The market for papaya from Fiji and other Pacific Islands – New Zealand Study

Table 12: Projected New Zealand market for Fijian papaya (tonnes)

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status quo - Fiji industry remains the same</td>
<td>250-270</td>
<td>270-300</td>
<td>300-340</td>
<td>340-390</td>
<td>390-450</td>
</tr>
<tr>
<td>Substantially improved Fiji industry</td>
<td>270-300</td>
<td>300-350</td>
<td>350-450</td>
<td>450-1,100</td>
<td>1,100-2,300</td>
</tr>
</tbody>
</table>

A Project Under the EU – Funded Facilitating Agricultural Commodity Trade Project (FACT)

Authors: Kyle Stice, Andrew McGregor, Sant Kumar and Vinesh Prasad

July 2009
New Zealand Market Analysis – Fiji and Pacific Island Papaya

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1 The New Zealand market for Papaya

1.1 Introduction

The New Zealand component of the market study comprised of a preliminary desk survey, followed by a visit to Auckland for importer consultations from February 10th – February 13th 2009. The team that visited Auckland comprised of Sant Kumar (Natures Way Cooperative), Kyle Stice (Koko Siga Fiji Ltd.) and Vinesh Prasad (SPC FACT). Andrew McGregor and Kyle Stice prepared this report. Coordination of trip logistics and arrangements for all meetings was provided by Ms Louisa Sifakula and Mr Joe Fuavou of the Pacific Islands Trade and Investment Commission (PITIC) Auckland office. A summary of all meetings is provided in Appendix 4.1

1.2 An overview of fresh papaya imports and trends

In 1995, Kokosiga Fiji Ltd conducted an extensive study of the New Zealand market for Fiji papaya. At this time, Fiji and Tonga had yet to establish their high temperature forced air (HTFA) quarantine treatment facilities. The study concluded that papaya sales in New Zealand of 1,000 tonnes at remunerative prices was readily achievable, provided there was continuity of supply and good quality fruit (McGregor 1995). Pacific Produce’s Ron Holt, the only papaya importer at the time, made the following assessment: “only 50% of our requirements are being met by the Cook Islands. We don’t promote papaya because we don’t have the supply - a promotional campaign would substantially increase demand” (McGregor 1995). It has taken more than a decade for New Zealand’s papaya consumption to approach this predicted level. The entry of the Philippines as a significant supplier in 2006, was a significant contributor to the substantial jump in New Zealand papaya consumption.

Table 1: Papaya imports to New Zealand - 2001 to 2008 (tonnes)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2.6</td>
<td>0.6</td>
<td>3.5</td>
<td>7.1</td>
<td>1</td>
</tr>
<tr>
<td>Cook Islands</td>
<td>117.3</td>
<td>137.4</td>
<td>252.7</td>
<td>106.9</td>
<td>53</td>
<td>93.4</td>
<td>42.9</td>
<td>9</td>
</tr>
<tr>
<td>Fiji</td>
<td>131.8</td>
<td>158.7</td>
<td>130.4</td>
<td>233.6</td>
<td>302.7</td>
<td>279.8</td>
<td>190.3</td>
<td>237</td>
</tr>
<tr>
<td>Philippines</td>
<td>6.6</td>
<td>0</td>
<td>8</td>
<td>40.4</td>
<td>119.6</td>
<td>508.7</td>
<td>510.8</td>
<td>716</td>
</tr>
<tr>
<td>Samoa</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9.7</td>
<td>5.4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Thailand</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>35.1</td>
<td>82</td>
<td>59</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tonga</td>
<td>9.4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>265.1</td>
<td>296.1</td>
<td>391.1</td>
<td>393.2</td>
<td>516.4</td>
<td>967.4</td>
<td>810.1</td>
<td>963</td>
</tr>
</tbody>
</table>
The general consensus of the various importers, wholesalers and exporters interviewed was that papaya sales in New Zealand could be substantially expanded, if quality fruit was available, at a competitive price.

Demand for papaya in New Zealand is steady through the year with a slight seasonal decrease in the summer months (December – February), when the New Zealand melons and stone fruit come into season.

At present, there are five suppliers of papaya to New Zealand. In order of magnitude of supply, these are the Philippines, Fiji, Thailand, Cook Islands and Australia (table 1). In the past, Samoa and Tonga have also supplied New Zealand. Table 2 shows the imported price of papaya (value for duty (VFD) NZ$/kg) for the four main suppliers to the New Zealand market (Cook Islands VFD NZ).

Table 2: The price of New Zealand papaya imports (VFD NZ$/kg)

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>1.01</td>
<td>0.92</td>
<td>0.85</td>
<td>0.85</td>
<td>1.18</td>
<td>2.24</td>
<td>3.6</td>
</tr>
<tr>
<td>Fiji</td>
<td>1.35</td>
<td>1.63</td>
<td>1.95</td>
<td>1.95</td>
<td>1.86</td>
<td>2</td>
<td>2.51</td>
</tr>
<tr>
<td>Philippines</td>
<td>2.72</td>
<td>2.34</td>
<td>1.79</td>
<td>2.1</td>
<td>2.03</td>
<td>2.06</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>2.77</td>
<td>2.74</td>
<td>2.57</td>
<td>2.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>2</td>
<td>2.41</td>
<td>2.87</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.3 The structure of the New Zealand papaya market: who are the buyers

Papaya is sold in four distinct segments of the fruit and vegetable market:

- The major supermarket chains
- The speciality fruit and vegetable stores
- The ethnic shops and Indo-Fijian dairies
- The flea markets

These segments are described briefly below.
1.3.1 The major supermarket chains

There are a number of large supermarket chains in New Zealand that represent a majority of all supermarket outlets. It is estimated that these supermarkets represent 47% of the New Zealand papaya market. A summary of the major supermarket chains is provided below.

**Progressive Enterprises Ltd**

Progressive Enterprises Limited holds approximately 42% of the New Zealand grocery market. Operating the Foodtown, Woolworths and Countdown supermarket banner groups, Progressive Enterprises Limited employs some 18,000 people nationwide within 149 supermarkets. Progressive is also the franchise co-ordinator for the FreshChoice and SuperValue banner groups. Wholesaling is conducted through the Supply Chain.

The number of stores by brand, are as follows:

- 56 Woolworths Stores
- 29 Foodtown Stores
- 64 Countdown Stores
- 39 SuperValue Stores
- 14 FreshChoice Stores

Progressive is a subsidiary of the Australian company, Woolworths Limited. Woolworths Limited operates more than 1600 stores in Australia and has over 140,000 employees, making it the second largest employer in Australia.

**Foodstuffs**

Foodstuffs (NZ) Ltd., is the country's largest grocery distributor, operating supermarkets including Pak 'n Save, New World and Four Square.

Kevin Nalder, the CEO of the New Zealand Fresh Produce Importers Association, notes that a major market trend in the New Zealand fresh produce industry is for supermarkets to enforce their own, individual quality standards (pers comm., 13.02.09). Supermarkets will require their suppliers to meet these standards, who in turn, will put pressure down through their supply chain.

At present, the only papaya carried by the super market chains is Dole product, imported from the Philippines. MG Marketing (MGM), the sole distributor of Dole products in New Zealand, have handled Dole papaya for 5 years. Papaya is advertised generically with other Dole products, including bananas and pineapples. MGM were extensively interviewed as part of this market study (appendix 3.1). MGM currently do not handle Fiji papaya, but have expressed interest, if Fiji exporters can meet their requirements.

1.3.2 The speciality fruit and vegetable stores

The New Zealand fresh produce market also consists of a range of specialty fruit and vegetable stores. It is estimated that these specialty fruit and vegetable stores comprise approximately 38% of the NZ papaya market.
Among these fresh fruit and vegetable stores is the Auckland based Fruit World. Fruit World has 26 stores in the Auckland area. Fruit World, unlike most supermarkets, carries a wide selection of fruit types, including exotic tropical fruit.

Fruit World carries both Fijian and Philippine papaya. The Auckland based importer/wholesaler, Darrack Produce Markets Ltd (DPM) is currently the main supplier of Fiji papaya to the speciality fruit stores. DPM buys exclusively from Fiji’s largest exporter Produce Speciality Ltd (PSL). DPM contributed substantially to the study (appendix 4.1). In the past, Turners and Growers supplied the speciality fruit stores with papaya from the Cook Islands and Fiji. Currently, MG Marketing (MGM) supply fruit stores with Dole papaya. Discussions with both companies indicated interest in handling Fiji papaya (appendix 4.1).

Fruit World customers were described by DPM (personal comm., 12.02.09) as having a broad appreciation for multiple varieties of a single fruit type. As such, it is in the supermarkets interest to have multiple suppliers of a particular fruit type.

1.3.3 Ethnic shops

Established by immigrants from across the Asia-Pacific region, it is estimated that ethnic shops comprise approximately 6% of the total market for papaya in New Zealand. The two main companies that were interviewed as part of this study (appendix 3.1) were established by Indo-Fijian immigrants. An overview of these businesses is provided below:

- **Get Fresh** is a small Indo-Fijian vegetable and spice store located in South Auckland. Get Fresh Imports papaya from Fiji in two forms - green for curry and colour break for fresh sales. While some of the produce is sold through the owner’s retail outlet, the bulk is moved through flea markets on Saturday and Sunday.

- **Valley Fruit and Vegetables (VFV)** have direct family links to Mahen’s Exports in the Sigatoka Valley. VFV only handle Fiji produce, including taro imported by sea. The main outlets are the small Indo-Fijian dairies. VFV is the main importer of eggplant from Fiji.

These stores do not have quality and food safety certification requirements. Price is generally the main consideration and quality standards are minimal. For example, newly arrived Fiji papayas were observed at the Get Fresh Store. The green fruit was lying loose in partially smashed cartons. The fruit was significantly damaged by bruising and post harvest diseases.

1.3.4 The flea markets

There are a number of flea markets across New Zealand, where produce is sold in significant volumes directly to shoppers. These flea markets are a primary weekend shopping event for many immigrant families including Pacific Islanders. These flea markets are also a significant outlet for Fiji papaya. It is estimated that the flea markets represent 5 to 10% of the New Zealand papaya market.

The Auckland area has three main flea markets where Fiji papaya is sold, these markets are described briefly below:

1. **Otara Market** – This is New Zealand’s largest street market and is dominated by Polynesian and other ethnic vendors and patrons. Otara Market is open every Saturday from 6 am – 12 noon and is located on Newbury Street, Otara, Auckland City. This market has on average 80 stall holders and up to 5,000 shoppers every Saturday.

2. **Mangere Market** – Significantly smaller than the Otara Market, Mangere Market also provides an outlet for Fiji papaya mostly to Pacific Islanders and other ethnic groups.
living in close proximity to Mangere. This market is open every Saturday from 6 am – 2pm.

3. Avondale Market – The Avondale market located at the Avondale racecourse, Ash Street, West Auckland has many of the same vendors as the Otara market because it is held on a Sunday. Avondale Market has approximately 80 stall holders selling a wide variety of goods including fruits and vegetables. Market is open from 6 am – 12 noon every Sunday.

1.3.5 The current distribution of papaya in the various market segments

Based on the information available through trade statistics and importer consultations, an indicative estimate of the current distribution of papaya between the different market segments in New Zealand has been made and is presented in table 3 below.

Table 3: An indicative estimate of the current distribution of papaya between market segments in New Zealand (2008)

<table>
<thead>
<tr>
<th></th>
<th>tonnes</th>
<th>Philippines share %</th>
<th>Fiji's share %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major supermarkets</td>
<td>450</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Specialty fruit stores</td>
<td>370</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Ethnic shops</td>
<td>60</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Flea markets</td>
<td>85</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>960</td>
<td>70%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Distribution of NZ papaya market outlets

- Major supermarkets: 47%
- Specialty fruit shops: 38%
- Flea markets: 9%
- Ethnic shops: 6%

Share of major supermarkets

- Philippines: 100%
- Fiji: 0%
1.4 The competition: How does Fijian papaya compare

The Nature's Way Cooperative (Fiji) Strategic Plan (2002-2006) noted the lack of competition from other suppliers as a key factor in projecting a substantial expansion in papaya sales to the New Zealand market. To quote:

Fiji now virtually faces no competition on the New Zealand market for papaya and this is expected to remain the situation for the foreseeable future. It is unlikely that the Cook Islands industry will ever return to its former glory. Tonga is not regarded as a serious threat. Tonga's government operated HTFA facility was commissioned just after the Nature's Way facility, but has remained largely idle. Samoa has purchased a small semi commercial unit that is expected to be commissioned in May 2002. Samoa has good production conditions for papaya. However, it does not yet have a papaya industry. Like Tonga the Samoan government will probably want to operate the HTFA facility. Furthermore Samoa has no container carrying aircraft flying to New Zealand (p, 44).

Nature's Way Cooperative's (NWC) market assessment has proven to be correct, with respect to competition from the other Pacific islands. In 2001, when the NWC Strategic Plan was prepared, the Philippines exported only 6.6 tonnes of papaya to New Zealand and in 2002 there were no exports. It is little wonder that the Philippines were not identified as a competitive threat. Since that time, the market landscape has changed dramatically with the Philippines now accounting for over 70% market share.

1.4.1 The Philippines: the dominant player on the market

Over the period 1999 to 2004, the Philippines produced an average of 77,000 tonnes of papaya - making it the world's 14th largest papaya producer (table 1). Japan is the dominant export market for Philippines papaya. Over the period 1999-2004, 93% of the Philippines papaya exports went to Japan.

Trade statistics indicate that the Philippines began shipping papaya to New Zealand in 2002, with significant exports commencing in 2004 (table 1). Since then, exports and market share have expanded rapidly, increasing from 40 tonnes (10% market share) in 2004 to 716 tonnes (74% market share) in 2008. In comparison, Fiji exported 234 tonnes to New Zealand in 2004 and had a market share 59%. By 2008, Fiji was exporting 237 tonnes to New Zealand, with market share falling dramatically to only 25%.

New Zealand papaya imports from the Philippines are shipped by Dole Philippines, a subsidiary of the large US multinational fruit company Dole. Dole Philippines also exports to New Zealand much larger volumes of bananas (56,693 tonnes in 2008, landed value USD 35
New Zealand Market Analysis – Fiji and Pacific Island Papaya

million)\(^4\) and pineapples (6,810 tonnes in 2007). Dole uses papaya as companion to bananas and pineapples, “piggy backing” on the shipping provided by these major products. The same companion product strategy is used in Dole’s papaya exports to Japan. It is also likely to occur when the Philippines commences exporting bananas to Australia.

Papaya imported from the Philippines is the Kapoho solo variety. Marketed as pawpaw in New Zealand, the yellow flesh variety (average size around 600 gms) was the main Hawaiian variety prior to the industry being decimated by PRSV. Kapoho is also the main variety the Philippines exports to Japan.

Dole established its papaya export operation at Davao, on the southern island of Mindanao, in the mid-1990s. This followed the collapse of Dole’s papaya operation on Oahu, due to papaya ring spot virus (PRSV). A destructive strain of PRSV is also present in the Philippines. Pabuayon noted in 2000 that the lower production of papaya in recent years is attributed to papaya ring spot virus (PRSV) infestation in Luzon (p. 13). Noting that the island of Luzon is further north from Mindanao, this could mean that Davao is free from the virus, or that Dole is using production practices to limit the spread of the virus\(^5\). In the meantime PRSV poses a major threat to the expansion of the Philippines papaya industry.

The sole importer of Dole fruit (bananas, pineapples and papaya) from the Philippines is Market Gardeners Ltd (MGs). While MGs exclusive relationship with Dole Philippines was established over a decade ago, the addition of papaya to this arrangement commenced in 2001. Dole bananas, pineapple and papaya are distributed to all the major supermarket chains. All Dole fruit meets the requirements of the supermarkets for quality and food safety certification. To quote MGs promotional material:

Dole implements strict procedures in its facilities and on its farms in conformity with ISO 9001, Good Agricultural Practices (GAP) and/or Hazard Analysis and Critical Control Points (HACCP) rules where recommended or required by applicable law.

Dole expects its independent growers to meet the same standards as Dole-owned farms.

HACCP is a system of guidelines that enables food industry participants to:

- Analyse potential food hazards
- Identify points in operations where food hazards may occur
- Determine which points in operations could be critical to food safety
- Conduct reviews of food hazards, critical control points, and monitoring procedures on a regular basis and upon any changes in operations
- Establish records and provide documentation

Dole’s responsibility to its customers is clear. Both customers and consumers expect products that are free from the risk of chemical, biological and physical contamination. This means that Dole’s fruit and vegetable products must strictly comply with the Maximum Residue Levels (MRLs) of crop protection products. Furthermore, measures are taken to prevent the presence of harmful bacteria (such as salmonella) and other foreign bodies that could potentially find their way into a particular product.

\(^4\) ITC calculations based on COMTRADE statistics.

\(^5\) GMO Compass reports a cooperation project, involving international companies and establishments in India, Indonesia, Thailand, Malaysia, the Philippines and Vietnam to bioengineer a virus-resistant papaya for the South-East Asian region (www.gmo-compass.org/eng/service/). It is reported that the first GMO papaya field-testing began in 2003.
Marketing arrangements

Damian Glengarry\(^6\), MG Manager Imports – Procurement & Logistics reports the following regarding papaya imports from the Philippines. The company charters a vessel every fortnight to ship banana, pineapple and papaya collectively. Approximately 80% of the consignment is bananas (NZ is reported to have the highest per capita consumption of bananas of any country in the world\(^7\)), with most of the balance being pineapples. A relatively small proportion of the consignment is papaya – around 8,000 to 9,000 cartons in the peak season and 3,000 to 4,000 cartons in the low season. Shipments of papaya reached 10,000 cartons in 2007 when the NZ$ exchange rate peaked. Dole papaya “piggy backs” on vessels carrying bananas and pineapples and thus enjoy favourable freight rates. The papaya, as with bananas and pineapples, is shipped in waxed cartons placed on treated wooden pallets. The fruit is subject to vapour heat treatment. The Dole papaya carton has holes to allow for the cold air to circulate through the box. The holes are covered with mesh to prevent the possibility of reinfestation.

The voyage time from the Philippines to Auckland is approximately two weeks. A “banana boat” from the Philippines arrives every two weeks, usually on a Thursday. MGs will try and sell the entire stock of papaya in the first week. The second week in the cycle offers Fiji an opportunity to sell to MGs or their competitors.

Papaya must be harvested at the green stage to ensure sufficient shelf life for the produce once it reaches New Zealand. The presence of Oriental fruit fly in the Philippines is also a factor necessitating the early harvest of fruit to avoid production damage\(^8\). The fruit is ripened

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\(^6\) Damian Glengarry, Imports – Procurement & Logistics, Market Gardeners Limited
106 Hansons Lane, PO Box 8581, Christchurch, New Zealand
Phone: 3 343 7588 Mobile: 21 220 1725 Fax: 3 343 0929
Email: dglengarry@mgmarketing.com.nz

\(^7\) In 2008 New Zealand imported 87,989 tonnes of bananas, yielding a banana per capita consumption of 21kgs

\(^8\) Liquido et al. (1989), undertook a comprehensive study on the infestation rates in papaya for oriental fly. The study involved substantial quantities of fruit being collected at various stages of ripeness (mature green, ¼ ripe, ½ ripe, ¾ ripe and full ripe). Samples were collected at four major papaya
once it reaches New Zealand in MG’s banana ripening rooms. This supply chain results in an inferior product in terms of sweetness and flavour.

Seasonal demand for papaya is not constant, with demand being greater in the winter months from May to August. In the summer months, from November to March, there is competition from locally produced and imported rock melons, honeydew melons and watermelons. Damian Glengarry reports a strong preference for local fruit amongst New Zealand consumers.

Glengarry reports MG’s papaya market share to be about 50-55%. However, trade statistics suggest that papaya from the Philippines has a much higher market share (74% in 2008). The distribution of MG’s papaya sales through New Zealand is approximately:

- Auckland area – 60 to 65%
- Lower North Island – 15 to 20%
- South Island – 15 to 20%

Dole papaya is aggressively promoted through generic Dole advertising at the major supermarket chains. Promotion is supported by MG’s dedicated brand manager and support staff, who conduct regular supermarket visits. Glengarry believes that sales have increased significantly as a result of this advertising.

Glengarry indicated a preference for female fruit because of the larger fruit size that was more popular with New Zealand consumers.

Production areas. The infestation rates for ¼ ripe fruit ranged from 0.90% (Keaau) to 3.83% (Pahoa) and average over 2% for all four areas.
An assessment of Dole papaya

Dole papaya was sampled at Woolworths Supermarket, South Auckland (February 2009). A sample of 12 fruit was examined in store and 3 fruit examined out of store. Papaya was retailing for NZ$5.99/fruit.

**External appearance**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Shape</th>
<th>Size (cm, weight)</th>
<th>Colour</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solo Kapoho</td>
<td>Highly variable between female and hermaphrodite</td>
<td>Female Length – 119.25mm Width – 102.95mm</td>
<td>Bright yellow colour Mostly uniform colour</td>
<td>Mostly clear skin Some green freckles Some stem end physical damage</td>
</tr>
<tr>
<td></td>
<td>Bell shaped to round to true hermaphrodite</td>
<td>Hermaphrodite Length – 129.34mm Width – 95.21mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Internal attributes**

<table>
<thead>
<tr>
<th>Sweetness (Brix)</th>
<th>Cavity size</th>
<th>Taste</th>
<th>Seed presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-12% across all samples</td>
<td>Female Cavity – 46.59 Hermaphrodite Cavity – 50.37</td>
<td>Initial sweet taste is quickly tainted by a bitter taste characteristic of immature – gas ripened fruit.</td>
<td>Much greater in the hermaphrodite than the female.</td>
</tr>
</tbody>
</table>
Future prospects for Philippines papaya

The performance of the Philippines papaya industry has been one of volatility, despite its apparently stronger export performance in recent years. In many respects papaya farmers in the Philippines appear similar to their Fijian counterparts, facing problems of cyclones, disease and poor management.

Pabuayon (2000) “noted that the export shipments of fresh papayas fell abruptly from 3,426 mt in 1994 to only 60 mt in 1998 with value declining from US$839,000 to US$85,000 over the same period” (p, 18). Pabuayon went on to describe the industry:

Philippine papaya which has made inroads in the world market suffers mainly from low supply. Present hectarage (5,500 ha) is lower than in the 1980s (7,170 ha in 1982). Papaya farms in Luzon are adversely affected by PRSV and some have been shifted to other uses. Specific RDE-related problems concern the lack of certified seeds, unreliable determination of harvest maturity, incidence of deformed fruits during summer months, limited cultivars for orchard establishment, variable planting distances, adoption of blanket recommendations on fertilization, less optimum pre-harvest disease control, and poor quality of fruits. Perennial problems in marketing such as lack of standards, use of inappropriate packaging materials, rough handling, and high cost of trading cause inefficiencies in the distribution system. Plantings of the Sinta variety which is moderately resistant to PRSV need to be expanded but the lack of planting materials and information on the required cultural management practices must be addressed.

For papaya, Lizada (1995) noted the limited adoption of technologies such that blanket recommendations on fertilizer application are usually followed and field sanitation and preharvest disease control are not consistently practiced. Among 20 papaya growers in Laguna who planted the Sinta variety and availed of planting materials and technical information from IPB, UPLB, adoption rate for most technologies is relatively high. Not all farmers though apply fertilizer as recommended with some using more and others less while a few do not use at all depending on the farmers’ perception of the fertility level of the soil. Pest and disease control is done as necessary but still some risk-averse farmers especially large ones opt to apply insecticides even if trees are not yet infected. Simple technologies for preparing the product for sale like sorting, cleaning, grading and wrapping with newspaper are widely practiced for the discriminating markets of Laguna and Metro Manila (p, 39).

It is the presence of PRSV that perhaps poses the greatest threat to the future of the Philippines papaya industry.
An assessment of Fiji competitive position with respect to papaya from the Philippines

The major advantages of Philippines papaya

Dole papaya from the Philippines has a number of major advantages compared with Fiji papaya:

- **Substantially reduced marketing costs** – sea freight “piggy backing” on chartered vessels carrying bananas, compared with Fiji papaya that is airfreighted. In early January 2009, the cost of airfreight for a kg of Fijian papaya was $F1.60/kg compared to an average farm gate purchase price of $F0.90/kg. A survey conducted by the Pacific Island Trade and Investment Commission (PITIC) in 2008, reported Philippines papaya was retailing for $NZ1.80/kg less than papaya from Fiji (PITIC 2008). This finding is consistent with the trade data presented in table 2 that shows the average value for duty purposes of papaya from Philippines in 2008 was $NZ 2.06/kg, compared with $2.51/kg for papaya from Fiji. However, a significant prices differential in favour of the Philippines is only a recent phenomenon. Up until 2006, the landed price of Fijian papaya was significantly less than that of Dole papaya from the Philippines - at least in terms of what was declared for customs purposes (table 2). In 2007 the prices were on about parity. The 20% devaluation in the Fiji dollar in April 2009 should significantly increase the competitiveness of Fijian papaya, at least in the short to medium term

- **Infrastructure and marketing system already in place to handle large volumes** Papaya from the Philippines is produced and marketed by one of the world’s largest tropical fruit agribusinesses. The system delivers a steady and substantial supply of fruit of consistent quality. This compares with the small and fragmented companies handling Fiji papaya.

- **The product meets the quality and food safety certification requirements of the supermarket chains** Dole has in place the HACCP, GAP and MRL certification systems increasingly required by the major supermarket chains. This provides access to the largest and fastest growing segment of the market. Fiji does not have access to this segment of the markets until it has such certification systems in place.

The advantages of Fijian papaya

Fiji papaya has advantages when compared with Dole papaya from the Philippines in the following areas:

- **Inherent fruit quality** The soils and climate in the river valleys of Western Viti Levu offer excellent growing conditions for Hawaiian solo “sunrise” variety papaya. A true type “Sunrise” papaya, harvested at colour break or at quarter ripe maturity, consistently produces fruit that combines exceptional sweetness and flavour (high °brix-11%-13%), strong red coloured flesh, with good size characteristics (400 to 600 gm) and good keeping qualities. Emeritus Professor Henry Nakasone, the world renowned University of Hawaii papaya breeder, in his report to the USAID’s Commercial Agriculture Development (CAD) in the early 1990s commented on the exceptional high level of sweetness of papaya grown in Fiji from Hawaii sourced seed (Nakasone 1990). This product is inherently superior to yellow fleshed Kapoho solo grown in the Philippines and harvested at mature green. Turners and Growers Gordon Hogg, a pioneer of papaya imports into New Zealand, described the taste of Dole papaya as “bitter”. However, if Fijian papaya entering the market is to realise this inherent competitive advantage in terms of quality, a number of conditions must be meet:
  - true to type “Sunrise” seed must be used to produce vigorous healthy papaya seedlings for planting by farmers;
  - farmers must apply the correct package of practices, with a particular emphasis on good drainage, irrigation and plant nutrition;
• Fruit must be harvested at the colour break /1/4 ripe stage of maturity
• Fruit needs to be correctly handled, graded and packed.

The consequences of not meeting one or more of these conditions more than offset the inherent quality advantage of Fijian papaya.

• **Proximity to market** Papaya harvested in the Sigatoka Valley can be in Auckland within 48 hours if air freighted and within 4 to 5 days if sent by sea freight. The brix (sweetness and flavour) level of papaya does not increase once it is harvested. Therefore fruit harvested at the ½ ripe stage is significantly sweeter than fruit harvested at colour break. Fruit harvested at the mature green stage, as is the case of fruit imported from the Philippines, is in turn sweeter that fruit harvested at colour break. Air freighted fruit can be harvested at the ¼ to ½ ripe stage and end up on the supermarket shelf at its peak in terms of flavour, sweetness and texture. In the future, fruit could be sea freighted at colour break and be in the hands of the consumer in good condition, in terms of flavour, sweetness and texture.

In contrast, it takes at least 14 days for Dole papaya from the Philippines to reach the market. To provide for sufficient shelf life, the product must be harvested at the mature green stage. The difference in shipping time represents a huge potential competitive advantage for Fijian papaya in terms of fruit quality and continuity of supply. A banana boat from the Philippines arrives every fortnight. Thus the second week in the cycle has been identified as a period of short supply for papaya. For this reason MG’s Manager Imports – Procurement & Logistics has expressed keen interest in sourcing papaya from Fiji to complement their imports from the Philippines.

• **Fiji image** Fiji retains a favourable image in New Zealand – associated with friendly people and a familiar holiday destination. This is despite Fiji’s political instability of recent decades and the accompanying unfavourable media coverage. The spectacular marketing success of Fiji Water has demonstrated that “Product of Fiji” is a brand that sells provided there is a quality product that matches the image.

• **Absence of Papaya Ringspot Virus (PRSV)** The absence of PRSV in Fiji provides a major competitive advantage. A particularly virulent strain of PRSV is reported to be present in the Philippines – although it is not certain if it yet occurs in the Dole production area. When and if PRVS arrives in south eastern Mindanao, there are three strategies available to Dole:
  - Adopting management strategies to counter PRSV. This essentially means continually moving plantings away from infected locations, which means shorter rotations and increased costs.
  - The adoption of Genetically Modified Organism (GMO) varieties. This will however have negative implications for marketing.
  - Abandoning papaya production altogether, as was the case with Dole’s Hawaii papaya project.

**Favourable fruit fly status** The Philippines has three fruit fly species that are of economic importance (oriental fruit fly, melon fly and Philippines fruit fly). Oriental fruit fly is a particularly damaging fruit fly that infests fruit once colour break stage of ripeness is reached. Papaya grown in Fiji is considered a fruit fly host for two fruit fly species (*Bactrocera passiliferae* and *B. xanthodes*). These two species are quarantine pest for papaya but not a production pest. The optimum stage of maturity to harvest papaya for export marketing purposes is ¼ ripe. There is no record of passiliferae or xanthodes being found in papaya at the ½ ripe stage of maturity, let alone the ¼ ripe stage. Thus the minimisation of fruit fly damage is not a consideration in
1.4.2 The Cook Islands: the pioneers of the New Zealand papaya market

The Cook Islands led the way in the development of the papaya market in New Zealand. At its peak in 1986, 555 tonnes were exported from the Cook Islands (Government of the Cook Islands). Since then, these exports have steadily declined to 253 tonnes in 2003. However, since 2003 there has been a precipitous drop in exports, with only 9 tonnes shipped in 2008 (table 1). There have been no exports in 2009 (up until the end of August) (per. com. Daniel Mataroa Nita Growers Association). Most of the papaya farms have now been abandoned or replaced by noni and vegetables. The availability of suitable land on Rarotonga has become an increasing constraint for Cook Islands agriculture. However, a papaya replating program has begun – with 5,000 trees planted by 20 growers in April 2009 (per. com. Daniel Mataroa Nita Growers Association). Another round of planting 5,000 trees is scheduled for November 2009. The Nita Growers Association hope to start exporting a tonne a week in 2010.

The Cook Islands HTFA facility began as a Department of Agriculture. It is now managed and run by the Rarotonga Nita Growers Association. However, the facility requires recertification. Changes are currently being made to the harvesting methods to reduce handling. The major problem faced by the Cook Islands facility has been the dependency on one commodity - papaya. The high fixed cost structure of a quarantine treatment operation means that the working capital position of the business can deteriorate rapidly if there major disruption to produce supply. This is exactly what happened with Fiji's great flood on January 2009. In the six months leading to the flood there was steady increase in throughput. At the end of 2008 NWC had a healthy operating account balance. The flood subsided in mid-January and throughput fell away sharply as shown in the figure 1.

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9 USDA currently has a project in place to eradicate Oriental fruit fly from the Puna District of Hawaii. The main justification for the project is to improve fruit quality (McGregor 2007). The fruit for export to the US mainland is harvested at the mature green stage to reduce fruit fly damage. Eradication of Oriental fruit fly would enable the fruit to be harvested at the ¼ to ½ ripe stage prior to quarantine treatment (eradiation) and shipment to the Mainland. The later harvesting would lead to a substantial improvement in fruit quality.
The Cook Islands can no longer be regarded as a player on the New Zealand market. However, the larger yellow fleshed Waimanalo solo grown by the Cook Islands set the standard of what papaya should be in the eyes of the average New Zealand consumer. As T&G’s Gordon Hogg noted “supermarkets always preferred the size of the Cook Island papaya over that from Fiji”.

### 1.4.3 Australia

Australia commenced papaya exports to New Zealand in 2004. To-date, the volumes have been very small (table 1). Currently, Australia is allowed to export irradiated mangoes, papaya and lychees to New Zealand. This fruit fly treatment is undertaken at a Brisbane based facility. Before any commodities can be irradiated for quarantine purposes and sold for human consumption in Australia and New Zealand, Food Standards Australia NZ must approve the use of irradiation for food safety purposes. This is quite a lengthy and costly process. FSANZ has currently approved 8 tropical fruits (mango, papaya, breadfruit, lychee, rambutan, mangosteen and 2 others). The Australian horticulture industry is working to put a submission to them for a wide range of other commodities that currently rely on dimethoate (as it’s use is currently under review) to manage fruit fly. A detailed discussion of the Australian industry is presented in the Australian market study.

It is possible that Australia could become a substantial competitor on the New Zealand papaya market, putting additional pressure on Fiji’s exporters. The Australian market study found the quality of Australian papaya has improved significantly in recent years. However, how much consumer resistance there will be to irradiated fruit remains to be seen.

### 1.4.4 Other Pacific Islands

Tonga, Samoa, New Caledonia and Vanuatu have in place bilateral quarantine agreements for the export of papaya utilizing HTFA quarantine. However, the exports of these countries have been insignificant. These industries are discussed briefly below.
Tonga

Both Fiji and Tonga were the direct beneficiaries of USAID’s HTFA Project. There were two aspects of this project; the first part was to transfer the technology developed by the USDA, the second was to develop the business to commercially operate the quarantine treatment facility. USAID’s requirement that quarantine treatment be the responsibility of the private sector (industry) was a major departure from the tradition of government operated quarantine treatment in the Pacific islands. In both countries there was considerable resistance to the concept of private sector responsibility. However, in Fiji the concept prevailed and today there is a thriving and growing industry in the export of fruit fly host commodities. In Tonga, government took control of the HTFA facility at the completion of the USAID Project. NZAID funding was obtained to build a modern packing facility at the international airport in which an identical treatment facility to Fiji was installed. The Tongan HTFA Project was a failure. Tonga no longer exports any fruit fly host material to New Zealand and the last exports of papaya was in 2001 when 9.1 tonnes were shipped (table 1).

Samoa

A research/semi commercial HTFA facility was established at the Department of Agriculture’s Atele Horticulture Centre in 2002 and began operations in 2003. The facility has the capacity to treat up to 300 kgs of fruit in a run. The intention was to first to develop treatment protocols and BQAs before establishing a commercial scale unit at the Faleolo Airport. BQA have been negotiated with New Zealand for papaya and breadfruit successful trial shipments of both products have been made.

A feasibility study for the commercialization of Samoa’s HTFA operations conducted in 1997 concluded that the only way for Samoa to successfully develop commercial exports of fruit fly host products was through an appropriate form of public private sector partnership (McGregor 2007). The feasibility study suggested that two forms of PPPs to operate in parallel:

- A modest sized (2 tonne capacity) HTFA facility owned and operated by the industry with government/donor funds used to meet start-up costs (The “Fiji model”).
- The Atele treatment equipment to be leased to a business already involved in related activities.

The commercial HTFA feasibility study saw breadfruit as the core product with papaya being a subsidiary product. However, no action has been taken on these recommendations. When the Atele facility was established it was expected that papaya might be the core product for a commercial HTFA facility. Markets were identified in New Zealand. The agronomic conditions prevailing in Samoa were seen a quite similar to those of the main papaya growing areas in Hawaii. However, the performance of papaya in Samoa to date has been disappointing. Major fungal diseases (particularly rot and stem rots) have been encountered with the Sunrise variety that has been planted. Also under Samoan conditions the self life of the fruit has been quite poor. In contrast Fiji is proving itself to have a comparative advantage in growing this variety.

Work continues at Atele to select papaya varieties that have good eating and keeping qualities and have disease resistance. Some encouraging initial results are being achieved in identifying a larger red fleshed variety that may have excellent niche market opportunities in New Zealand, particularly if it can be branded as a Samoa product. If this selection is successful, papaya will be an important complementary product for a future commercial HTFA facility. However, for the foreseeable future it is unlikely to be the core product that was originally envisaged.

New Caledonia and Vanuatu

Vanuatu and New Caledonia both have commercial scale HTFA facilities. The Vanuatu facility is owned by a local supermarket owner. It has a large capacity but has had insufficient throughput to approach viability. Small quantities of papaya, citrus and eggplant have been exported to New Zealand. The constraints have been availability of supply and limited airfreight capacity to New Zealand.
The New Caledonia facility is run as a quasi-government operation used to treat citrus for export to New Zealand. No data is available to assess performance and viability.

1.5 The processed papaya market

1.5.1 Dried fruit

The Auckland-based Pacific Islands Trade and Investment Commission (PITIC) undertook a major study of the New Zealand dried fruit market in 2004. A number of the respondents from the PITIC Study were interviewed as part of this study and confirmed the findings of the PITIC study (appendix 4.1). These included International Foods and Davis Trading Ltd. Davis Trading is one of New Zealand's largest importers and distributors of processed and packaged food, including dried fruit. Company buys dried papaya in bulk from Thailand and repacks for retail outlets or blends with other dried fruits.

**Marketing Opportunities for Pacific Island Exporters**

There are limited opportunities in New Zealand for Pacific Island suppliers to sell dehydrated tropical fruit, for the following reasons:

1. The market is currently well supplied, and not showing any significant growth.
2. Any new supplier looking to sell standard, dehydrated product will have to meet the market on price. As the market is dominated by Thailand, which is a country with a low wage structure, as well as greater economies of scale, Pacific Island processors may find it difficult to compete.

However, there are opportunities to develop a small, but comparatively high value market in the "health/specialty foods" segment, for organically grown, dried fruit, or for fruit that is processed without added sugar or preservatives (or a combination of the two). One New Zealand importer of organic foods is buying organic dried bananas from Pitcairn Island. However, supplies are inconsistent and organic certification hard to obtain. Any exporter that is able to consistently provide a range of quality certified solar dried fruit would be bound to find interest. Many of the larger importers of dried fruit may not be interested in dealing with such a low volume item. Those who specialise is supplying the retail sector would be more likely to be interested in this type of product, as would companies who sell gourmet food products direct to consumers by catalogue or via the internet.

As Fiji's papaya production increases so will the availability of low cost raw material suitable for drying. Dr Michael Williamson, the New Zealand-based engineer who developed the High Temperature Force Air (HTFA) units in the Pacific islands, is currently working on modifying the HTFA technology to enable it to efficiently produce high-quality dried fruit. The combination of low cost raw material and appropriate drying technology can be expected to expand the opportunities for commercial dried fruit production.

The following New Zealand buyers of dried fruit were identified in the PITIC study:

**Marsanta Foods Ltd**

P O Box 3168, Auckland

Contact: Jeoff Healy  Tel: 64-9-573 0587; Fax: 64 9 573 0292

Email: jeoff.healy@marsanta.co.nz

Web site: www.marsanta.co.nz

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New Zealand Market Analysis – Fiji and Pacific Island Papaya

One of New Zealand’s leading importers of natural food ingredients, specialising in dried fruit and nuts. Sells in bulk to industrial, food service and wholesale companies. They do import some organic product, but have received little demand for organically grown dried tropical fruit. All their suppliers must have Agri-Quality organic certification (see www.agriquality.co.nz).

They are a sister company to Harvest Traders (see below) which has more of a retail focus.

**Harvest Traders**

P O Box 12758, Penrose, Auckland

Contact: Hamish Harper

Tel: 64-9-622 4198; Fax: 64-9-622 4199

Email: hamish@harvest-traders.co.nz

Harvest Traders specialise in selling dried fruits and nuts into the retail sector. They sell a full range of dehydrated tropical fruits, mainly ex Thailand. They have dabbled in organically grown dried fruit, and are interested to hear from new suppliers who can offer competitively priced solar dried organic or conventionally grown tropical fruits.

**Real Foods Ltd**

P O Box 2339, Auckland

Contact: Tony Jennings

Tel: 64-9-256 4280; Fax: 64-9-256 1015

Email: tonyj@realfoods.co.nz

Importers/ Brokers and Distributors of a wide range of natural foods, including dried fruit and nuts. Sell into both the industrial and food service sectors, as well into supermarkets and other retail outlets. They are starting to import some organically grown dried fruit, although the demand is still quite small.

**Davis Trading**

P O Box 9907 Newmarket Auckland

Contact: Daniel Coates

Tel: 64-9-574 2250; Fax: 64-9-573 0055

Email: dcoates@davis.co.nz

Davis Trading is a major importer and distributors of food ingredients, including dried fruit and nuts, and sells mainly to industrial users and the food service industry. They sell some dried tropical fruit, but do not have strong demand from their customers for these products, except for crystallized ginger, which is showing good growth.

**Tasti Products Ltd**

P O Box 45013

Te Atatu North

Auckland

Contact: Gareth Dalton

Tel: 64-9-834 7199; Fax: 64-9-834 3389

Email: garethd@tasti.co.nz

Tasti Products Ltd is one of the main importers of preserved ginger from Fiji, which they repack and sell under their own brand. They also use dried papaya and dried pineapple for use in their breakfast cereals, but they chose to buy these from a local trader rather than import them directly.
Raw Energy

9 Pukeiti Rd Otahuhu
Auckland
Contact: Adel Yousef
Tel: 64-9-276 0826
Fax: 64-9-276 0828
Email: adel@rng.co.nz

Raw Energy imports a range of food products, with an emphasis on herbs, spices, grains, pulses, nuts and dried fruit. They sell in bulk to the public as well as through other wholesalers and directly to retail outlets. This is a small, family owned business with strong links into the ethnic food market.

Brooke Holdings Ltd

9a Appollo Drive Mairangi Bay, Auckland
Contact: Trevor Walsh
Tel: 64-9-476 2088; Fax: 64-9-476 2089
Email: brookehl@xtra.co.nz

Brooke Holdings import a range of ingredients for use in the food industry, including dried fruit. They import tropical dried fruit in bulk from Thailand, including pineapple, mango, papaya, guava, ginger and some banana. Their main customers for these products are cereal manufacturers.

Kauri NZ Ltd

P O Box 173 85
Wellington Auckland Office
Contact: David Hunt Contact: Trevor Newell
Tel: 64-4-476 0105 Tel: 64-9-278 7263
Fax: 64-4-476 0161 Fax: 64-9-278-9057
Email: david@kauri.co.nz Email: trevor@kauri.co.nz

Kauri NZ Ltd supply food ingredients and raw materials, including dried tropical fruit and crystallized ginger, which they mainly source from Thailand. They sell to food manufacturers and food service distributors. They could be interested in solar dried or organically grown fruit, as they believe that new products and new variations could help to stimulate the market.

1.5.2 Fruit pulps and puree

Auckland based Pacific Islands Trade and Investment Commission (PITIC) undertook a major study of the New Zealand dried, pulp and puree fruit market in 2004. The findings of this study are summarised below

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Tropical fruit pulps are essentially commodities that are traded in large quantities internationally. Quality issues aside, new suppliers have to meet the market price, otherwise they will not be considered. This is particularly true of the most popular fruits such as pineapple, where the end products are competing in mass consumer markets. Any fruit processing company in the Pacific Islands will find it very difficult to compete with large producers from low cost countries such as Thailand and the Philippines.

Consequently, Pacific Island suppliers need to concentrate on producing products suitable for use in food that is targeted towards the top end of the market. One obvious opportunity is the market for organically grown tropical fruit pulps. Although demand in New Zealand is small – possibly only sufficient to fill several containers per year, the market is steady, and some say it is growing.

This is not to say that there is no potential for Pacific Island suppliers to sell non-organic tropical fruit pulps in New Zealand. Importers are always interested in talking to new suppliers, particularly regarding those fruit that are prone to seasonal shortages such as passionfruit and mango. However, there is a general perception that Pacific Island suppliers are unlikely to be very reliable and so any new exporter will have to work very hard to counteract this negative reputation.

An important exception has been Agrana Fruit Australia which oversees the management of an operation in Fiji which processes tropical fruit purees. Its main products are Banana, Guava and Mango available in both organic and non organic certified forms. Agrana Fruit Fiji operates in Sigatoka. Locally managed, this business also produces a range of drinks and drink concentrates in cans and plastic bottles as well as canned jams and tomato sauce all for the local retail and catering market.

Agrana’s organic certification details are as follows:

- Certifier is Australian Certified Organic
- Certification is for both producer and processor
- Certification complies with both USFDA and EEC regulation 2092/91.
- Australian Certified Organic is a member of IFOAM – the international organic organisation

Fruit for this processing facility is sourced from farms across Viti Levu and processed on site into 20lt aseptic packs.

Agrana (Fiji) producers between 1,000 to 2,000 tonnes of puree products annually, requiring 2,500 to 3,500 tonnes of raw material annually. The main market for these products has been in baby food. For Agrana (Fiji), organic certification has been critical in gaining market access in face of competition with lower cost producer. Papaya puree has desirable characteristics as a baby food ingredient, particularly because of its high nutrient content. Agrana (Fiji) are interested in including organic papaya to their product range once sufficient volumes of reject organic papaya is available in reasonably low price.

1.6 The organic and non-GMO market

In recent years, the consumer demand for organic foods in supermarkets has grown. As a result of this social change, supermarkets have moved to offer organic produce alongside standard items. Auckland's Victoria Park New World was the first supermarket in New Zealand

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12End-users of banana puree in the United States can source product for $US0.30/kg from Central America. The landed cost of banana puree from Fiji is $US1.10/kg to which has to be added brokerage and duty.

13 One cup mashed papaya contains; Vitamin A – 2516 IU, Vitamin C – 142 mg, Vitamin B1 (thiamine) - .06 mg, Vitamin B2 (riboflavin) - .07 mg, Niacin - .77 mg, Folate – 87 mcg, Potassium – 591 mg, Phosphorus – 12 mg, Magnesium – 6.9 mg, Calcium – 55 mg, iron - .23 mg. Also contains trace amounts of iron, zinc, manganese and copper.
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to receive organic certification. Organic grocery shopping is now possible, thanks to the increase in organic produce in mainstream supermarkets throughout New Zealand. It remains only a small portion of the food products available, but despite this (and the higher cost of organic products) the demand for organically produced food continues to increase.

Similarly, the genetic modification of foods for human consumption has been a subject of debate in recent years. In 2001, market research group ACNielsen found that over 45% of households choose not to buy products that contained genetically engineered ingredients. Regardless of social opinion and an ongoing debate over the presence of genetically engineered crops in New Zealand, labelling of foods containing genetically modified ingredients is not compulsory.

There is an opportunity to develop markets based on environmental sustainability, capitalising on the increasing health concerns and environmental awareness of consumers in importing countries. Fiji has a number of distinct advantages in developing certified organic (products grown in a sustainable manner without artificial chemicals) industries:

- The general perception of Fiji (with some justification) being a relatively unpolluted and unspoiled environment.
- An opportunity to build on, and market, existing traditional and sustainable organic production systems.
- Locally available fertilizer resources (e.g. “mill mud” the residue from the clarifier in sugar processing) to provide sufficient nutrients to organically produce quality products.
- A non chemical quarantine treatment (HTFA) that will allow the export of fresh organic fruit.

Over the last decade a number of Fiji agribusinesses have obtained organic certification – these have included spices, fruit purees, cocoa, ginger and kura. Most of these have been through the New Zealand organic certifying agency BioGro. Annual re-certification is a standard requirement for most certifying agencies. The financial and administrative costs of recertification proved prohibitive for the small business concerned and thus they let their organic licenses lapse (although most retained their organic production system). Thus only Agrana (Fiji) (Formally South Pacific Foods)’s organic fruit puree (banana, mango and guava) operation of has proved sustainable.

Market research undertaken for the Asian Development Bank’s alternative livelihoods project (ALP) for the sugar industry identified immediate organic product prospects in New Zealand (Lincoln International 2003 p, 25). At that time the New Zealand organic market was worth around $60 to $70 – growing at about 10% annually. Chantal14, New Zealand’s largest organic distributor, was at this time particularly interested in sourcing organic produce from Fiji. The main interest is for fresh produce that can be supplied during the winter window (April – October). Certified organic papaya was included in the ALP study as a product for certified organic supply to New Zealand. Below is the assessment for the marketing study (Lincoln International 2003 p, 26).

<table>
<thead>
<tr>
<th>Product</th>
<th>Initial market potential</th>
<th>An evaluation of prospects for organic certification and market access</th>
</tr>
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There is currently no fresh organic papaya available on the market in New Zealand. During all interviews with fresh produce importers the question of demand for organic papaya was

14 Chantal – distributors of organic produce and commodities 13 Nothe Street Napier New Zealand; tel 64 6 835 7898; email chantals@xtra.conz
raised. The general consensus was that the demand for fresh organic papaya was very small. In general the mainstream New Zealand supermarkets have a very limited organic produce section.

The majority of organic fresh produce that enters the mainstream supermarkets comes in through Fresh Direct; even the large distributors such as Progressive Ltd. will channel their organic produce through Fresh Direct. Fresh Direct imports a mainly from suppliers in the USA, Australia and China. At an interview with Doug Hamilton of Fresh direct we were informed that actually there is a growing market for organics in New Zealand while he admitted that it was somewhat slower than other developing countries such as the USA, Japan and countries in Europe. Hamilton informed the group that ‘It is within our intention to import from Fiji’. When questioned on the estimated volumes of organic papaya that they could handle, Hamilton replied that it will all depend on the product and the price.

1.7 Major findings

1.7.1 Assessment of the current status of Fijian papaya in the New Zealand market

The positives

- The overall growth in demand for papaya in the New Zealand market
- A significant proportion of papaya consumers regard Fiji papaya as superior sweetness and flavour to papaya from the Philippines and other sources. This is particularly true for the growing Asian market segment. The benefits of this inherent advantage are far from realized due to short comings in production post harvest handling practices and marketing practices.
- The inherent quality of the product and a generally favourable response of the New Zealand consumer to the Fiji image.
- The interest in the largest papaya importer to handle Fiji papaya in parallel with Dole papaya from the Philippines.
- Proximity to the market allowing for later harvesting and a continuous supply flow.
- The demise of the Cook Islands papaya industry and the lack of competition from other Pacific island countries
- The treat of papaya ring spot virus overhanging the Philippines papaya industry
- A relatively favourable fruit fly status
- A reliable quarantine treatment that does not adversely effect fruit quality and allows for organic certification

The negatives

- The rapid growth of Dole papaya to a position of dominate market share.
- The threat of Australia becoming a significant supplier.
- Significant variability in supply, making it difficult to develop markets in the major outlets.
- The quality and food safety certification requirements of the major supermarkets. As Kevin Nalder CEO the NZ Importers Association noted “this has led to a differentiation in the market between those that supply the larger “progressive” supermarkets (accredited suppliers) and those that don’t. The former ground is expanding, while the later is contracting. Dole papaya is in the former group, while Fiji papaya exporters are not.
- Generally poor grading standards are applied by Fiji’s papaya exporters - the same carton contains variable stages of maturity and different sized fruit, with female and hermaphrodite fruit sometimes mixed.
- The packaging of some exporters are not up to standard;
- Prices now uncompetitive when compared with Dole fruit from the Philippines – although the 20% devaluation in Fijian dollar will help.
1.7.2 Opportunities and requirements to expand the Fijian papaya export market

Opportunities

- To produce a branded Fiji red papaya that is of superior quality in terms of flavour, appearance and presentation.
- To promote the Fiji red papaya brand through concerted in-store promotion.
- To sell Fiji papaya to the largest papaya importer (MGM) in parallel with Dole papaya from the Philippines.
- To export by sea to substantially reduce marketing costs.
- To simultaneously reduce farm gate prices and increase incomes by increasing yields and reducing reject rates.
- A small but increasing market for certified organic papaya.
- To development of quality dried fruit exports utilizing reject fruit.

Requirements

- Improved continuity of supply through papaya farming practices (the Fiji Papaya Project and the Taiwan Technical Mission).
- Improved quality and grading. Importers demand that fruit be even size and maturity with very minimal skin blemishes and no disease.
- Ongoing training of farmers, packing shed and NWC staff (continuation of the FAO papaya value chain approach).
- Coloured wall charts and other training material on the quality requirements and grading standards made available.
- The ongoing promotion of the financial rewards to farmers and exporters of improving quality and grading (continuation of the FAO papaya value chain project approach).
- NWC to play a more activist role in product grading.
- Establishment of quality assurance and food safety certification programs to provide access to the growing supermarket market segment (technical assistance via EU-FACT recommended).
- Substantial investment by exporters in improving quality and in adopting certification programs.
- Introduction of certified organic papaya production through the Fiji Papaya Project.
- The introduction of concerted in-store promotion program (support from PITIC and FACT).
- Substantial private sector investment in processing.

1.7.3 Opportunities and requirements for other Pacific islands

Cook Islands

Cook Islands papaya is well known in the New Zealand market and there would be an opportunity to rehabilitate exports. However, realising this opportunity is constrained by land availability issues and the returns from alternative uses of resources. The HTFA treatment facility is no longer viable because of the low level of throughput from just one product.

Other PICs

There are opportunities for Tonga, Samoa and Vanuatu to establish small export industries. However, all three countries don’t have commercially viable quarantine facilities in operation. In all cases there is a need to encourage the development of fruit exporting enterprises.

1.8 The projected market size for Fijian papaya in New Zealand

The size of the New Zealand market is projected under two scenarios:

- The Fiji industry continues as is – the status quo remains.
There is significant improvement in the Fiji industry

1.8.1 The projected market if the Fiji industry continues as is – the status quo remains

The status quo is described as follows:

- Fiji papaya is not sold in the major supermarket chains.
- Fiji’s largest exporter sells to DPM an importer/wholesaler who services smaller independent chains and specialty stores through New Zealand.
- The other Fiji exporters mainly sell to Indo-Fijian importers, who sell in their own retail outlets and through the flea markets.
- The inherent quality of the Fiji papaya is good – however, generally, the grading and presentation of the fruit is inferior to fruit from the Philippines.
- The landed price of Fiji papaya is higher than that Dole fruit.
- All shipments are by air

Over the last few years Fiji’s papaya exports to New Zealand have range from 190 to 300 tonnes annually. Somewhat more papaya could have been sold if the supply was available. It is estimated that the market could have absorbed around 400 tonnes of Fijian papaya annually under the present arrangements. Increasing competition from the Philippines can be expected – assuming that industry does no succumb to PRV. Also could be expected that Australia will also enter the industry on a significant scale. Offsetting is the increasing overall demand of NZ consumers for papaya, thanks largely to the promotion effort mounted by Dole. Thus the projected size of the New Zealand market for Fijian papaya is 400 tonnes if the current marketing situation remains the same. This is well short of the 1,000 tonnes estimated in 1995, when the feasibility study was undertaken for the HTFA facility

1.8.2 The projected market with significant improvements by the Fiji papaya industry

Improvements in the Fiji papaya industry can be achieved in four broad areas.

- Price competitive
- Reliability of supply
- Quality
- Marketing

Price competitiveness

In 2008 the price of Fijian papaya (measured in term of value for duty purposes) was 25% higher than that of the price of papaya from the Philippines. Fijian papaya can be made more prices competitive through a combination:

- Improvements in the terms of trade between Fiji and New Zealand
- Reducing the price paid to growers
- Reducing the cost of quarantine treatment
- Reducing transportation costs.

Improvements in terms of trade

On April 15, 2009 there was 20% devaluation in the Fijian dollar. Over the prior 12 months the Fijian dollar had appreciated by around 17% against the NZ dollar and by 12% against the Australian dollar (figure 2). Thus in the lead up to the devaluation Fiji papaya was losing competitiveness in both markets – but particularly in New Zealand. With the devaluation there was significant immediate enhancement in the competitiveness of Fiji papaya on export markets. This improvement in competitiveness is, however, less than 20%. Papaya production and marketing uses significant amounts of imported inputs (fuel, fertilizer and other agro chemicals). The cost of these imported inputs can be expected to increase in the order of 20%. It is estimated that imported items constitute 40% of the cost of growing papaya (table 4) and 30% of the cost of marketing papaya (table 5). The duration of any advantage from the devaluation for papaya exports will depend on by how much and for how long grower prices
and labour wage rates can be contained. However, the devaluation has certainly given the Fiji industry some breathing space to improve competitiveness through more fundamental efficiency gains.

**Figure 2: Exchange rates for the 12-month period June 15th 2008 – June 15th 2009**

Reducing the price paid to growers

The model presented in Appendix 1.10.5 shows the returns to a farmer planting 1 acre of papaya a year for three years and utilizing hired labour. At a farm gate price for papaya to be exported of 90c/kg (the price received prior to January 2009 floods) and 70c/kg for papaya sold on the local market, the returns to the farmer are estimated as follows:

- The average gross margin over a 5 year period from the 3 acres planted - $11,051
- The average gross margin per acre - $3,684
New Zealand Market Analysis – Fiji and Pacific Island Papaya

At a farm gate price of 90c/kg an exporter’s estimated fob (to the point of export) price is $1.88/kg (Appendix 1.10.6). At current freight rates this results in a landed price in New Zealand of $3.60/kg (or NZ$2.70 – 1 FJD = 0.75 NZD) (Appendix 1.10.6).

At farm gate purchase price of 80c/kg the estimated NZ landed price is $3.44. At a farm gate price of 80c/kg, all other factors remaining the same, the returns to farmer are as follows:

- The average gross margin over a 5 year period from the 3 acres planted - $9,670
- The average gross margin per acre - $3,223

(Appendix 1.10.7)

The impact on grower returns and the export price of the 10c/kg reduction in the grower price is summarised in table 6

Table 4: Estimated grower returns and landed prices for different farm gate prices

<table>
<thead>
<tr>
<th>Farm gate price ($/kg)</th>
<th>Gross margin/acre ($)</th>
<th>Landed price in NZ ($/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.90</td>
<td>$3,684</td>
<td>3.60</td>
</tr>
<tr>
<td>$0.80</td>
<td>$3,223</td>
<td>3.44</td>
</tr>
</tbody>
</table>

A farm gate price decrease in the order of 10c to 20c/kg could be expected as supply expands with increased plantings. These prices are still seen to provide growers a reasonable return considering the alternatives available from their labour and land resources. Gross margins for planting sugar in the Sabeto Valley, for farmers wishing to plant papaya, indicated a negative return per acre (Appendix 1.10.8). However, a decline in the farm gate price does not necessarily mean a decline in farm income derived from growing papaya if the decrease in price can be offset by increasing yields and reducing reject rates. There can even be an increase in farm income if the gains from increased productivity and improved quality more than offset the decline in price. In essence the objective of the Fiji Papaya Project is to simultaneously improve the competitiveness of Fiji papaya exports and increase the income derived from growing papaya.

Reducing the cost of quarantine treatment

Natures Way Cooperative (NWC) began treatment operations in October 1996, with the treatment rate set at 40c/kg. This treatment charge remained unchanged until June 2008. A treatment charge of 40c/kg was established based on projections that the business would be able cover its operating costs within in a period of 3 to 4 years. Thus sufficient working capital was necessary from the outset to cover initial short fall in revenue. In recent years, exporters have argued that treatment charges were too high and that it reduces their international competitiveness. In early 2008, in response to demands of exporters, NWC undertook a review of treatments changes.

Table 5 compares treatment charges with other costs over the period 1996 to 2007. Over this period when there was no increase in treatment charges, whereas base wages increased 50%, electricity charges per unit have increased by 6% and the unit cost of gas has increased by some 120%. Airfreight charges to exporters have increased by over 30%.

Table 5: A comparison of treatment rates with other charges over the period 1996 to 2007

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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment charge (c/kg)</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>0%</td>
</tr>
<tr>
<td>Wage (packer and grader) ($/hr)</td>
<td>1.74</td>
<td>1.74</td>
<td>1.74</td>
<td>1.74</td>
<td>1.74</td>
<td>1.9</td>
<td>1.9</td>
<td>2.05</td>
<td>2.05</td>
<td>2.25</td>
<td>2.25</td>
<td>2.25%</td>
</tr>
<tr>
<td>Electricity ($/kwh)</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>6%</td>
</tr>
<tr>
<td>Gas ($/kg)</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1</td>
<td>1.38</td>
<td>1.48</td>
<td>1.58</td>
<td>1.58</td>
<td>1.68</td>
<td>2.11</td>
<td>2.11</td>
<td>2.31</td>
<td>2.31%</td>
</tr>
<tr>
<td>Freight (LD8 to Auckland) ($/kg)</td>
<td>0.82</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.36</td>
<td>1.15%</td>
</tr>
</tbody>
</table>

28 of 54
The review found that NWC treatment charges were more than competitive with equivalent quarantine treatment facilities, for which data was available. These are in the Cook Islands and Molokai (Hawaii). Unfortunately, data could not be obtained for papaya quarantine treatment operations in the Philippines. The rate charged by the Cook Islands facility is NZ $0.45 cents/kg (approx FJD $0.53 cents). The Molokai facility is owned and operated by a grower exporter, who treats his own fruit. Thus the treatment charges are no explicit. Most of Hawaii’s papaya growers are located on the Big Island. Fruit exported to the US mainland is treated by a commercial irradiation facility. In 2007 the charge for this treatment was USD 0.17c/lb (which was equivalent to FJD $0.61 c/kg – and at the current exchange rate around FJD $0.80c/kg). Thus, the cost of quarantine treatment for Hawaii papaya exporters is about double that of their Fijian counterparts\textsuperscript{15}. According to a recent issue of the Philippines Agri Business Week the cost of vapour heat treating of mango for export to China is USD 0.40c/kg. One can assume that the cost for treating mango and papaya with vapour heat would be the same because the energy use and treatment parameters are the same. In Hawaii, the figure for vapour heat treating papaya shipped to is generally between US$0.21 and US$0.32/pound (personal communication Dr John Armstrong). Fiji’s exporters have a significant competitive advantage when it comes to the cost of quarantine treatment charges.

A comprehensive review of NWC treatment changes was conducted at the beginning of 2008. Based on the findings of the treat charges review the following treatments charge schedule is now in place\textsuperscript{16}:

1. The flat base treatment rate of 40c/kg.
2. At the end of each month any exporter that has no arrears exceeding 30 days receives a rebate of 5c/kg of fruit treated.
3. Rebates are given to exporters who achieve above certain treatment thresholds in a calendar year and who have no arrears exceeding 30 days. The thresholds and rebates that apply are:
   - > 150 tonnes/year receives a rebate of 3% of total treatment charges paid during the preceding year.
   - > 300 tonnes/year receives a rebate of 5% of total treatment charges paid during the preceding year.
   - > 500 tonnes/year receives a rebate of 10% of total treatment charges paid during the proceeding year.

This new treatment charge schedule offers the opportunity for exporters to substantially reduce their treatment cost by keeping their account current and by increasing their throughput. It is of note that Fiji’s largest papaya exporter currently has a particularly unfavourable arrears status. This company, just by getting it arrears current, would immediately reduce its fob cost of exporting by 5c/kg.

NWC recently completed its second Strategic Plan (2009 – 2014). The Plan which has been approved by the Cooperative’s Board and will be presented at the next AGM for endorsement, recommended that the treatment fees remain at 35c/kg (for exporters whose accounts are current) and 40c/kg for others (exporters with accounts over 30 days) remain for the

\textsuperscript{15} The difference between Hawaii and Fiji treatment rates can be explained by two main factors:
- The capital cost of eradication quarantine treatment is some $FJD 5 to 7 million, compared with less the FJD 1 million for an HTFA facility.
- Hawaii’s labour costs are substantially higher than those in Fiji (USD 10 – 12/hour compared with FJD 2.15/hour.

\textsuperscript{16} A Review of Treatment Charges and Worker Wages and Conditions for Natures Way Cooperative (Fiji) Ltd. Prepared by Koko Siga (Fiji) Ltd., May 2008
foreseeable future. This recommendation was based on the need to maintain a sufficient level of retained earnings to
- to continue a high level of repair and maintenance;
- to maintain a high level of “rainy day” reserves (the value of high level reserves has been proven with consequences of 2009 flood); and
- To have sufficient funds to operate a small field service.

Thus exporters should not expect further reductions in treatment charges in the foreseeable future.

**Reducing the cost of transportation**

It currently costs approximately $1.60/kg (including the fuel surcharge and the war risk levy) to airfreight papaya to New Zealand (table 6). This is significantly more than the cost of buying papaya from farmers and is the main factor in the lack of price competitiveness with papaya from the Philippines.

**Table 6: Air freight capacity and cost Nadi – Auckland (June 2009)**

<table>
<thead>
<tr>
<th>Airline</th>
<th>Aircraft type</th>
<th># flights per week</th>
<th>Capacity Total capacity (tonnes)</th>
<th>Capacity utilised</th>
<th>Capacity available</th>
<th>Contain er type</th>
<th>Container capacity</th>
<th>Cost per container ($)</th>
<th>Cost per carton (5kg)</th>
<th>Fuel surcharge per kg</th>
<th>War risk per kg</th>
<th>Total freight charge $/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Pacific</td>
<td>747</td>
<td>1</td>
<td>20</td>
<td>4</td>
<td>16</td>
<td>LD3</td>
<td>1300</td>
<td>1560</td>
<td>260</td>
<td>1.2</td>
<td>0.25</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>738</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>LD8</td>
<td>2100</td>
<td>2370</td>
<td>420</td>
<td>1.13</td>
<td>0.25</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>763</td>
<td>4</td>
<td>17</td>
<td>8</td>
<td>9</td>
<td>LD9</td>
<td>4200</td>
<td>3980</td>
<td>480</td>
<td>0.95</td>
<td>0.25</td>
<td>0.13</td>
</tr>
<tr>
<td>Air NZ</td>
<td>767</td>
<td>2</td>
<td>19</td>
<td>10</td>
<td>9</td>
<td>LD3</td>
<td>1300</td>
<td>1560</td>
<td>260</td>
<td>1.2</td>
<td>0.4</td>
<td>0.016</td>
</tr>
<tr>
<td></td>
<td>777</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>LD3</td>
<td>1300</td>
<td>1560</td>
<td>260</td>
<td>1.2</td>
<td>0.4</td>
<td>0.016</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>13</td>
<td>60</td>
<td>23</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There maybe some scope for negotiating better freight rates. Air Pacific has adopted a policy of maximizing freight charges. Such a policy, particularly for a national airline may not be in the best interest of Fiji or the airline. It would be in the national, and in the Air Pacific’s long run interest, to expand the volume of produce shipped by offering more competitive freight rates. Table 8 suggest that Air Pacific currently has significant excess freight capacity available. The critical role a national airline can play horticultural export development shown with Thailand’s Thai Air. In the past the Government of Thailand has utilised the IATA regulation allowing for Government Ordered Rates (GOR) to stimulate its horticultural export development. The Fiji government needs to give serious consideration to making similar interventions with respect to Fiji’s national airline.

NWC as a representative of the Fiji fresh produce export industry is particularly well place to negotiate more competitive air freight rates on behalf of the industry.

Airfreight will always be required to place a premium quality papaya product at the top end of the New Zealand market. However, substantial increases in papaya exports will require the use of sea freight if Fiji is to be price competitive with the Philippines. The current cost of shipping a reefer (cooler) container from Lautoka to Auckland is approximately $4000. A reefer container could be expected to carry around 1500 cartons at 5 kg per carton, giving a freight cost of $0.53 per kg. This compares with the current cost of $1.60/kg for air freighting papaya to Auckland. The voyage time from Lautoka to Auckland is 4 days, compared with two weeks from the Philippines. Thus Fiji would still retain a significant advantage in terms of quality.

Sea freighting papaya to New Zealand is a priority applied research requirement for the industry. Fiji exporters need to identify importers who are willing to handling sea freight containers of Fiji papaya at a time. Importers identified that fall into that category are:

- Darrack Produce Markets Ltd (DPM)
• MG Marketing
• Turners and Growers

**Achievable price competitiveness**

The section below outlines what is seen to be an achievable landed price for Fiji papaya in New Zealand for an exporter who:

- Buys papaya at the farm gate for 80c/kg
- Initially pays 35c/kg for quarantine treatment (exporter not in arrears in payments to NWC) and treats over 150 tonnes of fruit per year and thus gets a 3% (1.05c/kg) reduction in treatment charges. Thus the effective quarantine treatment charge is 33.95c/kg.
- Sea freight to Auckland at a cost of 53c/kg.
- An exchange rate of 1FJD = 0.75 NZ$ applies (rate at June 19th 2009)

It is estimated that this exporter could land papaya in Auckland at a price of $2.70 (NZ$ 2.04). This papaya would be reasonably price competitive with Philippines papaya. The average value for duty purposes (VFD) of Philippines in 2008 was NZ 2.06/kg. Thus if the quality and marketing of Fiji can be significantly improved it will be in position to strongly compete with papaya from the Philippines.

**Reliability and consistency of supply**

Reliability and consistency of supply is likely the key criteria that Fiji must meet in order to expand in the New Zealand market. Importers, wholesalers, and retailers need a product that is available in the right quantities all throughout the year. Currently Dole papaya from the Philippines is meeting this criteria and that is a key reason it is dominating the market. It has been unfortunate that Fiji has suffered a series of natural disasters over the last three years which has had a significant impact on supply of papaya. The ‘Great Flood’ of 2009 had a significant impact and papaya exports to New Zealand from a high 27 tonnes in October 2008 to only 5 tonnes in January 2009.

**Table 7: Effect of the Great Flood of 2009 on papaya supply**

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>NZ exports 2008(tones)</td>
<td>30</td>
<td>19</td>
<td>17</td>
<td>22</td>
<td>16</td>
<td>17</td>
<td>12</td>
<td>15</td>
<td>21</td>
<td>27</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>NZ exports 2009 (tones)</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>16</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aust exports 2008(tonnes)</td>
<td>10</td>
<td>6</td>
<td>9</td>
<td>14</td>
<td>14</td>
<td>12</td>
<td>5</td>
<td>9</td>
<td>15</td>
<td>26</td>
<td>35</td>
<td>24</td>
</tr>
<tr>
<td>Aust exports 2009 (tones)</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>9</td>
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The industry needs to seriously consider measures to mitigate against the threat of these natural disasters. Some measures to cushion Fiji’s papaya exports from the devastation in a natural disaster included:

- Spreading out the geographic distribution of papaya plantings
Use the January 2009 flood as a benchmark for the flood line and only plant in areas above this flood line.

Spread planting throughout the year, one planting immediately after cyclone season (April) and one planting in August – so that trees are small enough not to be affected by strong winds in the event of a cyclone.

Quality

From consultations with importers and from physically inspecting fruit in the market it is clear that Fiji papaya has major quality issues. Fiji growers and exporters need to improve the quality of their product. This is seen as critical improvement necessary to be competitive with Dole papaya and increase Fiji’s market share.

The quality parameters in need of improvement include:

- Control of postharvest diseases on the farm
- Harvest and postharvest handling
- Grading
- Packaging and labelling

Control of postharvest diseases on the farm

Damage by disease infection is a leading cause of post harvest losses in papaya. Like physical damage, the affects are often not seen until the fruit begins to ripen. Therefore fruit can be shipped looking nice and clean but arrive infected with disease which creates a particularly bad impression in the market place.

Anthracnose (Colletotrichum gloeosporioides L.) disease is one of the most common post harvest diseases of papaya in Fiji. The disease is present on unripe papayas but is latent (not visible). As the fruit starts to ripen, circular spots (lesions) begin to appear and gradually enlarge and may become sunken into the fruit.

Phytophthora stem-end rot (Phytophthora nicotianae var. parasitica) is another major post harvest problem affecting Fiji papaya. Phytophthora is characterised by circular spots (lesions) which develop with grey and white ‘fungus’ (mycelium) growing on the surface. Infection of phytophthora is particularly apparent around the stem end.
There are number of measures that can be taken to reduce the impact of post-harvest diseases of papaya; including

- Good site selection (avoid locations that have poor airflow and poor drainage)
- Good farm management practices (good hygiene, monitoring and chemical control as necessary)
- Control by various pre and post-harvest chemical treatments
- Careful handling to minimize physical damage.
- Keep fruit in a cool place with a low relative humidity.

**Harvest and postharvest handling**

The Fiji papaya export supply chain involves a large number of actors and fruit is handled/graded up to five times before being packed in cartons. It is through this rigorous handling that fruit is subject to significant bruising and scratching. The post harvest damage to fruit is compounded by the condition of roads from the farm to the packing house and NWC.

Physical damage to papaya fruit at the green stage will not show up until the fruit ripens. Physical damage can occur from the time of harvest through to final packing and at all of the steps in between.

Physical damage on the farm usually occurs as a result of the harvesting implement, dropping into crates, over-filling of crates and excess movement of fruit during transport.

Similar effects can occur as a result of poor handling during washing, grading and transportation. These actions will result in latex staining, punctures, scars and bruises. During ripening, bruised areas will develop into dark soft regions which become affected by secondary diseases such as Anthracnose and Phytophthora.

Most physical damage occurs when staffs are trying to work to fast. Because the damage is not immediately seen staffs are often not aware that they are doing anything wrong.
There are number of measures that need to be adhered too in order to reduce the damage caused to papaya during harvest and postharvest handling; including:

- Always practice good harvesting techniques and do not rush.
- Stems should be removed in the field to prevent puncturing or scratching of other fruit in the crate.
- Foam or newspaper should be placed in the base of field crates and crates should contain only one layer of fruit.
- Fruit should never be dropped or thrown into crates or bins.
- Vehicles used to transport the fruit should be driven slowly and with care

**Grading**

In order to be competitive the grading of the fruit for export must be improved. Importers demand that all exports are of even size and maturity with very minimal skin blemishes or diseased fruit. Currently Fiji exporters have very poor grading which means that importers, wholesalers and retailers have to do this grading on their end at a much higher cost.

For this very reason it is critical that farmers, exporter staff and NWC handlers understand that the market wants each box to be the same in terms of:

- size (weight)
- sex (shape – female, round; hermaphrodite bell shaped)
- stage of ripeness.

At present NWC staff use scales in order get fruit of the same size for final packing. The performance here is mixed and should improve significantly with the installation of the grading machine that is currently being purchased with NWC’s Enterprise Challenge Fund grant.

What is much more difficult is trying to get fruit of the same stage of ripeness – this is where our competitors are doing a much better job.

It is the importers request to an exporter that dictates what should be packed in a box, therefore the onus is on the exporter to strive to meet the exact requirements of his order and to achieve consistency within every box.
Packaging and labelling

In order for Fiji papaya to secure a significant share of the main stream papaya market (supermarket chains) in New Zealand it is necessary to have appropriate packaging and labelling. The improvements in packaging and labelling that are described will inevitably require additional costs to the exporter.

The packaging and labelling requirements for the NZ market can be summarised on three levels;

1. What packaging will ensure that the fruit arrives to the customer in the best possible condition?
2. What labelling is necessary to comply with importers/retailers standards?
3. What packaging and labelling will serve to promote Fiji papaya as a high quality product?

A critical component of maintaining fruit quality through transportation is the carton. In Fiji the quality of cartons varies significantly between different exporters. Physical inspection of Fiji papaya in NZ saw the difference in the two types of cartons and how they hold up.
A more durable waxed carton of Fijian papaya that remains in good shape in an exporters cooler, Auckland (February, 2009)

A much thinner, unwaxed carton of Fijian papaya that has collapsed and started to come apart, Auckland (February, 2009)

Some Fiji exporters also use individual fruit socks to protect fruit from rubbing up against each other. This, or a similar measure is considered critical to ensure the fruit arrives at the market in the best possible condition.

It should be noted that papaya is rarely displayed at the retail level with the fruit sock. This is usually taken off by the stocker at the supermarket. If socks were deemed to be cost prohibitive an exporter could consider use of paper to individually wrap the fruit as is seen in papaya exports from Hawaii and the Philippines below.

Papaya individually wrapped in newspaper from Kumu Farms, Molokai, Hawaii, ready for export to the US mainland. (March, 2009)

Dole papaya from the Philippines individually wrapped in newspaper at MG Marketing packhouse, Auckland. (February, 2009)

Labelling requirements for papaya cartons entering the mainstream market in NZ must contain the following information;

- Country of origin
- Weight of the carton (The papaya carton exported from Fiji has an average net weight of 5 kg.)
- Fruit count in carton (How many fruit are within the carton).

Individual importers retailers might also require other labelling or packaging; including,

- Individual stickers on each fruit with bar codes
- Printed boxes with promotional text
- Other appropriate labelling

**Marketing**

**Branding of Fiji Red**

Fijian papaya in New Zealand is a unique product. Fijian papaya is a red fleshed Solo Sunrise variety, whereas the market was developed based on a yellow fleshed Waimanalo variety from the Cook Islands. At present the main papaya in the market is another yellow fleshed fruit of the variety Kapoho which is being market as ‘Pawpaw’. It is important that Fiji exporters work
to promote this product differentiation. Fiji exporter, Produce Specialties Ltd. (PSL), has been involved in a number of promotional activities in the New Zealand market to promote the Fiji papaya as ‘Papaya’ and not ‘Pawpaw’.

The branding name of Fiji Red has been developed and adopted by some exporters as a means marketing Fiji papaya. This example of a national marketing promotion was described by importers in NZ as being ‘very worthwhile’.

**In-store promotion and customer awareness**

Importers and retailers in New Zealand cited the need for more in-store promotion and customer awareness about Fiji papaya. Importers interviewed said that they would be interested in a joint promotion campaign whereby the exporter, importer and retailer share the cost of the promotion. A common in-store promotion is to have a point-of-sale demonstrations and tastings that are usually accompanied by a promotional sale price on the Fiji papaya. A promotional campaign for Fiji Papaya was staged in Auckland in November 2004 funded by the Pacific Island Trade and Investment Commission (PITIC).

It was also noted that there is still a great deal of work that needs to be done in NZ to make the customer aware of this fruit by educating the shopper how to choose a ripe fruit (customers buy with their eyes); how to eat it; how to cook with it. Other promotional activities could include TV advertisements with chefs; approach restaurants to use papaya in their menu (a customer will buy once they have eaten it in a restaurant).

In this respect the Fiji papaya industry has benefited from Dole’s entrance as papaya supplier in NZ because this has brought a significant amount of promotional activity to papaya which Fiji could benefit from.

**Food safety and quality certification**

If Fiji papaya is to significantly expand its market in New Zealand and elsewhere the product must be on offer in the major supermarket chains. Those exporters who wish to sell in this expanded market will need to have in place food safety and quality certification that meet the requirements of the supermarkets. As Kevin Nalder CEO of NZ Producer Importers Association reminded the market study team:

Fiji papaya exporters, directly or indirectly will need to meet these standards if they are to capture a share of the supermarket trade, which currently they don’t. This trend has lead to a differentiation in the market between those that supply the larger “progressive” supermarket (accredited suppliers) and those that don’t. The former ground is expanding, while the later is contracting. The challenge for Fiji papaya exporters to get into the accredited supplier group. This requires establishing export standards and controlling compliance (how was the product harvested, post harvest handling etc.). The key is consistency – both in terms of supply and quality.

Dole, Fiji’s main competitor has the required certification. Fiji’s exporters will need to follow suit or they will remain on the “other side of the fence”. EU’s Facilitating Agricultural Commodity Trade (FACT) and the ACIAR Fiji Papaya Project have an important role to play in assistance the industry achieve the necessary compliance.

**Estimated market with improved price competitiveness, quality and marketing**

New Zealanders are large consumers of tropical fruit. In 2008 New Zealand imported around 102,000 tonnes of tropical fruit (bananas, pineapples, mango and papaya) (table 8). This represented approximately 24.4 kgs per capita. Of this total around 89% were bananas (table 9), making New Zealanders amongst the per capita consumers of bananas in the world. In 2008, 963 tonnes of papaya were imported, representing a market share of tropical fruit of 1%, compared with 8.6% for pineapples and 1.8% for mango.
Table 8: New Zealand tropical fruit imports, 2004-2008 (tonnes)

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>% growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bananas</td>
<td>71,181</td>
<td>85,308</td>
<td>88,189</td>
<td>86,635</td>
<td>87,989</td>
<td>24%</td>
</tr>
<tr>
<td>Pineapples</td>
<td>4,730</td>
<td>6,631</td>
<td>8,313</td>
<td>9,488</td>
<td>8,567</td>
<td>81%</td>
</tr>
<tr>
<td>Mangoes</td>
<td>2,406</td>
<td>2,155</td>
<td>1,915</td>
<td>2,282</td>
<td>1,752</td>
<td>-27%</td>
</tr>
<tr>
<td>Papaya</td>
<td>393</td>
<td>516</td>
<td>967</td>
<td>810</td>
<td>963</td>
<td>145%</td>
</tr>
</tbody>
</table>

78,710  94,610  99,384  99,215  99,271  26%

Table 9: Distribution of New Zealand tropical fruit imports 2008

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bananas</td>
<td>87,989 88.6</td>
</tr>
<tr>
<td>Pineapples</td>
<td>8,567 8.6</td>
</tr>
<tr>
<td>Mangoes</td>
<td>1,752 1.8</td>
</tr>
<tr>
<td>Papaya</td>
<td>963 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>99,271 100</td>
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</tbody>
</table>

Projected growth in New Zealand tropical fruit consumption

New Zealand tropical fruit consumption over the 5-year period 2004 to 2008, grew by 25% - driven by income and population growth and high levels of Asian migration. Improved availability of tropical fruit, particularly from the Philippines, at reasonable prices has also contributed to the increase in consumption. Some slow down in the growth rate in tropical fruit consumption might be expected as a result of the current recession. However, a growth in tropical fruit consumption of 10% over the next would seem to be a reasonable conservative estimate. This would result in a total tropical fruit consumption of around 111,000 tonnes.
**Papaya’s projected market share of tropical fruit consumption**

Papaya has over the last 5 years has experienced by far the most rapid growth in consumption, increasing by 145%. Pineapples have increased by 81% and bananas by 24% - the consumption of mangoes has decreased by 27% over the period. Thus a 2% to 3% share of the tropical fruit market for papaya would seem a reasonable expectation, particularly if the price competitiveness, quality and marketing of Fijian papaya improve. This would represent a total market of 2,200 to 3,300 tonnes of papaya.

**Fiji papayas projected market share of New Zealand papaya consumption**

Fiji papaya has inherent competitive advantage in the New Zealand market. Thus a share 50 to 70% over the next 5 years is seen as a reasonable expectation if the price competitiveness, quality and marketing improvements discussed above are put into place. This would represent a market for Fijian papaya of between 1,100 and 2,300 tonnes.

**A summary of market projections for Fijian papaya**

A summary of the market projection under the two scenarios are presented in table 10 below:

- The status quo of the Fiji industry remains.
- There are significant improvements in the Fiji industry (price competitiveness, quality and marketing)

<table>
<thead>
<tr>
<th>Year</th>
<th>Status quo - Fiji industry remains the same</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>250-270</td>
<td>270-300</td>
<td>300-340</td>
<td>340-390</td>
<td>390-450</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Substantially improved Fiji industry</td>
<td>270-300</td>
<td>300-350</td>
<td>350-450</td>
<td>450-1,100</td>
<td>1,100-2,300</td>
</tr>
</tbody>
</table>

**Table 10: The Projected New Zealand market for Fijian papaya (tonnes)**

1.9 References


New Zealand Market Analysis – Fiji and Pacific Island Papaya


1.10 Appendices

1.10.1 What the papaya buyers say

**Darrack Produce Markets Ltd**

The Auckland based Darrack Produce Markets Ltd (DPM) is currently the main New Zealand importer of Fijian papaya, buying exclusively from Fiji largest exporter Produce Speciality. DPM is an importer/wholesaler that deals with a variety of fruit and vegetable products. Most of DPM’s produce is sourced from New Zealand, particularly in the summer months. Produce is imported from the USA (citrus), Australia (grapes), Chile, New Caledonia (limes), Thailand and Fiji (papaya).

DPM services independent market chains around New Zealand. These independents include Fruit World, a specialty market that retails a wide range of fruits and vegetables. Fruit World has 26 stores in the Auckland area. Fruit World, unlike most supermarkets carries a wide selection of fruit types, including exotic tropical fruit. Fruit World carries both Fijian and Philippine papaya. This contrast with most supermarkets, which usually carry one papaya line. In the past DPM sourced papaya from Cook Islands. This larger yellow fleshed Waimanalo fruit was very popular – however, in recent years the Cook Islands have not been able to meet minimum supply requirement.

The preference is for 6-8 count cartons. The New Zealand consumers were initially introduced to papaya via Cook Islands Waimanalo – hence there is preference is for larger fruit (650 gm

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17 Meeting held 10th February at Otahuhu Auckland (17 Saleyards Rd Phone: 64 9 259 0050 DDI: 64 9 259 0050 Fax: 64 9 270 3367; www.darrak.co.nz). Present at the meeting was Managing Director, Ivan Rakich (Mobile: 0275 773 188 Email: ivan@darrak.co.nz), Operations Manager, Paul Kennedy Mobile: 0274 902 182 Email: pk@darrak.co.nz and Ben Barker (Mobile: 0275 875 310 Email: ben@darrak.co.nz), Sales Executive

18 DPM presently receives summer fruit from Central Otago; green vegetables from Pukekohe; citrus from Gisborne
plus). In today’s market there tends not to be an outlet for product that has any defects, even if the price is heavily discounted.

Fruit World have relatively better trained staff who are able to differentiate the fruit which means that they can stock more than one variety and bar coding is not mandatory. Although costly, manual checking of the fruit is conducted by DPM for Fruit World, which means that every fruit is inspected for ripeness stage and quality. The preference of the owner of Fruit World (Mr Jack Lum) is for pink flesh fruit. However, the Fruit World stores have no particular preference

Papaya is considered to be a minor product for DPM with only one airfreight container per week being imported from Fiji prior to the January floods. This is equivalent to around 400 cartons (approx 4000 pieces fruit or 2,000 kgs). DPM laments that the overhead costs for handling a small volume of fruit are high – “it is not economical to send a person to the airport to clear and take delivery of 2 tonnes of papaya19 and to make the necessary investment in the promotion of the product.” DPM continue to receive Fiji papaya because it increases the product range they can offer to customers and they have expectations that the volume will increase to make the business more economic. It is only from October through November that DPM has been receiving an adequate supply from Fiji - 800 to 1,200 cartons (4 to 6 tonnes) per week. In winter when there is peak demand supply from Fiji falls to only 400 cartons (2 tonnes per week).

One of the main challenges for DPM is the limited consumer knowledge of papaya. DPM sees papaya as are a high maintenance product which requires hard work to convince people to make an initial purchase. The promotional over heads required are difficult to justify with the small volumes involved.

Papaya from Fiji arrives on Saturday and is taken to DPM bulk store, where it is sorted in terms of colour and size. DPM prefers that fruit that on Saturday be at ¼ ripe maturity, which enables it to be held for distribution to the stores on Wednesday morning. The main grocery shopping days are Thursday through Saturday. Fruits that arrive ¾ ripe have to be distributed to stores on Monday, which is less than satisfactory.

A preferred shipment schedule for DPM would be to:

- **Saturday/Sunday** - harvest fruit in Fiji on Saturday/Sunday;
- **Monday** - packed and quarantine treat
- **Tuesday** - airfreight to Auckland – cleared by customs and quarantine – 2/3 of this fruit should be at the ¾ ripe stage and 1/3 and the ½ stage of maturity, allowing for immediate distribution to the stores.
- **Wednesday** – fruit distributed to the stores.

DPM is of the view that there is good potential expands consumption of Fiji papaya through promotion. It is suggested that this take the form of:

- In-store sampling with companies such as Field Force
- Joint promotions with DPM such as bar code competition which require customers to register online to win a trip to Fiji
- Branding – believes there would be a positive response to the “Fiji Red” brand

**MG Marketing**20

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19 Papaya arrives from Fiji to the Auckland airport every Saturday where it is met by a DPM employee. The DPM employee follows the cargo through the quarantine inspection and clearance process. Once cleared, the papaya is hand loaded and sorted onto pallets in DPM’s own truck and transported to the distribution center in Otahuhu. This whole process takes approximately 5 hours and requires 1-2 staff depending on the size of the load.

20 Damian Glengarry, Imports – Procurement & Logistics, Market Gardeners Limited
Marketing: MGM have been handling Dole papaya for 5-years. Papaya is advertised generically with Dole products (bananas, pineapples and papaya). Sales of papaya have responded to the substantial promotional campaign that has been undertaken. MG Marketing has a dedicated Dole brand manager and support staff who conduct regular supermarket visits. Surprisingly MGM, in contrast to Turners and Growers, prefer female fruit to the smaller bell shaped hermaphrodite fruit.

Level of imports: There is a fortnightly charter that brings in pineapple, bananas and papayas from the Philippines. During the peak winter months 8000 to 9000 cartons (40 to 50 tonnes) per shipment are imported. During the summer down period the level of imports falls to 3,000 to 4,000 cartons (15 to 20 tonnes) per fortnightly shipment. January and February are particularly slack demand months because of the availability of low price local melons. New Zealanders give high preference for local produce when it’s available.

Market share and distribution: MGM indicated that they have a 55% share of the papaya market. However trade statistics would suggest that it is considerably higher than that. Some 60 to 65% of MGM sales are in the Auckland area, with 20% in lower North Island, with the balance sold in the South Island.

Main issues with the papaya market: Even with Dole papaya there is still a need to better manage the cool chain. Overall the declining value of the NZ$ has decreased the demand for imports – MGM have felt the impact of the depreciation $ on the demand for bananas, pineapples and papaya. The exchange rate impact has been greater on papaya which is considered a luxury item, for local melons are considered a substitute. The 20% devaluation in the $F will help the competitiveness of Fijian papaya.

Opportunities for Fijian papaya: Completing supply from the Philippines in the second week of the supply cycle is seen as the best opportunity for Fijian papaya. MG will welcome receiving Fijian papaya. The best seasonal niche is seen in October through November at the front end of summer, when people start eating mangoes and before the summer melons come on stream. MGM offered assistance in the promotion of “Fiji Red” papaya, provided a satisfactory cool chain can be established and competitive prices are offered.

Progressive Enterprises Ltd

PE is a vertically integrated produce company, operating their own stores and supply and distribution system.

PE carries Dole papaya and in past handled Cook Islands papaya. The company is interested in Fiji papaya. However, to do so they would require the Fiji supplier to fund some in-store promotion, which would include marketing and in-store tasting (estimated minimum cost $5,000). They also see bar coding as necessary to enable the cahiers to distinguish between Dole and Fiji papaya.
It is almost a requirement that if they were to start carrying Fiji papaya that it should be accompanied by some marketing materials and in-store tasting. Brent believes that for $5000 you could get a good hit of marketing in a range of stores. Brent also feels that it would be necessary to have a barcode on the Fiji papaya product so that the cashiers could easily distinguish it from the Dole papaya.

**Turners & Growers**

T&G pioneered the development of produce imports from the Pacific islands and were the first company to import papaya from the Cook Islands. Gordon Hogg, T&G Produce Specialist, has long experience with imports of papaya into New Zealand and was involved with the initial importing of Cook Islands papaya. Gordon attributes the decline in papaya from Cook Islands primarily to the availability of land and priority of land use.

T&G supplies the independent retailers. They handle around 280 cartons of papaya a week - both Dole and Fiji papaya. T&G was prefer to handle hermaphrodite (bell shaped fruit) that female fruit. The female fruit has thinner skin and tend to collapse faster. The supermarkets prefer 8-9 count fruit, with 500 gm from that often supplied from Fiji not seen as good value for money. A single blemish on the fruit can reduce the value around 90%. The fruit from Fiji is seen to have a better flavour – with Dole fruit regarded as somewhat bitter.

The peak demand period is October through December and March through May. January and February are a particular down period for most imported fruit due to the plentiful supply of locally produced fruit.

T&G identifies the following marketing issues with papaya from Fiji:

- Inconsistency fruit maturity – the fruit arrives at widely different stages of maturity
- Poor sizing – fruit of different sizes is placed in the one carton
- Inconsistency in supply – making it difficult to promote the produce and develop the market.
- Inadequate packaging – often not strong and visually appealing and most Fiji exporters don’t use socks to protect the fruit.

T&G identifies the main opportunity for Fijian papaya is to fill the gap in market when Dole papaya is sold out (the second week of the Dole supply cycle). The entry of Dole papaya into the market is not seen as necessarily a bad thing for Fiji papaya. Dole has been able to expand the market for papaya amongst New Zealand consumers through regular supply and promotion. Gordon Hogg also believes there is a small but growing market for organic papaya.

**Bizpro Ltd (Clive Wickham)**

Clive Wickham, was previously with Carter Spencer (CS), and was the main importer of Fiji papaya, working closely with Produce Speciality. They also imported from the Cook Islands (referred to as pawpaw because of its yellow fresh).

22 Gordon Hogg, Product Specialist, Turners & Growers Ltd
8 Monahan Road, Mt Wellington, PO Box 290, Auckland 1140, New Zealand
Phone: 9 573 8962 Fax: 9 573 8946 Mobile: 021918 026
Email: gordon.hogg@turnersandgrowers.com Web: www.turnersandgrowers.com

23 Bizpro New Zealand Ltd
Level 1, 411 Great South Road, Penrose. PO Box 62-589, Kalmia Street, Ellerslie, Auckland. Phone 021 349 543. Email: clive@bizpronz.co.nz
New Zealand Market Analysis – Fiji and Pacific Island Papaya

Marketing strategy:
- ‘Pawpaw’ for the Cook Islands
- ‘Papayas’ for Fiji
- Conducted in store sampling and special prices (See Report in PITIC Database)

Demand:
- The Asian market were quick to pick up the papaya and are the ‘big customer’ for Fruit World
- Papaya has a good following
- Big papayas sold better

Supply:
- False economy with female fruit because they were a bit hollow → T&G unwilling to take female

<table>
<thead>
<tr>
<th>Cook Island</th>
<th>Fiji</th>
<th>Philippines</th>
<th>Tonga</th>
</tr>
</thead>
</table>
| - Product: hard centre, spongy skin, spore spotting
  - Inconsistent sizes | - Fiji papayas are generally packed loose
  - Cartons are sealed due to the fruit fly problem | - Advantage: sea freight and top load containers with papayas | - hard to sell
  - sizing problems |

Get Fresh (Naushad Ali)

This is a small Indo Fijian vegetable and spice store located in South Auckland. Importers papaya from Fiji in two forms; green for curry and colour break for fresh sales. While some of the produce is sold through the owner’s retail outlet, the bulk is moved through flea markets on Saturday and Sunday. Newly arrived Fiji papayas were observed at the Get Fresh Store. The green fruit was lying loose in partially smashed cartons.

Valley Fruits & Veges

VFV is an Indo-Fijian importer is directly linked to Mahen’s Exports in the Sigatoka Valley. Only handles Fiji produce, including taro imported by sea. The main outlets are the small Indo-Fijian dairies.

Receives an LD3 container (1.2 tonnes) of papaya on a fortnightly basis from Mahen’s exports. They are received at the ½ ripe stage of maturity. He is satisfied with the quality received. The fruit is packed in 5kg cartons and sells by the kilo – therefore not particularly concerned about the count. Products are promoted on the radio to the Fiji community in Auckland.

VFV market: Mainly serves an ethnic market (Indo-Fijian and other Asia buyers). Chinese consumers prefer Fijian papaya because of its sweeter taste and red colour. VFV have a number of Chinese restaurant buyers, who buy 10 to 20 kgs at a time. They see the larger papaya as better value. There are spikes in demand associated with particular festivals (Diwali and Chinese New Year)

Tropical Fresh Ltd (Bobby Kumaran)²⁴

TF is the largest of the Indo-Fijian fresh importer. Also has a substantial value adding business. TF is the main supplier of Koko Samoa in New Zealand, processing cocoa beans imported from PNG. Also roasts peanuts imported from China.

During the main season TF imports an average of 1 LD3 (1.2 tonnes) per fortnight (?) This fruit is sorted by TF and sometimes gas ripened on their premises before distributions to stores. Sales of papaya, unlike eggplant, extend beyond the Indo-Fijian stores. TF does not find the

²⁴ Tropical Fresh Ltd. 54A Tidal Road, Mangere, Auckland. Phone: 09 275 5200 Mobile: 021 800 486. Email: bobbyk@tropicalfresh.co.nz
New Zealand Market Analysis – Fiji and Pacific Island Papaya

importation of papaya from Fiji as profitable due the amount of handling required and the amount of rejects. Asian buyers prefer Fiji papaya because of its sweetness.

**Main issues with marketing Fiji papaya.** TF has a number of issues with the quality of Fiji papaya:

- Packaging – the non waxed cartons are two week and to large – the lower cartons in stack cave in under the weight and moisture.
- Inconsistence in the count – we ask for 12 count and we often get 15 – 16, with small fruit put in the box as fillers.
- Rough handling in Fiji – results in bruising which shows up after heat treatment – such fruit is rejected in New Zealand.
- Poor information received by Fiji farmers resulting in unrealistic price demands.
- The high cost of quarantine treatment in Fiji – 40c/kg

### 1.10.2 Industry representatives

**Kevin Nalder, New Zealand Produce Importers Association (NZPIA)**

The NZPIA is an organisation that represents the interests of produce importers and is supported by levies imposed on member companies. The CEO of the NZPIA is Kevin Nalder. Kevin work for MAF Quarantine and was responsible for the Pacific Islands. He was involved in the certification of the HTFA facilities in Fiji and the Cook Islands.

**Monitor & Evaluation:** There is a need to have an independent person (or team) to conduct regular follow ups on Pacific Island produce imports. The person would operate along the entire supply chain and provide feedback to the suppliers. They would also provide an independent trouble shooting function. This service could come under the umbrella of PITIC and be donor funded.

**Quality control:** There is a lack of quality control in Pacific island produce imports. To expand the market there is a need to implement standards along the entire chain that adhere to NZ and Australian standards. It needs to be demonstrated to PIC supplier the financial benefits of adhering to the standards at each stage of the value chain. This will require a benching marching of the current situation.

**Main issues:** From NZPIA perspective the main issues for Pacific islands produce are quality and consistency of supply. Market access in itself will not guarantee success.

**Market trends:** The major market trend in the fresh produce market is that the supermarkets are enforcing their own quality standards – such as the Woolworths Quality Standards Authority (WQSA). This means that the supermarkets will require their supplies to meet these standards, who in turn will put pressure down through their supply chain. Fiji papaya exporters, directly or indirectly will need to meet these standards if they are to maintain or expand market share. This trend is leading to forces differentiation in the market between those that supply the larger “progressive” supermarket (accredited suppliers) and those that don’t. The former ground is expanding, while the later is contracting. The challenge for Fiji papaya exporters to get into the accredited supplier group. This requires establishing export standards and controlling compliance (how was the product harvested, post harvest handling etc.). The key is consistency – both in terms of supply and quality.

**Opportunities identified:** Kevin Nalder identified a number of opportunities for Fiji papaya:

- Organic certification to differentiate the Fijian product
- Making the quarantine treatment requirements less arduous but still meeting NZ bio-security standard (requires presentation of data and appropriate lobbying)

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25 New Zeland Fresh Produce Importers Association (NZPIA). Unit 1102, Level 11, 156 Willis St, Wellington. PO Box 24-322, Manners St. Wellington 6142. Phone: 04 801 5042 Mobile: 021 480 660 Email: nzfpia@xtra.co.nz
The desirability of presenting Dole and Fijian papaya together.
• Turning reject papaya into dried fruit and other processed forms.

1.10.3 Dried fruit buyers

**International Foods**

Importer and distributor of processed and packaged food, including dried fruit. Handle Pacific islands products including cocoa beans, biscuits and coconut cream.

- International Foods Ltd does not import dried fruit is buys it
- **Market Trends:**
  - People are far more aware of what they are putting in their bodies and some will touch products from the East (e.g. China)
  - Organics:
    - A growing market in NZ
    - People are only as green and socially conscious as deep as their pockets
    - Opportunity: need to add value and price organic products that would compete effectively against non organic products
    - Fair Trade is yet to hit its mark
- **Demand:**
  - Bakeries prefer diced and sliced dried fruit
  - Snack market prefer chunks
  - IMPT: Colour is important
    - Artificial colouring is not good as consumer prefer a natural product.
    - E.g. artificial colouring (orange) applied to dried mangoes
  - People are concerned about the sulphur treatment to dried fruit
- **Supply**
  - Most of the dried fruit is sourced from the East
  - About 90% of the dried fruit is packed in NZ
    - Buy 20kg and divide into 4-5kg bags
- **Issues:**
  - Quality and supply from Fiji – products from Fiji need that point of difference
  - Health & safety
  - Biosecurity should not be underestimated
  - Shipping
  - Business culture: difficult to communication with Pacific business partner
- **Opportunity:**
  - Branding:
    - Build a brand is a big task which may take up to 5-10 years
    - **Challenge:**
      - Generation Gap = 1st generation Pacific Islanders in NZ look for brand they are familiar with at home; 2nd-3rd generation P.I. in NZ are becoming less likely to buy these brands
      - This argument is evident in the consumer trends for cabin bread (Lees Biscuits) and to a lesser extent corn beef
  - Move your bulk product to NZ and let NZ add the value

**Robert Hammond, Davis Trading Ltd**

- Davis Trading Ltd

26 Davis Trading Co. Ltd. PO Box 9907, New Market, Auckland 1149, New Zealand. 91 Carbine Road, Mt Wellington, Auckland, New Zealand. Phone: 9 574 2250 Mobile: 21 622 183. Email: rhammond@davis.co.nz Website: www.davis.co.nz
New Zealand Market Analysis – Fiji and Pacific Island Papaya

- Receive mixed container from Thailand = 5ml diced cereal; 10ml other
- Papaya bereneal = 8ml; papaya diced = 10ml; papaya snack = 12ml
- Davis Trading Ltd is interested in bulk

- Demand:
  - Retail:
    - Prefer the natural reddish colour in dried papayas
    - The product is infused with sugar
    - Pineapple and papaya go hand in hand
    - Papaya is infused with lime green strip
  - Supply:
    - 10 tons a month of papayas
- Opportunity:
  - Create a healthy (low sugar) product that can compete on price

1.10.4 Organic buyers

**Doug Hamilton, Fresh Direct Ltd**

- Fresh Direct Ltd:
  - Imports mainly from USA, Australia, China and etc
  - 'It is within our intention to import from Fiji'
  - Pure Fresh is the largest organics supplier
  - Progressive Ltd will channel organic products through Fresh Direct
- Demand:
  - Organics is a growing market

1.10.5 Farm Budget 1

Farmer planting papaya on a one acre farm for the first three years using hired labor 17/07/09

<table>
<thead>
<tr>
<th>Year</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Total number of trees</td>
<td>480</td>
<td>960</td>
<td>1,440</td>
<td>960</td>
<td>480</td>
<td>4320</td>
</tr>
<tr>
<td>2 Total marketable production @ 1.5kg/tree/month</td>
<td>1440</td>
<td>20160</td>
<td>47520</td>
<td>28800</td>
<td>5760</td>
<td>103680</td>
</tr>
<tr>
<td>3 2/3 for export</td>
<td>959</td>
<td>13427</td>
<td>31648</td>
<td>19181</td>
<td>3836</td>
<td>69051</td>
</tr>
<tr>
<td>4 1/3 for local market</td>
<td>480</td>
<td>6713</td>
<td>15824</td>
<td>9590</td>
<td>1918</td>
<td>34525</td>
</tr>
<tr>
<td>5 Revenue from exports (@ 0.90c/kg)</td>
<td>863</td>
<td>12084</td>
<td>28483</td>
<td>17263</td>
<td>3453</td>
<td>62146</td>
</tr>
<tr>
<td>6 Revenue from local sales (@ 0.70c/kg)</td>
<td>336</td>
<td>4699</td>
<td>11077</td>
<td>6713</td>
<td>1343</td>
<td>24168</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td>1199</td>
<td>16783</td>
<td>39560</td>
<td>23976</td>
<td>4795</td>
<td>86314</td>
</tr>
</tbody>
</table>

**Costs**

| Non Labor Cash Expenses | | | | | | |
|-------------------------|--------|--------|--------|--------|--------|
| 7 Land rental @ $1068/spread over 1 year | 600 | 600 | 600 | 600 | 600 | 3000 |
| 8 Seedlings @ $0.50 x 480plants | 240 | 240 | 240 | | | 720 |
| 9 Land Preparation | | | | | | |
| Ploughing x 2 @ $90.00/acre | 180 | 180 | 180 | | | 540 |
| Harrowing x 2 @ $60.00/acre | 120 | 120 | 120 | | | 360 |
| Ridging x 1 @ $50.00/acre | 50 | 50 | 50 | | | 150 |
| **Subtotal** | 1190 | 1190 | 1190 | 600 | 600 | 4770 |

27 Doug Hamilton, Import Manager. Fresh Direct Ltd, 29 Clemow Drive, Mt Wellington. PO Box 17 470 Auckland 1546 New Zealand. Phone: 09 573 4100. Mobile: 021 415 942. Email: dhamilton@freshdirect.co.nz
New Zealand Market Analysis – Fiji and Pacific Island Papaya

NPK 16:16:16 @ 80grams/bearing tree/month  384  768  1152  768  384  3456
Urea - 10grams /seedling hole @ $0.10  48  48  48  48  144
Poultry manure @ $3.00/bag (120bags/acre)  360  360  360  1080
Glyosoholate Weedicide- 20ltr @ $280/acre/year  280  560  840  560  280  2520
Irrigation Equipment and labor  500  500  500  500  500  2500
Knapsack - 20ltr @ $435  435  435  435  435  435  2175
Subtotal  2007  2671  3335  2263  1599  11875
Total Non Labor Cash Expenditure  3197  3861  4525  2863  2199  16645

Labor inputs (person days)
Land clearing  6  6  6  6  18
Lining and digging holes  2  2  2  2  6
Planting (5 persons x 2days)  10  10  10  10  30
Fertilizer application @ once/month x 2 persons  12  24  36  24  12  108
Hoeing / Ring weeding x 5 persons  45  45  45  45  135
Pest control and sanitation x 2 persons  24  24  24  24  24  120
Harvesting and packing in field bins x 2 persons  16  56  88  80  32  272
Grading and packing for sale x 2 persons  16  56  88  80  32  272
Total Labor input  131  223  299  299  208  100  961

Imputed cost of labor @ $15.00/day  1965  3345  4485  3120  1500  14415
Average labor days/annum  192.2
Total costs (non labor costs + labor costs)  5162  7206  9010  5983  3699  31060
Gross margin (Total Revenue - Total Cash expenditure)  -3963  9577  30550  17993  1096  55254
Average gross margin over 5 years  11051
Average gross margin /acre  3684

Footnotes
1 Assuming the farmer plants 1 acre of papaya trees every year for the first three years
2 Total marketable fruit @ 1.5kg per tree/month (Average)
3 Exportable fruit account for 70% of total production which mostly include hermaphrodite
4 The other 30% accounts for female fruit, undersized , deformed and non exportable
5 Farm gate price for exportable fruit is is @ $0.90
6 Current local market price is @ $0.70
7 Land rental is based on the (NLTB) First Class (UCV) Unimproved Capital Value for the Province of BA @ $2476.56/ha.
Note that papaya on the ground accounts for only 3acres of the whole 12acre lease
8 The seedlings are sourced from TTM @ $0.50/seedlings(for growers outside the group) TTM growers pay $0.40/seedling
9 Land preparation quote is the standard quote used by tractor drivers in the Sigatoka valley ( 03/03/09)
10 Fertilizer and other Agri chemicals are sourced from any Hardware department while poultry manure is sourced from
various poultry sheds in the Eastern Division. Irrigation pumps are hired from the Agricultural Department and shared
amongst the farmers i.e. one water pump among a group of 8 -12 farmers
11 The total non labor cash expenditure
12 The total labor input during the five year period

Summary table of farmer planting 1acre for the first three years using hired labor

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Revenue</td>
<td>1199</td>
<td>16783</td>
<td>39560</td>
<td>23976</td>
<td>4795</td>
</tr>
<tr>
<td>Total non labor</td>
<td>3197</td>
<td>3861</td>
<td>4525</td>
<td>2863</td>
<td>2199</td>
</tr>
<tr>
<td>Total labor</td>
<td>1725</td>
<td>3345</td>
<td>4485</td>
<td>3120</td>
<td>1500</td>
</tr>
<tr>
<td>Net margin</td>
<td>-3723</td>
<td>9577</td>
<td>30550</td>
<td>17993</td>
<td>1096</td>
</tr>
</tbody>
</table>

48 of 54
## Exporter Budget 1

The costs and return from exporting 1 tonne of papaya to New Zealand (July 5th 2009)

<table>
<thead>
<tr>
<th></th>
<th>$/kg</th>
<th>$/carton</th>
<th>Total shipment($)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost of fruit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Papaya purchased (1.2 tonnes @ $0.90/kg)</td>
<td>0.9</td>
<td>4.50</td>
<td>1,080</td>
</tr>
<tr>
<td><strong>Transportation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Farm to exporters shed</td>
<td>0.06</td>
<td>0.30</td>
<td>72</td>
</tr>
<tr>
<td>3 Exporters shed to NWC</td>
<td>0.01</td>
<td>0.73</td>
<td>13</td>
</tr>
<tr>
<td><strong>Materials</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 cartons</td>
<td>0.3</td>
<td>1.50</td>
<td>300</td>
</tr>
<tr>
<td>5 sponges and tape</td>
<td>0.01</td>
<td>0.26</td>
<td>17</td>
</tr>
<tr>
<td>6 sticker</td>
<td>0.05</td>
<td>0.24</td>
<td>48</td>
</tr>
<tr>
<td>7 Quarantine treatment @ NWC $0.39/kg (VIP)</td>
<td>0.39</td>
<td>1.95</td>
<td>390</td>
</tr>
<tr>
<td><strong>Labor Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Lead Supervisor (8 hours @ $4/hour)</td>
<td>0.03</td>
<td>0.16</td>
<td>32</td>
</tr>
<tr>
<td>9 Pack house supervisor (5 hours @ $3/hour)</td>
<td>0.02</td>
<td>0.08</td>
<td>15</td>
</tr>
<tr>
<td>10 Washing (2 hours @$2.50/hour)</td>
<td>0.01</td>
<td>0.06</td>
<td>13</td>
</tr>
<tr>
<td>11 Grading and packing (3 hours $2.50/hour)</td>
<td>0.01</td>
<td>0.04</td>
<td>8</td>
</tr>
<tr>
<td><strong>Overheads</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Telecommunications ($150/month spread over 10 tonnes of produce)</td>
<td>0.02</td>
<td>0.08</td>
<td>15</td>
</tr>
<tr>
<td>13 Electricity ($210 spread over 10 tonnes)</td>
<td>0.02</td>
<td>0.11</td>
<td>21</td>
</tr>
<tr>
<td>14 Rental of pack house ($150/month spread over 10 tonnes)</td>
<td>0.02</td>
<td>0.08</td>
<td>15</td>
</tr>
<tr>
<td>15 Miscellaneous ($300/month spread of ten tonnes)</td>
<td>0.03</td>
<td>0.15</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total FOB costs (to point of export)</strong></td>
<td>1.88</td>
<td>10.22</td>
<td>2067.50</td>
</tr>
<tr>
<td><strong>Exporters Gross Margin (15% Fob cost)</strong></td>
<td>0.28</td>
<td>1.53</td>
<td>310.13</td>
</tr>
<tr>
<td><strong>Fob price</strong></td>
<td>2.16</td>
<td>11.75</td>
<td>2377.63</td>
</tr>
<tr>
<td><strong>Freight to New Zealand (for LD3 1,300kgs)</strong></td>
<td>1.24</td>
<td>6.20</td>
<td>1,240</td>
</tr>
<tr>
<td><strong>New Zealand fees (documentation and inspection)</strong></td>
<td>0.2</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td><strong>New Zealand landed price</strong></td>
<td>3.60</td>
<td>18.95</td>
<td>3,818</td>
</tr>
<tr>
<td><strong>New Zealand wholesale price (20% of landed price)</strong></td>
<td>4.32</td>
<td>21.58</td>
<td>4,316</td>
</tr>
</tbody>
</table>

**Footnotes:**

1. It is assumed that the exporter buys papaya from farmers in the Sigatoka valley for 0.90cents/kg. The exporter buys 1.2 tonnes in order to export just one tonne.
2. For transportation costs from the farm to the exporters shed the exporter incurs a cost of 0.06cents/kg,
New Zealand Market Analysis – Fiji and Pacific Island Papaya

this is assuming the cost of transportation from the farm to exporters shed is $150.

3. From the exporters shed to NWC transportation costs are calculated $0.01/kg based on a total trip cost of $15.

4. Based on carton cost of $1.50 each (no print) from Golden Manufacturers, Suva.

5. Based on rough estimates provided by exporters.

6. Estimate

7. Quarantine treatment at NWC for exporters who pay on time is $0.39/kg. On the other hand exporters who do not pay on time are being charged $0.45/kg.

8. Labour estimates based on exporter interviews

9. Phone, fax, internet

10. coolers, office equipment etc.

11. based on exporter interviews

12. Office stationary, VAT, Income Tax, bookkeeping fees

13. Based on figures provided by Corporate Freight Services – April 2009

14. Based on exporter interviews.

1.10.7 Farm Budget 2 (80c scenario)

Farmer planting papaya on a one acre farm for the first three years using hired labor 17/07/09

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Total number of trees</td>
<td>480</td>
<td>960</td>
<td>1,440</td>
<td>960</td>
<td>480</td>
<td>4320</td>
</tr>
<tr>
<td>2 Total marketable production @ 1.5kg/tree/month</td>
<td>1440</td>
<td>20160</td>
<td>47520</td>
<td>28800</td>
<td>5760</td>
<td>103680</td>
</tr>
<tr>
<td>3 2/3 for export</td>
<td>959</td>
<td>13427</td>
<td>31648</td>
<td>19181</td>
<td>3836</td>
<td>69051</td>
</tr>
<tr>
<td>4 1/3 for local market</td>
<td>480</td>
<td>6713</td>
<td>15824</td>
<td>9590</td>
<td>1918</td>
<td>34525</td>
</tr>
<tr>
<td>5 Revenue from exports (@ 0.80c/kg)</td>
<td>767</td>
<td>10741</td>
<td>25319</td>
<td>15345</td>
<td>3069</td>
<td>55241</td>
</tr>
<tr>
<td>6 Revenue from local sales (@ 0.70c/kg)</td>
<td>336</td>
<td>4699</td>
<td>11077</td>
<td>6713</td>
<td>1343</td>
<td>24168</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td>1103</td>
<td>15441</td>
<td>36396</td>
<td>22058</td>
<td>4412</td>
<td>79409</td>
</tr>
</tbody>
</table>

| **Costs** |   |   |   |   |   |       |
| Non Labor Cash Expenses |   |   |   |   |   |       |
| 7 Land rental @ $1068(spread over 1 year) | 600 | 600 | 600 | 600 | 600 | 3000 |
| 8 Seedlings @ $0.50 x 480plants | 240 | 240 | 240 |   |   | 720 |
| **Land Preparation** |   |   |   |   |   |       |
| Ploughing x 2 @ $90.00/acre | 180 | 180 | 180 |   |   | 540 |
| Harrowing x 2 @ $60.00/acre | 120 | 120 | 120 |   |   | 360 |
| Ridging x 1 @ $50.00/acre | 50 | 50 | 50 |   |   | 150 |
| **Subtotal** | 1190 | 1190 | 1190 | 600 | 600 | 4770 |

| **Fertilizer & other Agri - Chemicals** |   |   |   |   |   |       |
| NPK 16:16:16 @ 80grams/bearing tree/month | 384 | 768 | 1152 | 768 | 384 | 3456 |
| Urea - 10grams /seedling hole @ $0.10 | 48 | 48 | 48 |   |   | 144 |
| Poultry manure @ $3.00/bag (120bags/acre) | 360 | 360 | 360 |   |   | 1080 |
| Glyphosate Weedicide- 20ltr @ $280/acre/year | 280 | 560 | 840 | 560 | 280 | 2520 |
| Irrigation Equipment and labor | 500 | 500 | 500 | 500 | 500 | 2500 |
| Knapsack - 20ltr @ $435 | 435 | 435 | 435 | 435 | 435 | 2175 |
| **Subtotal** | 2007 | 2671 | 3335 | 2263 | 1599 | 11875 |
| **Total Non Labor Cash Expenditure** | 3197 | 3861 | 4525 | 2863 | 2199 | 16645 |
| **Labor inputs (person days)** |   |   |   |   |   |       |
Land clearing & 6 & 6 & 6 & 18  
Lining and digging holes & 2 & 2 & 2 & 6  
Planting (5 persons x 2days) & 10 & 10 & 10 & 60  
Fertilizer application @ once/month x 2 persons & 12 & 24 & 36 & 24 & 12 & 108  
Hoeing / Ring weeding x 5 persons & 45 & 45 & 45 & 135  
Pest control and sanitation x 2 persons & 24 & 24 & 24 & 24 & 24 & 120  
Harvesting and packing in field bins x 3 persons & 8 & 56 & 88 & 80 & 32 & 264  
Grading and packing for sale x 3 persons & 8 & 56 & 88 & 80 & 32 & 264  
**Total Labor input** & 115 & 223 & 299 & 208 & 100 & 945  

**Imputed cost of labor @ $15.00/day** & 1725 & 3345 & 4485 & 3120 & 1500 & 14175  
**Average labor/annum** & 189  
**Total costs (non labor costs + labor costs)** & 4922 & 7206 & 9010 & 5983 & 3699 & 30820  
**Gross margin (Total Revenue - Total Costs)** & -3819 & 8235 & 27386 & 16075 & 713 & 48589  
**Average gross margin over 5 years** & 9718  
**Average gross margin /acre** & 3239  

Footnotes  
1. Assuming the farmer plants 1 acre of papaya trees every year for the first three years  
2. Total marketable fruit @ 1.5kg per tree/month (Average)  
3. Exportable fruit account for 70% of total production which mostly include haemoprodite  
4. The other 30% accounts for female fruit, undersized, deformed and non exportable  
5. Farm gate price for exportable fruit is @ $0.80  
6. Current local market price is @ $0.70  
7. Land rental is based on the (NLTB) First Class (UCV) Unimproved Capital Value for the Province of BA @ $2476.56/ha. Note that papaya on the ground accounts for only 3acres of the whole 12acre lease  
8. The seedlings are sourced from TTM @ $0.50/seedlings(for growers outside the group) TTM growers pay $0.40/seedling  
9. Land preparation quote is the standard quote used by tractor drivers in the Sigatoka valley (03/03/09)  
10. Fertilizer and other Agri chemicals are sourced from any Hardware department while poultry manure is sourced from various poultry sheds in the Eastern Division. Irrigation pumps are hired from the Agricultural Department and shared amongst the farmers i.e. one water pump among a group of 8-12 farmers  
11. The total non labor cash expenditure  
12. The total labor input during the five year period

Summary table of farmer planting 1acre for the first three years using hired labor

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Revenue</td>
<td>1103</td>
<td>1541</td>
<td>36396</td>
<td>22058</td>
<td>4412</td>
</tr>
<tr>
<td>Total non labor cost</td>
<td>3197</td>
<td>3861</td>
<td>4525</td>
<td>2863</td>
<td>2199</td>
</tr>
<tr>
<td>Total labor cost</td>
<td>1725</td>
<td>3345</td>
<td>4485</td>
<td>3120</td>
<td>1500</td>
</tr>
<tr>
<td>Net margin</td>
<td>-3819</td>
<td>8235</td>
<td>27386</td>
<td>16075</td>
<td>713</td>
</tr>
</tbody>
</table>

**1.10.8 Gross margin for planting one acre of sugar cane in the Sabeto Valley**

**Gross margin from planting 1 acre of sugar cane (updated May 2009)**

<table>
<thead>
<tr>
<th>Plant crop</th>
<th>unit</th>
<th>no of units</th>
<th>rate/unit ($)</th>
<th>total/acre($)</th>
</tr>
</thead>
</table>

51 of 54
## Land preparation

<table>
<thead>
<tr>
<th>Activity</th>
<th>Application</th>
<th>Rate (NZ$)</th>
<th>Total (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ploughing</td>
<td>3</td>
<td>90</td>
<td>270</td>
</tr>
<tr>
<td>Harrowing</td>
<td>3</td>
<td>60</td>
<td>180</td>
</tr>
<tr>
<td>Drilling</td>
<td>1</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

Sub-total: 480

### Seed cane

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate (Tonnes)</th>
<th>Total (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed cane</td>
<td>5</td>
<td>53.5</td>
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</tbody>
</table>

### Land rental

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate (Yearly)</th>
<th>Total (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land rental</td>
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<td>260</td>
</tr>
</tbody>
</table>

### Fertiliser and agrichemicals

<table>
<thead>
<tr>
<th>Activity</th>
<th>Application</th>
<th>Rate (NZ$)</th>
<th>Total (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blend A fertiliser</td>
<td>2</td>
<td>31.5</td>
<td>63</td>
</tr>
<tr>
<td>Blend B fertiliser</td>
<td>5</td>
<td>31.5</td>
<td>158</td>
</tr>
<tr>
<td>Pre-emergent herbicide</td>
<td>1</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Post - emergent herbicide</td>
<td>1</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

Sub-total: 281

### Cultivation

<table>
<thead>
<tr>
<th>Activity</th>
<th>Application</th>
<th>Rate (NZ$)</th>
<th>Total (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiller</td>
<td>3</td>
<td>75</td>
<td>225</td>
</tr>
<tr>
<td>Transporation</td>
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<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

Sub-total: 275

### Labour inputs

<table>
<thead>
<tr>
<th>Activity</th>
<th>Person Days</th>
<th>Rate (NZ$)</th>
<th>Total (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting and loading seed cane</td>
<td>5</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Planting</td>
<td>10</td>
<td>20</td>
<td>200</td>
</tr>
<tr>
<td>Fertiliser application</td>
<td>3</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>Hoeing</td>
<td>5</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Spraying of herbicides</td>
<td>2</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Weed thrashing</td>
<td>10</td>
<td>20</td>
<td>200</td>
</tr>
</tbody>
</table>

Subtotal: 700

### Harvesting costs

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate (Tonnes)</th>
<th>Total (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvesting</td>
<td>45</td>
<td>21</td>
</tr>
</tbody>
</table>

### Other costs

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate (NZ$)</th>
<th>Total (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCGC levy</td>
<td>45</td>
<td>1</td>
</tr>
<tr>
<td>Drainage and Cane access road levy</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>Rice advance</td>
<td>1</td>
<td>240</td>
</tr>
<tr>
<td>Sugar advance</td>
<td>1</td>
<td>140</td>
</tr>
</tbody>
</table>

Subtotal: 515

### Total plant cane cost

3,723

### Plant cane revenue

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate (Tonnes)</th>
<th>Total (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant cane revenue</td>
<td>45</td>
<td>61.5</td>
</tr>
</tbody>
</table>

### Gross Margin (revenue - cost)

(956)

### Ratoon crop

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate (Yearly)</th>
<th>Total (NZ$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land rental</td>
<td>1</td>
<td>260</td>
</tr>
<tr>
<td>Fertiliser and agrichemicals</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Blend A/ B fertiliser</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Blend C fertiliser</td>
<td>5</td>
<td>31.5</td>
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</tbody>
</table>
## New Zealand Market Analysis – Fiji and Pacific Island Papaya

<table>
<thead>
<tr>
<th></th>
<th>4 litre</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-emergent herbicide</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Post - emergent herbicide</td>
<td>1</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Sub-total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cultivation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tiller application</td>
<td>3</td>
<td>75</td>
<td>225</td>
</tr>
<tr>
<td>Transporation trip</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td></td>
<td></td>
<td>225</td>
</tr>
<tr>
<td><strong>Labour inputs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertiliser application person days</td>
<td>3</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>Hoeing person days</td>
<td>5</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Spraying of herbicides person days</td>
<td>2</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Weed thrashing person days</td>
<td>10</td>
<td>20</td>
<td>200</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td></td>
<td>400</td>
</tr>
<tr>
<td><strong>Harvesting costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonnes</td>
<td>40</td>
<td>21</td>
<td>840</td>
</tr>
<tr>
<td><strong>Other costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCGC levy tonne</td>
<td>40</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Drainage and Cane access road levy tonne</td>
<td>40</td>
<td>2</td>
<td>80</td>
</tr>
<tr>
<td>Rice advance yearly</td>
<td>1</td>
<td></td>
<td>240</td>
</tr>
<tr>
<td>Sugar advance yearly</td>
<td>1</td>
<td></td>
<td>140</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td><strong>Total ratoon cane cost</strong></td>
<td></td>
<td></td>
<td><strong>2,673</strong></td>
</tr>
<tr>
<td><strong>Plant cane revenue</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonnes</td>
<td>40</td>
<td>61.5</td>
<td><strong>2,460</strong></td>
</tr>
</tbody>
</table>

**Gross Margin (revenue - cost)**  
(213)

*Source: Data supplied by Livai Tora Sabeto Valley*