems.</li> <li>Demand for anthuriums has fallen.</li> </ul>	<p><u>Market share</u></p> <ul style="list-style-type: none"> <li>Floramax accounts for around 45% of the market.</li> <li>United Flower Growers (another auction house) accounts for 25%.</li> <li>The balance comes from direct buyers such as FDL.</li> </ul> <p>Golden Cowrie from Fiji were selling heliconia through Floramax auction (Floramax were helping to facilitate this). Difficult to compete with the New Zealand heliconia– New Zealand supplier who creates and patented 2 hybrid varieties: (1) Pacific Fire, (2) Pacific Rainbow.</p>	<p><u>Challenges</u></p> <ul style="list-style-type: none"> <li>It is hard to get flowers and foliage from anywhere at the moment due to (1) New Zealand MAF and (2) Freight.</li> <li>New Zealand MAF: Mandatory fumigation?</li> <li>Airfreight expenses.</li> <li>Getting a pest list.</li> </ul> <p><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>Need a trial shipment to test market. Need to find your niche.</li> <li>Floramax can guide and facilitate and provide feedback. Gentle trials before to get it done.</li> <li>500 bunches a week and scaling up to 1000 bunches is what Floramax would be interested in looking at.</li> </ul>



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<p><b>Quarantine issues</b>                      Naca Waqa – New Zealand MAF  <i>Nacanieli.Waqa@maf.govt.nz</i>                      Bob Fullerton – Manager Plant and Food Research  <i>Bob.Fullerton@plantandfood.co.nz</i>                      Mat Porea – Permanent Secretary of Agriculture, Cook Islands  <i>mat.porea@agriculture.gov.ck</i>                      Jack Armstrong – Quarantine treatment specialist  <i>armstrong.jack@xtra.co.nz</i></p>	<ul style="list-style-type: none"> <li>Naca Waqa – Fiji, New Caledonia and Vanuatu have market access for the smooth cayenne, Ripley Queen and <i>veimama</i> (a natural cross with a local variety). The Philippines has market access for smooth cayenne. Thus it will be important for Samoa to be able to identify their varieties to facilitate timely market access.</li> <li>Bob Fullerton confirmed that there are basically two varieties of pineapple – smooth cayenne and Ripley Queen. The Dole “Gold” is smooth cayenne selection out of Hawaii. Samoan pineapples would fall into one of these two categories.</li> <li>Mat Porea worked extensively with pineapples at the University of the South Pacific Alafua campus in the 1970s and 1980s and subsequently the Food and Agriculture Organization Regional Office in Apia. <i>Smooth Cayenne were brought in from Hawaii to plant an acre on the western side of the campus around 1968–69. The other variety – namely Fala Samoa – is the thorny variety better known as the Queensland Ripley Queen – a table pineapple and very sweet. Same line as the ones we see on the market in Fiji also here in the Cook Islands. Those are the main economic varieties in Samoa. There are other Smooth Cayenne type lines but not many.</i></li> <li>There can be little doubt that Samoa’s two varieties are SK and Ripley Queen or combinations of both.</li> <li>Jack Armstrong believes that Ozone (O<sub>3</sub>) has the potential as a quarantine treatment for weed seed on pineapples. Proposing a research project to test. Being able to ship with the tops on would provide a substantial market advantage for Samoa. The cost of Ozone treatment is expected to be relatively low.</li> </ul> <p>Naca Waqa. Samoa foliage. The problem is the additional declaration to issue the phytosanitary certificate. Contains a long list of pests that Samoa Quarantine has to certify Samoa is free of. Thus, Samoa needs a current pest list for foliage. Wilco Liebrechts (EcoConsultant) recently undertook a similar survey for Fiji.</p>				

## Appendix B

# Appendix B Suitability of the Samoan Environment for Pineapple Production<sup>24</sup>

## B.1 Soils of Samoa

The soils of Samoa have been described by Asghar (1988) based on his own research and that of others (including Cable 1985; Kear and Wood 1959; Morrison et al 1986; Schroth 1970; Soil Survey Staff 1985; and Wright 1962 and 1963). In summary, he concluded that:

- In terms of soil origin and classification: The soils are volcanic in origin and are derived from olivine or andesite basalt. A majority of soils in Samoa belong to the Soil Taxonomy Order of Inceptisol;
- The main physical factors of Samoan soils limiting crop production are: Shallow depth of soil; stoniness (including boulders) and rockiness of the soil; steep slope of the land, especially in the central and upland regions; and low water storage capacity, leading to water shortage in some of the north-eastern areas of Upolu and Savai'i;
- In terms of chemical properties:
  - The soils of Samoa are more fertile than expected due to their young age and less intensive cultivation practices (shifting cultivation) being followed widely;
  - The organic matter content of the soils has a profound effect on soil properties. Cation exchange capacity of soil and nutrient status are directly related to the level of soil organic matter. Therefore, good organic matter management is very important in productive agriculture – especially since very little fertiliser is used;
  - Soil pH is generally between 5 and 7; agricultural soils with a pH of less than 4.5 or 4.0 are not common;
  - Soils are strongly leached, especially at high elevations. In particular, potassium levels in soil are low (< 1 me/100 g). The leaching losses of potassium (K) is particularly serious since K is mobile and easily leached, K-fixing clay minerals do not exist to a great extent in Samoa, the soil parent materials are low in K content, the crops being grown have high K requirements, and very little, if any, artificial fertiliser is used to replace K lost by crop/plant uptake and leaching losses;
  - Soils in Samoa fix high amounts (50–100 %) of applied P, thereby significantly reducing (/preventing) its uptake by crops.
- In terms of productivity:
  - Most soils are stony and fairly shallow, and mechanised agriculture is generally not possible. The parent material is basalt, so soils tend to have a good fertility but, because of their frequent shallow and stony nature, productivity is often fair to moderate.
  - The major store of nutrient cations lies in the surface horizon due to organic matter accumulation. Soil fertility decreases rapidly on clearing the land due to fast decomposition of organic matter.

## B.2 Pineapple Requirements

According to the Philippines Department of Agriculture (ROPDA, undated), pineapple grows best in areas where the temperature is mild (24–30°C) and relatively uniform throughout the year, and where

<sup>24</sup> Prepared by Dr Nat Tuivavalagi

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rainfall is 1,000 to 1,500 mm/year and evenly distributed throughout the growing period. They can grow within a wide range of elevation, preferring acidic and well drained soils.

In Hawaii, it is reported (College of Tropical Agriculture and Human Resources [CTAHR], undated) that pineapple seldom has problems with wind and tolerates drought but, in terms of soil types, that soil pH greater than 7.0 should be avoided; acid soils are especially suited to pineapple, particularly where soil pH is between 4.5 and 5.5, which results in a reduction in soil-borne diseases. Good soil drainage is a necessity; where rainfall is high or soils are not well drained, soil management techniques to improve drainage must be used. CTAHR also pointed out that pineapple tolerates low soil fertility (but best production is obtained with high fertility); pineapple also tolerates high levels of soluble soil aluminum and manganese, and does well in soil with high soil organic matter and potassium status.

With regard to fertiliser needs, the Hawaii researchers reported that pineapple has high requirements for fertiliser N, K, and iron (Fe), and relatively low requirements for fertiliser phosphorus (P) and calcium (Ca). K is usually applied to the soil before planting and later may be sidedressed. Other nutrients, sometimes including K, are applied as foliar sprays or through the drip irrigation system, or by both methods, during the plant growth cycle.

### B.3 Suitability of Samoan Soils and Other Conditions

Samoa is generally well suited to pineapple production in view of its climatic and soil conditions. In the agricultural areas of Upolu and Savai'i, the mean annual temperature is 20–27°C, while the mean annual rainfall is 1,500 to 5,000 mm. While average rainfall is adequate, distribution can be an issue, hence appropriate management (e.g. mulching) should be considered during the dry season, especially towards the western end of the main islands.

The soil is excellent for pineapple – acidic and well drained. According to Cowie (1974), the pH values of the topsoil of the various soil types at the Asau block (2,500 ha/6,000 acre block of government land at the western end of Savai'i which is considered moderately to highly suitable for pineapple production) are as follows: 6.7 (Vaisala soil), 6.2 (Sasina), 5.9 (Sataua), 5.7 (Lefaga), 5.4 (Elietoga), and 4.4 (Salega). The stoniness/rockiness of the soil has been mentioned but this has its advantages, particularly as this helps in weed control and the continual release of minerals as the stones and rocks undergo weathering. The high K requirement of pineapple as opposed to the low K status of Samoan soils have been mentioned, but this is an issue that could be addressed by appropriate management techniques, especially via the addition of organic and/or inorganic fertilisers.

The fact that a significant portion of the agricultural areas in Samoa is well suited to pineapple is supported by the fact that many farmers in Upolu and Savai'i are currently growing pineapple successfully on a subsistence, semi-commercial and commercial basis. Also, the Agriculture Component of the Integrating Climate Change Risks in the Agriculture and Health Sectors in Samoa Project has produced maps of Upolu and Savai'i identifying areas suitable for pineapple production.

## Appendix C

### Appendix C Bibliography

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