Improving Marketing Services for the Fiji Fruit and Vegetable Export Industry: An Alternative Livelihoods Project Proposal from Natures Way

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NATURE'S WAY

Improving Marketing Services for the Fiji Fruit and Vegetable Export Industry: An Alternative Livelihoods Project (ALP) Funding Proposal from Natures Way Cooperative (Fiji) Ltd.

1 Summary

This is a proposal from the fruit and vegetable export industry via Natures Way Cooperative (Fiji) Ltd (NWC). The Project involves institutional development, capacity building and services development. The primary aim is to substantially increase the contribution of fruit and vegetable exports to livelihoods of rural people in western Viti Levu.

There are two principal outcomes from the Project

- A doubling of quarantine treatment capacity for the export of fresh fruit and vegetables that are fruit fly hosts.
- Increased production of high quality fruit and vegetables to take full advantage of the increased quarantine treatment capacity and available markets.

The Project, that is based on a strong partnership between the public and private sector, has two principal components:

Component 1: To double Fiji quarantine treatment capacity for the export of fresh fruit and vegetables. This will involve: increasing the packing area; an additional treatment chamber; expanded administrative facilities; grading and handling equipment and improved systems; and, an additional fork lift

Component 2: To create a focused industry outreach program to facilitate the substantial increase in the volume and quality of fruit and vegetable exports. This will involve the establishment of a NWC field service and the acquisition of field crates for farmers.

Over the last decade NWC has invested retained earnings in a program to increase treatment capacity and to enhance product quality. The total value of this investment has been around $250, 000. NWC's projected cash flow position is such that it is in a position to make incremental capital investments in the order of $25, 000 per year. However, there is not sufficient retained earnings to make the large scale capital investment required to take the export fruit and vegetable industry beyond its current level and into the future. The request to ALP is for assistance to enable the industry to make this quantum jump.

The annual farm value of the 1,000 tonnes of produce currently treated by the NWC's is around $800, 000. A more than a three fold increase in this amount can be expected as a result of the Project. The Project removes a critical bottleneck to agricultural export diversification. It complements a number of other initiatives that are being supported by ADB, NZAID and the EU. Without a substantial increase in quarantine treatment capacity, and an associated increase in product quality, these initiatives will be of limited value.

This investment generates a high economic rate of return. In contrast, the risks are low. The Project involves the expansion of existing activity by a financially viable industry owned business with a proven track record dealing with a proven technology. In comparison the economic and social consequences of not proceeding with the Project are considerable.

The benefits of the Project can be measured in terms of:

- increased value added from exports;
- increased efficiency of NWC operations;

- increased employment and provision of rural livelihoods; and,
- environmentally sustainable production practices.

The fob value of additional exports arising from the Project is projected to increase from $200,000 in 2007 to $3.5 million in 2011. Farmer income is estimated to increase by some $100,000 in 2007 to around $1.5 million in 2011. Direct employment arising from NWC operations is projected to increase from around 420 people in 2006 to over 1,200 in 2011. NWC's non-chemical quarantine treatment opens up opportunities to develop markets based on environmental sustainability and the health concerns of consumers in importing countries.

The total cost of the project over a 5-year period is estimated at $2.74 million. ALP's share of the total cost is $1.10 (40%) and NWC's share is $1.64 million (60%). Under the proposal, ALP meets 85% of the capital cost and the industry 15%; with industry meeting 95% of the operating costs and ALP 5%.

Benefits and cost are compared the results show this to be a hugely economically viable Project. Over a 5-year period the Project has a benefit cost ratio of 3.3. The internal rate of return (IRR) for Project is 109% , with Net Present Value (NPV) of $3.7 million (applying a 12% discount rate).

2 An ALP Agriculture Diversification Activity

This is a proposal from the fruit and vegetable export industry via Natures Way Cooperative (Fiji) Ltd (NWC). The Project involves institutional development, capacity building and services development.

3 Aims and objectives

The primary aim of the Project is to substantially increase the contribution of fruit and vegetable exports to livelihoods of rural people in western Viti Levu.

4 Outcomes

There are two principal outcomes from the Project

- A doubling of quarantine treatment capacity for fresh fruit and vegetables to reach around 5, 000 tonnes per annum.
- Increased production of high quality fruit and vegetables to take full advantage of increased quarantine treatment capacity and available markets.

5 Outputs

The tangible products of the proposed project are:

- A 2, 500 tonnes increase in annual quarantine treatment capacity.
- A sustainable field service for the fruit and vegetable industry.

6 The Components and Sub-components of the Proposed Project

Component 1: To double Fiji's quarantine treatment capacity for the export of fresh fruit and vegetables. This component has 5 sub-components:

Sub-components:

1. Increasing the packing area (2 bay extension)
2. An additional treatment chamber (with bins)
3. Expanded administrative facilities
4. Grading and handling equipment and improved systems.
5. Purchase of an additional fork lift

Component 2: To create a focused industry outreach program to facilitate the substantial increase in the volume and quality of fruit and vegetable exports. This component has 2 sib-components

Sub-components:

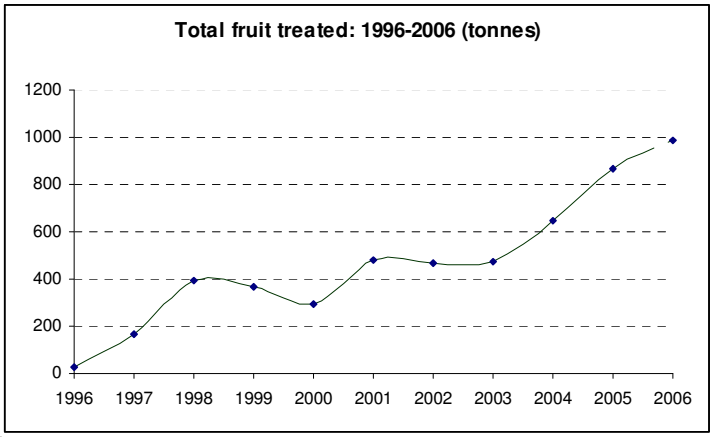
1. Establishment of a NWC field service
2. Acquisition of field crates for farmers.

7 Background

Most of Fiji's horticultural export markets were lost when the chemical ethylene dibromide was banned as a quarantine treatment in 1990. Fortunately Fiji was proactive in addressing this constraint. In a unique partnership between industry and government, Fiji embarked on an ambitious project to acquire high temperature forced air (HTFA) quarantine treatment technology developed by the United States Department of Agriculture (USDA). Nature's Way Cooperative

(Fiji) Ltd was registered on August 15th 1995 to own and operate the new quarantine treatment facility on behalf of Fiji's fruit growers and exporters. The USAID requirement was that the quarantine treatment facility be operated by the private sector (the industry). This was a major departure from the tradition in the Pacific Islands of government operating quarantine facilities. The Ministry of Agriculture had the foresight to embrace this new approach, which led to the creation of industry business to operate the treatment facility. Today, as a result, Fiji has thriving and growing industry in the export of fruit fly host commodities to New Zealand and Australia. NWC now has around 120 shareholding members, most of which are small farmers located in the Sigatoka Valley and in the Nadi area.

Over the last decade NWC has grown from a small business handling just 30 tonnes of papaya to an agribusiness treating 1,000 tonnes fruit (papaya, mango, eggplant and breadfruit) annually for export. In achieving this, the Cooperative has had to overcome major constraints. These included the unavailability of start-up working capital; the political crisis of 2000 and its disruption to trade; and, market access barriers. In being able to overcome these problems, Natures Way has become a stronger organisation better able to serve its members.



Due to the success of Natures Way, the livelihoods of small farmers in the cane growing areas have been enhanced by around $1 million annually. A three fold increase in this amount can be expected in the next few years. Such a development could not be more timely given the crisis faced by the sugar industry with the loss of preferential access to the EU. The Alternative Livelihood Project (ALP) identifies horticultural exports as one of the major immediately available alternatives to sugar. A key factor in this assessment was the existence of Natures Way with a proven track record as an industry owned quarantine treatment business.

8 Project components

8.1 Component 1: To double Fiji's quarantine treatment capacity.

8.1.1 Treatment capacity - a limiting factor to fruit exports

8.1.1.1 Current treatment capacity

NWC currently operates two parallel treatment systems:

- The original dual chamber system operating since 1996. These two chambers in the dual system can operate independently or together. The dual system is to use treatment lugs or bin. The dual system is used for all four crops currently handled by NWC.
- A wide body system installed in 2005. The wide body system is only equipped with lugs. The wide-body system is not used for eggplant.

Table 1 shows the treatment capacity for each system for the four crops currently handled.

Table 1: The current treatment capacity of the NWC facility

	Papaya		Eggplant		Mango		Breadfruit	
	tonnes	hours	tonnes	hours	tonnes	hours	tonnes	hours
Dual system (lugs)	2.6	5	2.4	4.5	2.6	4		
Dual system (bins)	3.6	6	2.2	4.5	3.2	5	2.6	6
Wide-body(lugs)	2.5	6			2.6	5	1.8	6
Maximum capacity	6.1		2.4		5.8		4.4	

In any day a maximum of 6.1 tonnes of papaya can be treated if each of the treatment chambers is devoted to papaya, with one run per chamber. Similarly a maximum of 5.8 tonnes of mango, 4.4 tonnes of breadfruit, and 2.4 tonnes of eggplant could be treated. Papaya and eggplant are available year round, while mango and breadfruit are seasonal crops. A typical treatment day involves either papaya, eggplant or a combination of both. Papaya is increasingly becoming the dominant product. The seasonal crops of mango and breadfruit place peak demands on treatment capacity. This is particularly felt in November and December if there is a good season for improved variety mangoes.

With the existing facilities it takes around 11 hours to handle 6.1 tonnes of papaya, as shown schematically in figure 1. Under current arrangements only the fruit treated in the LHS of the dual chamber is packed on the same day. The remainder of the treated fruit is packed the next day during the time that treatments are in progress. It is possible to increase the quantity of papaya handled in a day to 7.9 tonnes by packing the fruit treated in RHS dual chamber on the day of treatment. This would increase the overall time by a further 3 hours to 14 hours as shown schematically in Figure 2. The capacity ceiling of 7.9 tonnes of papaya per day was reached several times during peak demands periods of 2006.

Figure 1: The treatment of 6.1 tonnes of papaya with existing treatment facilities

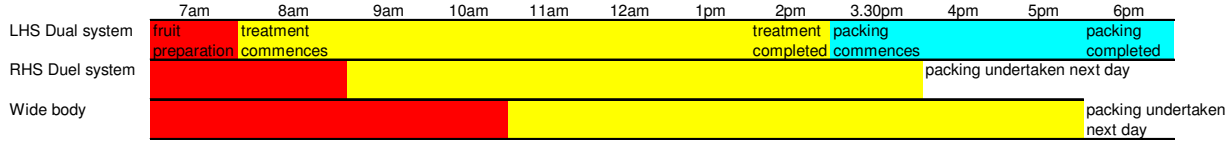


Figure 2: The treatment of 7.9 tonnes of papaya with existing treatment facilities

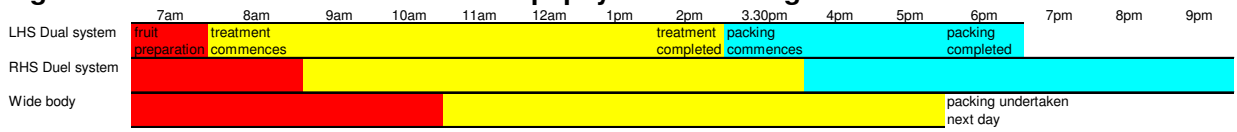
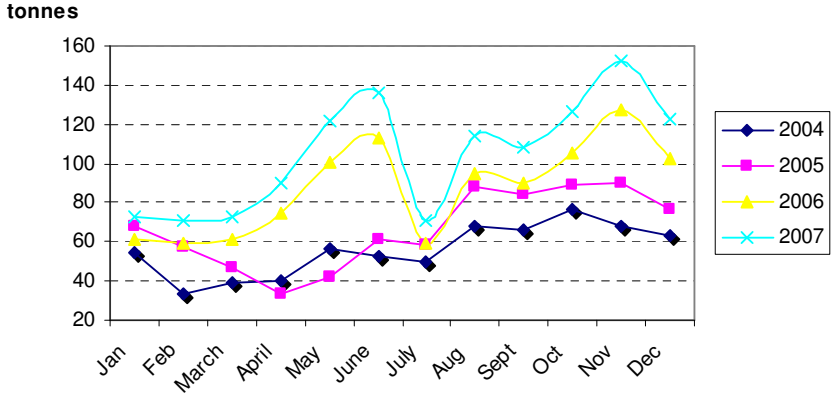


Figure 2: Monthly treatments 2004-2007



If there was sufficient packing space available it would be possible to pack the fruit treated in wide-body chamber on the day of treatment by running two shifts. This would allow 10.4 tonnes to be handled in a day. However, currently there is not sufficient packing space to allow this. Hence the need for a 2 bay extension to increase the area available for packing.

Monthly fruit treatments for the period 2004 to 2007 are shown in figure 2. The 2007 treatments are projections based on the trend from the previous years. During the peak demand months of June, and October through December, the facility has already reach the limits of its capacity of 7.9 tonnes per day. Treatment capacity poses a major constraint of the further development of fresh fruit export industry.

The NWC facility operating around 350 days a year, could in theory, treat around 2,500 tonnes of fruit. However, due to the seasonality of production, effective treatment capacity is closer to 1,500 tonnes per annum. NWC is now approaching this limit, with over 1,000 tonnes expected to be treated in 2006. The proposed investment project will increase the theoretical treatment capacity to around 3,800 tonnes, with an effective capacity of around 3,000 tonnes per annum.

8.1.1.2 NWC's investment in treatment capacity.

NWC's Strategic Plan (2001 – 2006) identified that it would be necessary to purchase a new treatment chamber plus ancillary equipment in 2006. The estimated cost of a wide bodied chamber at the time was $245,000. This Investment was brought forward with the availability of a second-hand widebody unit from Kauai (Hawaii). The purchase price of the chamber plus ancillary equipment was approximately $95,000. A grant of $43,000 was obtained from British American Tobacco (BAT), the balance of the capital cost was met through the Cooperative's retained earnings. In addition NWC paid the cost of shipping ($7,000) plus VAT ($12,000). An additional $15,000 had to be spent on wiring, plumbing, consulting engineer services and the purchase of a new boiler.

This purchase of the wide body chamber proved to be a hugely beneficial investment allowing an almost two fold increase in exports. However, the industry is again reaching the limits of its treatment capacity.

8.1.2 Projected demand for treatment capacity

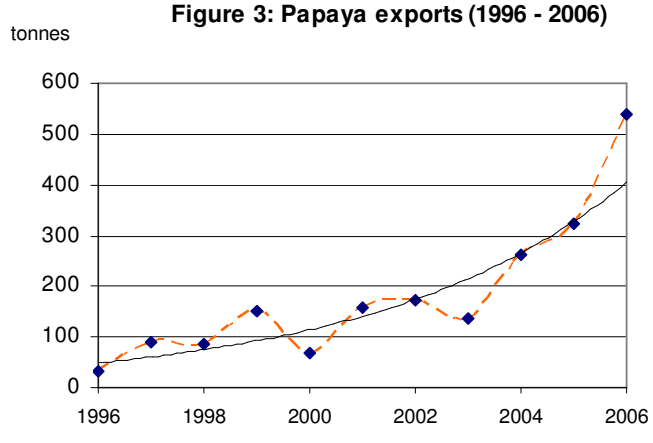
Market demand projections indicate that the realistic export potential is well in excess of current treatment capacity. The markets for existing approved products and for products likely to be approved in future are analysed briefly below.

8.1.2.1 Existing approved products

Papaya

Papaya has now become Fiji's most important fruit export commodity and offers the prospect of becoming a major industry. The growth in papaya exports since HTFA treatment began in 1996 is shown in Figure 3. From initial exports of 33 tonnes they now exceed 500 tonnes annually. Based on current trends these exports are likely to be well in excess of 1,000 tonnes in the next few years. This, however, can only happen if the treatment capacity is available.

Figure 3: Papaya exports (1996 - 2006)



The New Zealand, Australian, United States and Japanese markets are discussed below.

New Zealand: An extensive study of the New Zealand market was undertaken in 1995 in advance of Fijian and Tongan HTFA facilities being established[1]. The study concluded "that papaya sales in New Zealand of 1,000 tonnes at remunerative prices would seem to be readily achievable provided there was continuity of supply and good quality fruit". Since that time the Cook Islands supply has substantially declined. However, Fiji's marketing experience indicates that it will take much longer to obtain broad market acceptance of smaller red fleshed "sunrise" papaya than was originally envisaged. Yet, a number of factors have emerged that favour continued growth in Fiji's papaya sales to New Zealand. These are:

- *The steady growth in demand*. The New Zealand papaya market has developed steadily since the early 1970s. Interest in the fruit has developed through hotels and restaurants and papaya is now sold through supermarkets throughout most of New Zealand. The Sunrise variety is gradually gaining acceptance on market particularly by the Asian population. It is encouraging to note that Food Town supermarket chain is now selling Fiji papaya for the first time and Fijian papaya is also prominent in the eight Fruit World shops in Auckland. However, a more concerted promotional effort is required expand this market.

- *The demise of the Cook Islands papaya industry*. 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. Since then, these exports have been in decline. By 2001 papaya exports from the Cook Islands had almost ceased, with noni replacing papaya on most farms. There have been further set backs with the discovery of Queensland fruit fly and cyclones.

- *Lack of competition from other suppliers*. 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. The Cook Islands, despite some recent replanting, is unlikely to ever return to its former glory. Tonga is not regarded as a serious threat. Tonga's government operated HTFA facility has remained largely idle. Samoa now has a small semi-commercial HTFA unit. Samoa has good production conditions, but does not yet have a papaya industry. Furthermore Samoa has no container carrying aircraft flying to New Zealand. However, 2006 saw the arrival of Philippines papaya into the New Zealand market.

- *The commencement of sea freight shipments to New Zealand*. In the later part of 2006, Fiji largest papaya exporter plans to commence sea freight exports of papaya to New Zealand. This will substantially reduce transportation costs and increase the competitiveness of Fijian papaya.

Since 2003 the average annual growth rate in papaya exports to New Zealand have been around 60%. At a 20% annual growth rate, exports to New Zealand will exceed 1,000 tonnes within 5 years. Achieving this target contingent on the supply being available and sufficient treatment capacity being in place.

Australia: The Australian papaya market is far larger than New Zealand. Some 6,000 tonnes of papaya are sold annually on Sydney's Flemington Markets alone (Sydney Market Reporting Service).

During the 1980s Fiji was a significant exporter of papaya to Australia. The highest exports were achieved in 1987 when 132 tonnes were shipped. By comparison in that year only 25 tonnes were exported to New Zealand. These exports ceased in 1992 the chemical ethylene dibromide (EDB)

[1] A marketing study for pineapple and other tropical fruit from Fiji; with particular emphasis on the Seaqaqa Pineapple Micro Project. McGregor, Andrew 1995

was lost as a quarantine treatment. It took 7 years before Fiji's HTFA facility was certified for shipment to Australia. Exports to Australia recommenced in October 2004. In that year 5 tonnes were shipped. In 2005 exports to Australia totalled 38 tonnes. In 2006 there was a substantial increase in exports to Australia, with 123 tonnes shipped up until the end of June. This sharp increase in shipments was a result of cyclone damage to the North Queensland papaya crop.

Three exporters are now shipping to the Australian market. There are two importers of Fiji papaya based in Melbourne and one in Sydney. Most of the papaya goes to Melbourne. It remains to be seen what the demand for Fijian papaya will be once Australian production returns to normal. Indications are that provided Fijian papaya can maintain its unique high quality image, it should be in a position to retain market share. NWC Strategic Plan noted:

> Aggregate figures show a situation of increasing supply and declining price. However, there are large price variations with respect to season, type of papaya and quality. The relevant comparison for an aspiring Fiji exporter is the prices received for "Hawaiian Solo" papaya. Highest prices are received during the winter months (July through September). Prices usually peak in August, which coincides with the lowest supply and the non-availability of local stone fruit. Over the four years (1998 – 2002), the average August wholesale price was $A23.05/18 liter carton (or $A3.83/kg). (The highest average August price was $A32.48/carton or $A5.41/kg and the lowest $A15.48/carton or $A2.58/kg.) The lowest prices are received during December and January. Over the four years the average December wholesale price was $A14.60/carton (or $A2.43/kg). (The highest average December price was $A20.65/carton or $A3.44/kg and the lowest $A9.91/carton or $A1.65/kg.)
>
> At any one time there is a huge variation for the price received for any particular type of papaya. Chart 3 plots the low, high, average and best prices for hermaphrodite solo papaya for the first eleven weeks of 2002. Price variations at any one time are largely a reflection of quality. Fiji's better quality export fruit can certainly match the appearance of the higher price fruit sold at Flemington. The likely superior taste of Fijian papaya could be expected to enhance its position at the top end of the market.

The Strategic Plan goes on to suggest "that the appropriate marketing strategy for redeveloping the Australian market would be initially target the July to September winter window, with superior quality fruit. During this period returns in Australia can be expected to be at least as good as those obtained in New Zealand. Once Fijian papaya has established a reputation for quality and reliability it would be in a position to attract the best prices available at other times of the year. Only best quality fruit should be sent to the Australian market". The cyclone has provided Fiji's exporters with the opportunity to re-entry the market. If they can now establish a reputation for quality and reliability, annual sales of 500 tonnes would seem achievable over the next 5 years.

<u>The United States:</u> The west coast United States offers a potential market for high quality Fijian papaya. This market has had been traditionally supplied by Hawaii. However, the Hawaiian industry has been in decline since the establishment of Papaya Ringspot Virus (PRV) in 1992. In 1990 18,500 tonnes of papaya were shipped out of Hawaii. By 2002 outshipments had declined to 9,600 tonnes (Hawaii Agricultural Statistics). Disease problems have been compounded by the presence in Hawaii of Oriental fruit fly which is both a serious production and quarantine pest in papaya.

HTFA quarantine treatment technology was originally developed by the USDA for the treatment of Hawaiian papaya for export to the US mainland. Despite this, NWC's facility is not yet certified for the export of papaya to the USDA. Fiji Quarantine has yet to commence the process for entry into the US market. Even in the best of circumstances it will take several years before export approvals to the US will be in place. High airfreight rates are also likely to be a major constraint to

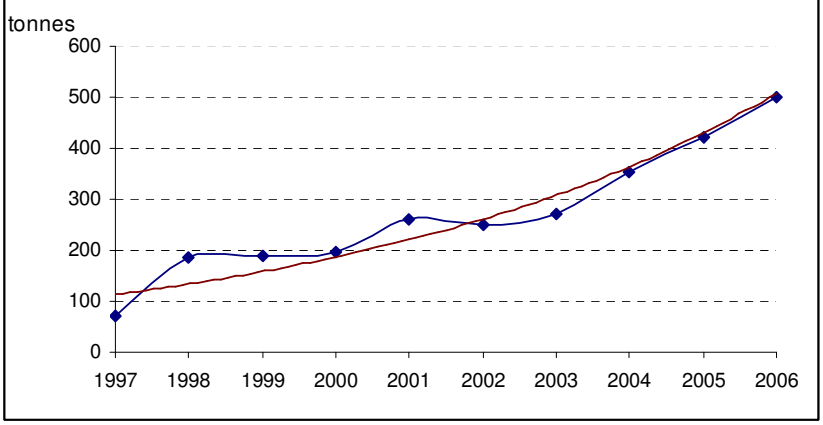
exporting fresh produce to the United States. Thus given these circumstances, exporting 50 to 100 tonnes annually of papaya at the end of 5-years is probably a realistic target.

Japan: According to JETRO statistics, Japan imports around 500 tonnes of papaya per month. In the past Hawaii was the main supplier. In 1990, Hawaii shipped 8,400 tonnes of papaya to Japan (US Census Bureau). Since the arrival of PRV these exports have fallen to less than 2,500 tonnes. This has created a market opportunity for Fijian papaya. Two Fiji exporters are now shipping to Japan. In 2004, according to Fiji's trade statistics, 71 tonnes of papaya were exported to Japan. Red flesh of Fiji papaya, with its GM free status, has significant niche market opportunities in the Japanese market. At present Japan does not require quarantine treatment of papaya for fruit fly. However, the main exporter Produce Specialities Ltd, chooses to use the HTFA facility as a precautionary measure. It is also convenient to use NWC's packing facilities. It could be expected that over the next 5-years the HTFA facility will handle around 50 to 100 papaya per annum destined for the Japanese market.

Eggplant

Eggplant exports to New Zealand since HTFA treatment began in 1997. Growth has been strong with exports standing 423 tonnes in 2005 (fig 3). Eggplant exports are projected to exceed 500 tonnes for 2005. This compares with an average annual export of only 120 tonnes for all markets for the period 1984 to 1988 when EDB treatment was used. The large increase in eggplant treatments can be attributed to the superior shelf life following HTFA treatment compared with chemical fumigation. As noted by Grandison and Atkinson (2000) "the previous EDB treatment for fruit fly was a deterrent to exporters but the new HTFA treatment gives an increase in shelf life of up to 7 days" (p, 30). Eggplant is now exported year round to New Zealand and not just during the winter window as was previously the case.

Figure 3: Eggplant exports (1997-2006)



Over the period 2002 to 2006 there was an average annual growth of around 20% in eggplant exports. At a continuing 10% annual growth rate, exports will exceed 800 tonnes within 5 years. This is seen as realistic given the continued steady growth in the New Zealand market and the re-emergence of the Australian market. However, there is a need for increased plantings of eggplant and improved field practices. The markets for eggplant are discussed briefly below.

New Zealand: Growth in the New Zealand market for eggplant is driven by the growing Indo-Fijian and Asian populations. Further increase in the distribution of eggplant to southern markets can be expected. Grandison and Atkinson (2000) reports that "Auckland importers would like more supplies to satisfy the southern markets of New Zealand". Most of the growth is expected to come from the traditional Fiji varieties such as long purple and charat. However, there is good market potential for mainstream varieties like "black beauty" during the winter window and green varieties that are popular amongst the Asian communities. In the past the main markets for Fiji eggplants had been the Saturday "flea markets" and the Indo-Fijian operated dairies. This is now changing. Tropical Fresh, the largest importer of Fiji eggplant, has now contracts with Progressive (the Food Land supermarket network). This is expected to lead to sustainable growth in the

eggplant market. No competition can be expected from other Pacific island producers, who have neither the production nor the marketing links for the traditional Fiji varieties.

Australia: During the 1980s Fiji was exporting EDB treated eggplant to Australia. The prospect of reestablishing this market emerged with HTFA treatment being approved for eggplant exports to New Zealand. However Fiji Quarantine has not been sufficiently active in securing an export protocol for the Australian market.

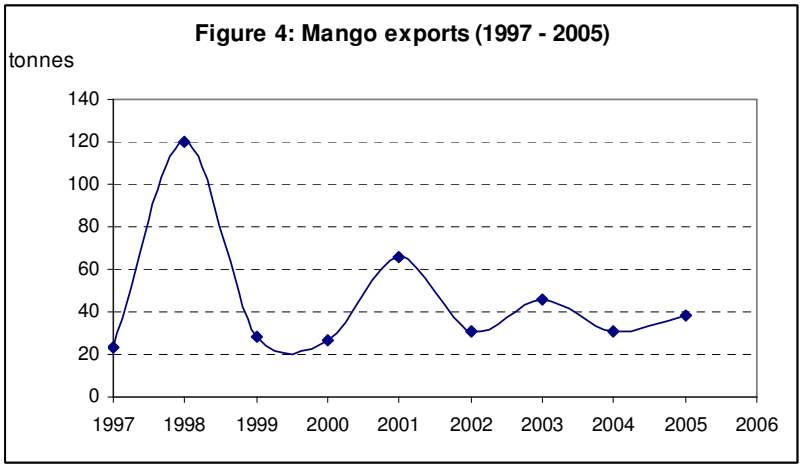
The Sydney Market Reporting Service reports the following results for eggplant on the Flemington Wholesale Market during 2001: A total of 3,425 tonnes of eggplant, of all types, was sold. "Purple" eggplant is sold year round, with significantly higher prices received in the last quarter. A survey conducted by NWC during the preparation of its Strategic Plan found that Flemington based companies were not particularly interested in importing eggplant from Fiji. They saw domestically available eggplant as cheap and readily available throughput the year. However, the experience in New Zealand and Canada is that Fiji eggplant varieties are preferred by the Indian community and have been able to find a year round market despite the ready availability of local supplies during the summer months. Australia has a much larger population, with a similar ethnic composition to New Zealand. Purple varieties are grown in Australia, although they are reported to be different than the Fiji varieties. It is unlikely that the marketing channel would be through the main produce markets. Eggplant will be exported to the growing number of Fiji stores that sell directly to the Fiji community. This has been the basis of eggplant market development in New Zealand and there is no reason to expect Australia to be any different. It is anticipated that in the future these Fiji stores would be able to receive mixed consignments of eggplant, papaya, orkra, breadfruit and chillies.

For planning purposes in NWC's Strategic Plan it was projected that a small volume of eggplant (50 tonnes) will be shipped to Australia in 2004. Rapid growth is projected to occur in the following years – 85 tonnes in 2005 and 170 tonnes in 2006. These projections were not realised because of the failure of Fiji Quarantine to negotiate an export protocol for eggplant into the Australian market. These projections remain valid once an export protocol is in place. Negotiating such protocols is expected to be a focus of the quarantine strengthening component of the ALP Project.

Mango

Mango was the second commodity to have New Zealand approval for HTFA exports, with export commencing in 1997. Annual throughput has been highly variable (fig 4) – ranging from 23 tonnes in 1997 to 120 tonnes in 1998. The average annual throughput over the 9 years has been 46 tonnes. The variability in throughput is largely due to weather conditions. The fruiting of the improved variety mangoes grown at the Legalega orchard are particularly sensitive to weather conditions

Figure 4: Mango exports (1997 - 2005)



Annual data suggests that mango is a minor product for HTFA treatment. However, in some years a considerable volume requires treatment in a short period of time. This occurred in Nov/Dec 1998 and to a lesser extent in 2001. These occasional mango demand peaks can place considerable pressure on treatment capacity. In November 1998 the HTFA facility ran continuously for 24 hours over a 7 day period. Despite

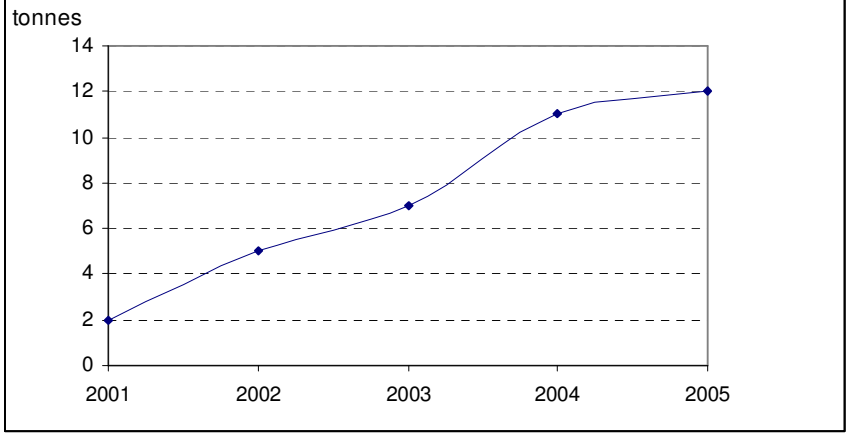
this is it was not possible to treat all the fruit that was available for export. The seasonal problems of capacity are compounded by mango season coinciding with the peak periods for papaya and eggplant supply.

The same average annual level of mango treatments is projected for the next 5 years, with considerable year-to-year variation expected. This "no growth" projection is based on the expectation of increasing competition for mango on the New Zealand market. Some continued growth can be expected for green pickling mangoes. Traditional Fijian eating varieties (peach, juicy and even parrot) that can reach Auckland in October will still find a remunerative market. However, improved variety mangoes shipped at the peak of the Fiji season (November and December) now face stiff competition from high quality mangoes from Ecuador. The expectation is that in the next few years Australian mangoes will again enter the New Zealand, using eradiation quarantine treatment. These mangoes would be in direct competition with Fiji mangoes.

Breadfruit

Figure 5 shows annual fresh breadfruit exports from Fiji to New Zealand since they began in October 2001. These exports, although small (12 tonnes in 2005) have proven that it is feasible to export HTFA treated breadfruit. However, the performance has been well below market potential. The NWC Strategic Plan makes optimistic projections for breadfruit treatments. These were 20 tonnes (2002); 100 tonnes (2003); 100 tonnes (2004 and 2005); and 150 tonnes (2006). These projections were based on a combination of positive indicators:

Figure 5: Fresh breadfruit exports (2001-2005)



- proven suitability to HTFA treatment;
- the existing production base;
- a large New Zealand market is already in place;
- Australia offers similar market potential to New Zealand; and,
- the possibility of entry into the United States market.

However experience has shown that achieving breadfruit's market potential will depend on:

- Moving from wild harvesting of fruit to growing breadfruit as a crop.
- Introducing appropriate quality control and postharvest handling procedures

NWC has been proactive in trying to address these constraints. A Breadfruit Industry Development Project was developed, through assistance from the World Bank's Pacific Enterprise Development Facility (PEDF). MASLR and the Secretariat of the Pacific Community (SPC) have been collaborating partners in the implementation of this Project. A major output from Breadfruit Project has been a "A Pictorial Manual for the Growing and Marketing of Breadfruit for Export". This manual has been supported by a breadfruit quality standards poster. The resource materials have been used in ongoing training programs for farmers and exporters. In a response to these efforts small breadfruit orchards have been established at Tilivalevu in Sigatoka and Nasau in Nadi. These are being supported by demonstration orchard trials at the Sigatoka Research

Station. As a result of these efforts it is expected that Strategic Plan projections will be realized over the next few years.

8.1.2.2 New products and markets

The approval by New Zealand MAF in 2001 of mixed consignment quarantine treatments created prospects for a number of minor fruit fly host products. The Strategic Plan identified gourds (bitter, bottle, and sponge), wi, jak fruit and limes as priority products having good market opportunities. All these products were included in the Strategic Plan. Table 2 summarises the Plan projections.

It was suggested that a number of other fruit fly host commodities could come on stream over the next 5 years, but for which no projections were made. These included passion fruit, rockmelon guava (Thailand variety) and tomatoes.

Table 2: NWC Strategic Plan Projections for New Products and New Markets

Product	Market	Projected year market access commences	Projected exports at the end of the Plan period (2006) - tonnes
Eggplant	Australia	2002	170
Mango (pickling and traditional var.)	Australia	2003	20
Breadfruit	Australia	2004	10
	USA	2005	10
Jak fruit	New Zealand	2004	15
Bitter melon	New Zealand	2003	20
	Australia	2005	5
Other gourds	New Zealand	2003	20
	Australia	2004	5
Wi	New Zealand	2003	15

Regrettably no new products or new markets (except for papaya to Australia) have been developed over the Strategic Plan period. This represents a failure of Fiji's quarantine system to develop new export protocols. The ALP Project proposes to focus on resolving this bottleneck by providing appropriate technical assistance. Thus it is anticipated that the Strategic Plan projections for these new products and market will be realised, albeit delayed, over the next 5-years or so. This would represent an annual increase of 300 tonnes in demand for quarantine treatment capacity.

The market opportunities for bitter melon, other gourds, wi, jakfruit, mangoes (Australia),are discussed briefly below:

Bitter melon Prior to the loss of EDB treatment, Fiji exported around 10 tonnes of bitter melon annually to New Zealand. Since that time there has been considerable growth in New Zealand's Asian population. It has been suggested that amongst Fiji Indians bitter gourd consumption is about one third that of okra. Over the last 3 years an average of 19 tonnes of okra were exported to New Zealand (Quarantine Statistics). Fiji growers could significantly increase the productivity of gourd production through the use of trellising. New Zealand grows some bitter gourd from January through March/April. During this period it retails for around $NZ9/kg (Per. Com. Trade Commissioner, South Pacific Trade Commission, Auckland). However, there is no local production between April and December and much higher prices could be expected.

In Australia bitter gourd is available year round and there does not appear to be a market available for bitter gourd from Fiji. Unlike, eggplant, there is nothing unique about bitter gourd grown in Fiji.

Other gourds Bottle and sponge gourd can be expected to follow bitter gourd into New Zealand. It is assumed that these other gourds will have a combined throughput that equals that of bitter gourd. In 1990, the last year of EDB fumigation, 4.1 tonnes of bottle gourd and 2.3 tonnes sponge gourd were exported to New Zealand (Quarantine Statistics). The demand and production pattern is expected to be approximately the same as that for bitter gourd.

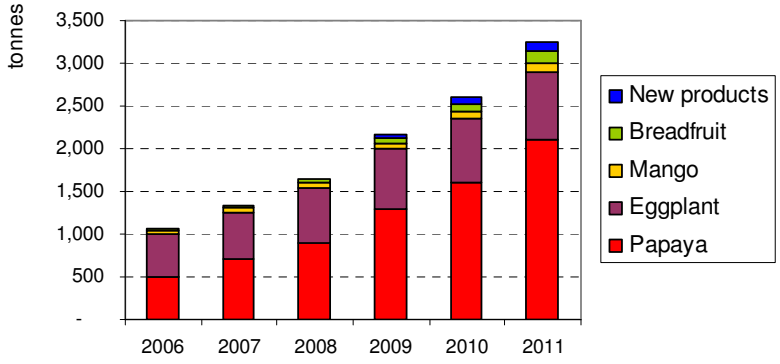
Jakfruit Jakfruit is particularly popular for curry. Around 6 tonnes annually were being shipped to New Zealand annually in the early 1990s. Some of that market is now being supplied by ready to use packets of frozen jakfruit. Many consumers no doubt prefer the convenience of the ready to use packs. However, it is reported that these cannot match the flavour and texture of freshly prepared jakfruit. Thus, it is thought that a substantial market still exists for fresh jakfruit, provided the smaller varieties are shipped. If the experience of breadfruit is anything to go by, jakfruit will be very amenable to HTFA treatment. The peak jakfruit treatments will be in December and January, with some treatments in October, November and February.

Wi In the days of EDB treatment, up to 4 tonnes of wi were shipped annually. Wi (or vi in Polynesia), or commonly known as hog plum, is particularly popular amongst Samoans and other Pacific islanders. It would also be sought after by the Indian community to make pickles. The peak of the Fiji wi season is January through March which conveniently coincides with the low time of HTFA utilization. In Australia, locally grown wi is available between February and June, where it sells for around $A3.50/kg at the Flemington Wholesale Market. Thus it is unlikely there would be a market in Australia for wi from Fiji.

8.1.2.3 Total projected demand for quarantine treatment

Figure 6 summarised the total projected demand for quarantine treatment over the period 2006 to 2011. This demand is estimated to increase from around 1,000 tonnes in 2006 to over 3,000 tonnes in 2011. The estimated fob value of exports increases from around $2 million to over $6 million. Demand for treatment is expected to be increasingly dominated by papaya.

Fig. 6: Projected treatment requirements (2006-2011)



8.1.3 Sub-component details and rational

8.1.3.1 Sub-component 1: Increasing the packing area (2 bay extension)

Space to grade and pack fruit following treatment poses the most binding constraint to increasing the volume passing through the HTFA facility. As described above it is not possible to operate two shifts and run each treatment chamber twice in 24-hours. Usually only one side of the dual chamber is operated twice in 24-hour. If necessary, but with some difficulty, it is possible to run both sides of the dual chamber. With the existing number of treatment chambers, lack of packing space reduces the maximum amount of fruit that can be handled in a day by about 2.5 tonnes.

The most important component of the NWC's proposal for ALP funding is to increase the packing and grading area by 2 full bays (178.5 sq meters). This allows for two grading and packing teams

to operate simultaneously within the fruit fly free zone. A small purpose built cooler will be incorporated into the expansion to allow for the better handling of more perishable products such as eggplant, bitter gourd and other cucurbits. What is being proposed is shown in the schematic diagram and is described in more detail in annex 1.

The resulting capacity increase The daily capacity of the existing chambers is increased by around 2.5 tonnes. This investment also allows for the installation of an extra wide body chamber providing a further 2.5 tonnes of capacity if it is used once a day or an extra 5 tonnes if it is used twice in 24-hours. The net impact of the two bay extension on annual treatment capacity is (assuming 350 treatment days per year):

- 870 tonnes if there is no additional investment in a treatment chamber.
- 2,500 tonnes if there is additional investment in a new treatment chamber.

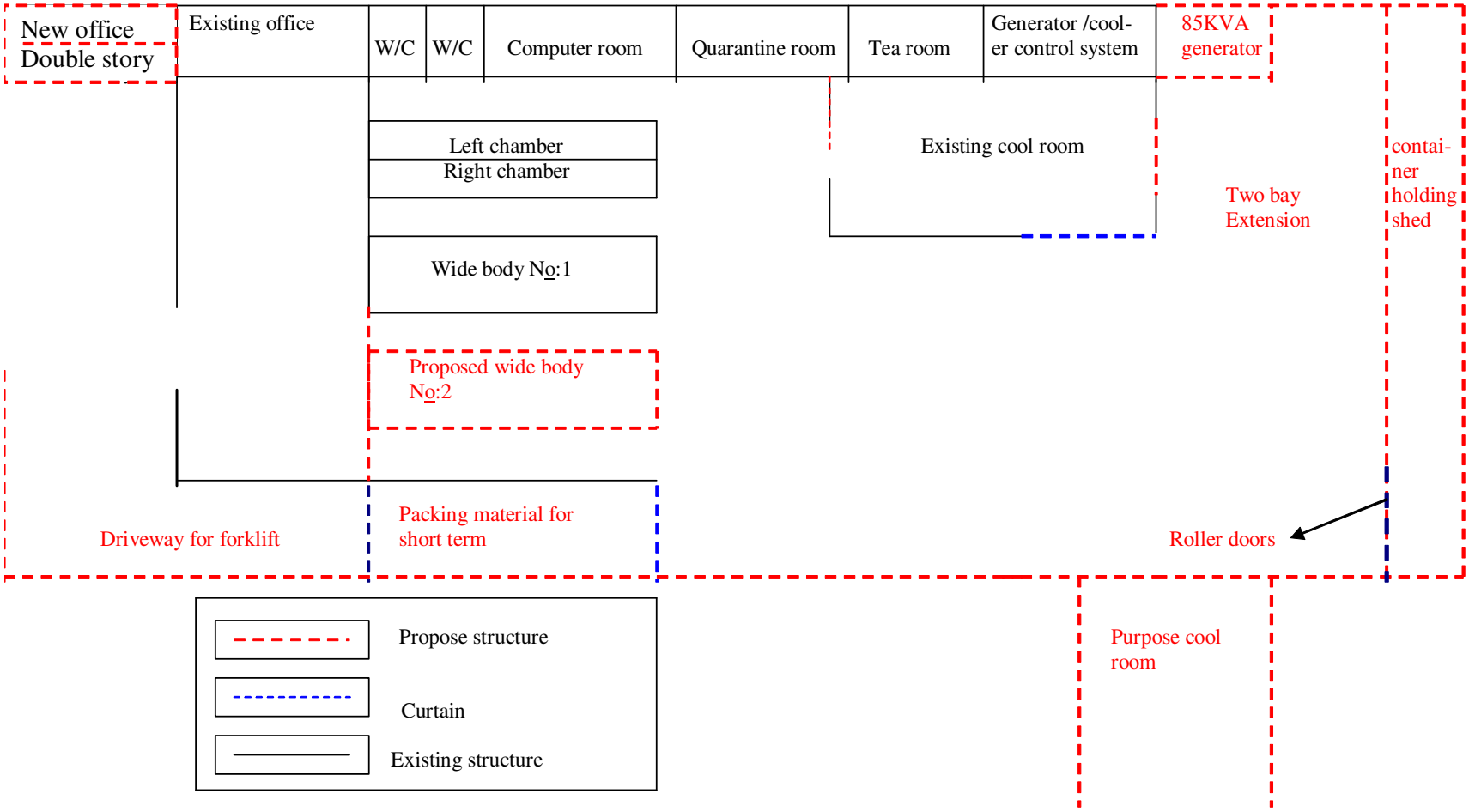
Estimated cost This extension will be the same steel frame design as the existing building. The provisional cost estimated is $850/sq meter. The total estimated cost of the extension is $295,200, which is itemized table 3 below:

Table 3: Cost estimate for the proposed two bay extension for the NWC treatment facility

Item	$/unit	Cost estimate ($)
Steel frame building (178.5 sq mtres)	$850/sq mtr	152,000
Drain re-alignment and new culvert		45,000
New rolling door		12,000
Plastic slide door for fork lift access		3,700
Purpose built cooler		40,000
Storage shed for containers awaiting collection	$250/sq mtr	42,500
Total cost		$ 295,200

PROPOSED EXPANSION OF NATURE WAY QUARANTINE TREATMENT FACILITY

GROUND PLAN



8.1.3.2 Sub-component 2: An additional treatment chamber

The two bay extension in itself provides for a significant increase in capacity by allowing for the operation of two shifts. However, a substantial increase in capacity can only be achieved through investment in second-wide body chamber.

The resulting capacity increase

An additional wide-body chamber (using lugs) gives an increase in capacity of 2.5 tonnes per day with one treatment per day. This is doubled if there two shifts and two treatments per day. If treatment bins are used a wide body chamber can handle 3.6 tonnes of papaya per treatment. Thus the maximum total annual increase in capacity is 2,520 tonnes of papaya - if the new wide body was used twice a day for 350 days a year.

Estimated cost

The existing wide body chamber was purchased second hand from Hawaii. It is doubtful whether another second hand chamber could be secured. It is proposed that the new chamber be assembled in Fiji, utilizing a new Corten steel container. Dr Michael Williamson, NWC's consulting engineer, has concurred that local assembly is technically feasible and economically viable. To support the operation of 3 chambers, operating simultaneously it will be necessary to invest in a new 85 kva generator. The turn key cost of the new chamber is estimated at approximately $228, 000. The various cost elements are itemized in table 4 below:

Table 4: Estimated cost for a new wide-body chamber

Component	$
New Corten steel container	4,800
New 85 kva generator	45,000
Intech electronics pakage	7,800
Temperature probes (14)	4,200
Inverters, fans and pumps	9,600
Hot water pump, pipe work and boiler	7,200
Two 10hp fans, heat exchamger conveyor components	27,600
Hydro cooling system, doors, rubbers etc.	3,600
Computer and printer	4,200
Software package	3,000
Patent licence	19,920
Treatment lugs (720 one container load)	21,600
Treatment bins	9,600
Steel frames for bins	5,400
Installation services (electrition, plumber labour for 4 weeks)	12,000
Consulting engineer and certification services (for 8 weeks)	28,800
Consultant travel and per diem costs (3 trips NZ to Fiji)	14,040
Total	**$ 228,360**

8.1.3.3 Sub-component 3: Expanded administrative facilities

The current office facilities are particularly cramped with the GM having to share a very limited space with his administrative assistant. The cramped office is used for consultations with exporters, government officials and other frequent visitors. With the expanding business there is increasing demands for filing space. The limited space undermines administrative efficiency.

A double story area is planned (see schematic plan). The new office space would house the GM and his administrative assistant. The Assistant Manager responsible for field operations would also be based in the same office area. It is expected that these new office facilities will be shared with two related industry organizations – the Fiji Fruit and Vegetable Industry Council (FFVC) and the Fiji Organic Association (FOA).

Estimated cost The estimated cost of building and outfitting the new office is $45,000. This includes a $10,000 for office equipment including computers.

8.1.3.4 Sub-component 4: Improvement to packing and grading systems and facilities

Enhancing labour efficiency There is need to increase the efficiency of labour utilization. Labour is the main element of prime (direct) treatment costs (around 76%). Labour represents from 20% to 24% of total expenditure. The expectation is that with increasing throughput, the efficiency of labour utilization should improve. However, these efficiency gains are yet to be realised reflecting a degree of inefficiency in the utilization of labour and the need to rely on high levels of overtime usage. The requirement to increase labour efficiency becomes urgent as treatment throughput increased further.

The provision two bay extension of the building will in itself improve the efficiency grading and packing operations. However, with the two bay extension there are opportunities for further significant further efficiency gains through the introduction of appropriate grading and equipment and via the adoption of better handling systems.

The core investment is in a mechanical grading system. Appropriate equipment has been identified in Australia at an estimated installed cost of approximately $50,000. However, the actual configuration of investment awaits the completion of the two bay extension and the conclusion of a professional study on NWC's fruit handling systems.

Estimated Cost Table 5 provides indicative cost estimates of improving packing and grading systems and facilities. The total estimated indicative cost is $85,000.

Table 5: Cost estimates of investments to improve fruit handling systems and facilities

	$
A study of fruit handling systems	15,000
A mechanical grading system	50,000
Ancillary equipment (conveyer track, stainless steel table, stools, scales)	20,000
Total	**$ 85,000**

8.1.3.5 Sub-component 5: Purchase of an additional fork list

With the installation of an additional wide chamber there will not be sufficient space for the existing fork lift to move readily from the "fruit fly" to the "fruit fly free" area. It will be necessary to have a second fork lift stationed permanently within the "fruit fly free" packing area. A electrical powered folk lift with a 2 tonne capacity is proposed at a cost of $55, 000.

8.1.3.6 The total available capacity with the completion of proposed investment program

Following the proposed investment in increased packing space, an additional treatment chamber and improvement in the packing systems the maximum theoretical treatment capacity is around 3, 800 tonnes per annum. This is based on the following assumptions:

- The treatment facility operates 350 day per year.

- There are two working shifts per day – allowing for two full treatments/chamber/day.
- All treatments are under taken in bins, allowing for 3.6 tonnes per chamber per treatment.

A realistic maximum capacity is likely to be more in the order of 3,000 tonnes per annum.

With the Fiji fresh fruit and vegetable export industry starting to realise its full potential treatment requirements may in the not too distant future exceed this expanded capacity. At this stage, the volumes handled by some of the larger exporters would be sufficient to justify investment in their own quarantine treatment facility.

8.2 Component 2: Creating a focused industry outreach program to increase the volume and quality of fruit and vegetable exports.

8.2.1 Sub-component details and rational

Substantial export markets have been identified for fresh fruit and vegetables. Investment in quarantine treatment capacity will enable a substantial increase in exports to these markets. A large increase in the production of export quality fruit and vegetables spread more evenly throughout the year is required to take full advantage of increased capacity and available markets.

8.2.1.1 Sub-component 1: The establishment of a NWC field service

To be competitive Fiji must always be at the premium end of quality scale - there is no place for grade 2. The high cost of packing, shipping, and handling tends to be the same regardless of the quality of the product and the premiums paid for quality are usually large. Market driven quality requirements relate to every stage of the production process from site selection to final shipment. Some examples of these are:

- Site selection - papaya growers must have access to irrigation to produce export quality
- Seed selection – maintaining and expanding papaya markets for Fiji depends on having strong red fleshed fruit
- Planting date – it is important to spread production to match seasonal peaks in the market and to make best use of quarantine treatment capacity.
- Husbandry practices – type, timing and amount of fertiliser is critical for fruit quality.
- IPM and other environmentally sound management practice - necessary to meet the increasingly stringent requirements of importing countries.
- Harvesting - date and time of day determined by the requirements of the market
- In-field handling and transportation - minimum conditions must be met.

Fruit specialist/field officer

NWC's Strategic Plan recommended that an experienced fruit specialist be appointed to support the Manager in his efforts to the quality and flow of fruit from the field. It was suggested that a request be made to the Ministry of Agriculture for the secondment of an officer to take up this position. This appointment would give a valuable focus for the Extension Division and provide a link with Natures Way Cooperative. While there was agreement in principle to this proposal, it was never operationalized. It is now seen as appropriate for NWC to go onto the open market and secure the services of the best person available for this important position. The role of the NWC's field officer is not to replace the Ministry of Agriculture's extension service. Rather it is to complement and provide an industry focus for the Ministry's fruit and vegetable activities.

The Field Officer would be responsible for the day-to-day operation of field support services. The officer would be trained by the GM and work under his direction. A particular initial focus of the field service will be facilitating the production of high quality papaya seed for the industry. A

priority is the maintenance of strong red coloured flesh in Fiji's export papaya. It is envisaged that this person will service the organic industry in a certification role. Fees from this service will provide an additional opportunity for self-funding of the field service.

While the emphasis is on field support operations, the Field Officer needs to become fully familiar with all aspects of quarantine treatment business and be capable of managing these as and when required. This would be staff position with a potential career path to Assistant Manager and eventually, Manager.

Cost and sustainability

To attract the calibre of person required, a remuneration package of the $27, 000 annum is proposed. To this has to be added the cost of a 4WD vehicle for the field service at a cost of $48,000. It is proposed that the ALP meet the salary cost for a period of 3-years plus the capital cost of the vehicle. NWC would meet all operational cost from the outset. All cost would be met by NWC after 3-years. The total proposed ALP contribution to this service is $129,000. NWC's contribution to the field service is projected to increase from about $30,000 in 2007 increasing $110, 000 in 2011 (table 9). NWC total contribution to the field service over 5-years is estimated at around $260, 000.

Table 9: NWC's indicative costs of operating the field service ($)

	2007	2008	2009	2010	2011
Wages				27,000	27,000
Vehicle purchase					48,000
Vehicle operating expenses	9,600	10,560	11,616	12,778	14,055
Communications	2,000	2,000	2,000	2,000	2,000
Workshop and training expenses	3,000	3,000	3,000	3,000	3,000
Material purchases (including seeds)	5,000	5,000	5,000	5,000	5,000
Contingencies	10,000	10,000	10,000	10,000	10,000
Total	29,600	30,560	31,616	59,778	109,055

8.2.1.2 Sub-component 2: The supply of plastic field crates

Post harvest quality constraint

Fruit is often transported from the field to packing shed in polybags or "banana" style boxes. This seriously undermines quality and substantially increases reject rates. The adoption of plastic field crates as an industry standard would greatly improve product quality.

The bulk purchase of field crates

It is proposed that NWC bulk purchases plastic field crates on behalf of the industry. Their widespread adoption would then be encouraged through the field service. Farmers and marketers would purchase these crates under the two-third/one-third program (government meeting two-third of the cost and farmer or exporter meeting one – third). Initially the focus should be on export produce and produce sold to hotels – but there is no reason why plastic bins could not eventually become the standard for domestically traded produce.

Cost

The request is for seed capital of $180, 000 to acquire 12,000 crates. These crates are currently subject to a fiscal duty of 28%. A request will be made to waive, or least substantially reduce, this duty. If this was agreed to, then the seed capital requirements would be reduced accordingly.

9 Benefits

9.1 Relevance

The Project is relevant to all of NWC's shareholders which constitute over 100 farmers and 12 exporters of the products handled by the HTFA facility. Most of the shareholders are small farmers located in Sigatoka and Nadi areas. Shareholder numbers will grow as the fresh fruit and vegetable export industry expands.

The current annual farm gate value of the 1,000 tonnes treated by the HTFA facility is around $800, 000. More than a three fold increase in this amount can be expected as a result of this Project. Thus the Project is highly relevant to Fiji's alternative livelihood efforts.

The Project removes a critical bottleneck in Fiji's agricultural export diversification efforts and complements a number of other initiatives being undertaken. ALP and NZODA are strengthening the Quarantine Service to improve market access for export horticultural products. The ALP will be working with farmers to upgrade their farm management capability. The EU through its National Adaptation Strategy for the sugar industry is targeting irrigated horticulture for export. Without a substantial increase in quarantine treatment capacity, and an associated increase in product quality, these efforts will be of limited value.

9.2 Project Viability

This is a highly viable Project which generates an exceptionally high economic rate of return (Section 12). In contrast, the risks are low. The Project involves the expansion of existing activity by a financially viable industry owned business with a proven track record dealing with a proven technology. NWC has been in operation for eleven years. The financial viability of the business is reflected in the NWC 2005 Audited Accounts (Annex 2).

In comparison the economic and social risks of not proceeding with the Project are considerable. A recent study by the International Centre for Trade and Sustainable Development noted that "the export horticulture sector is now, after years of disappointment, the fastest growing part of the Fiji's agricultural sector"[2]. This growth will stall unless there is investment in quarantine treatment capacity and improved production systems.

9.3 Benefits

The benefits of the Project can be measured in terms of:

- Increased value added of exports
- Increased efficiency of NWC operations
- Increased employment and provision of rural livelihoods
- The promotion of environmentally sustainable production practices

9.3.1 Increased value added from exports

Table 6 provides export projections for the products treated by the NWC facility. Only a portion of the projected increase in exports can be attributed to the Project. In the earlier years (2007 and 2008) this portion will be relatively small. Only in the peak months of June and November is there currently a treatment capacity constraint. Just at these times would the increased capacity be utilised. In these earlier years there are also some benefits from the NWC field service in terms of

[2] International Centre for Trade and Sustainable Development (ICTSD). Special Products and Special Safeguard Mechanism: The Fiji Islands Country Study. April 2006

increased production and improved quality. In the later years (2009 onwards), with expanding production, most of the increase in exports would be attributed to the Project. Table 6 provides indicative estimates of the additional exports attributable to the Project. These estimates are based on currently available capacity, the seasonal distribution in treatment demand and the projected overall increase in demand for treatment.

Table 6: Treatment projections and additional exports attributable to the Project

	2006	2007	2008	2009	2010	2011
Treatments (tonnes)						
Papaya	500	700	900	1,300	1,600	2,100
Eggplant	500	550	650	700	750	800
Mango	50	55	60	60	60	60
Breadfruit	10	20	30	50	100	150
New products	-	5	15	40	70	100
Total	1,060	1,330	1,655	2,150	2,580	3,210
fob value of exports ($ million)	2.2	2.8	3.5	4.5	5.4	6.7
farm gate value of exports ($million	1.0	1.2	1.5	1.9	2.3	2.9
Additional exports attributed to the Project (tonnes)						
tonnes		**100**	**300**	**640**	**1,560**	**1,690**
fob value ($ million)		**0.2**	**0.6**	**1.3**	**3.3**	**3.5**
farm gate value ($million)		**0.1**	**0.3**	**0.6**	**1.4**	**1.5**

The benefits to Fiji arising from the additional exports resulting from the Project can be measured in terms of the fob value of these exports (the value of the produce at the point it leaves Fiji). For the farming community the benefits can be measured in terms of the farm gate value of the additional exports. The fob value of additional exports arising from the Project is projected to increase from $200,000 in 2007 to $3.5 million in 2011. Farmer income is estimated to increase by some $100,000 in 2007 to around $1.5 million in 2011.

9.3.2 Increased efficiency of NWC operations

The project also results in increased efficiency of NWC operations, which will lower treatment costs. This improves Fiji competitiveness on export markets and increases the funds available for reinvestment in the industry.

9.3.3 Increased employment and provision of rural livelihoods

The major benefits of the Project lie in the employment and livelihoods created by the investment. It is estimated that the average farm produces 20 tonnes of exportable produce annually. As a "rule of thumb" the average farm employ the farmer and three other full time job equivalents. The estimated on-farm employment arising from the export projections in table 6 are shown in table 7. There is additional direct valued added employment with the produce exporting companies. The present 14 exporting companies employ an average of 10 full time worker equivalents each. This employment can be expected to grow in proportion to projected exports. This employment is shown in table 7. The work force at Natures Way currently totals 16. The project will lead to more efficient utilisation of labour. Thus only a small increase in the work force will be required in 2007. However, by 2008 two shifts will need to operate on a daily basis and the workforce is projected to increase to 28. Table 7 provides projections of the employment arising from the Natures Way's quarantine treatment facility. Direct employment is projected to increase from around 420 people in 2006 to over 1,200 in 2011.

Table 7: The direct employment arising from the projected level of HTFA treated fruit exports

	2006	2007	2008	2009	2010	2011
Projected fruit treatments (tonnes)	1,060	1,330	1,655	2,150	2,580	3,210
Estimated employment (full time job equiv.)						
On-farm	265	333	414	538	645	803
Exporter	140	176	219	284	341	424
Natures Way	16	18	28	28	30	30
Total	**421**	**526**	**660**	**849**	**1,016**	**1,256**

There is indirect multiplier employment impacts in related industries, such as carton manufactures and transports. No attempt is made to quantify these benefits.

9.3.4 The promotion of environmentally sustainable production practices

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 now has 5 certified organic processing companies with some 20 suppliers groups, sending exports to EU, Australia, NZ and USA. Some 10 more are expected to be certified in the next year, thanks to the support provided by ALP.

Fiji has a number of distinct advantages in developing certified organic horticultural export industry:

- The general perception of Fiji being a relatively unpolluted and unspoiled environment.
- An opportunity to build on, and market, existing traditional and sustainable organic production systems.
- High demand for certain products technically feasible to produce organically in Fiji (sugar, cocoa, fresh and processed fruits, coconut products and spices).
- Locally available fertiliser 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 organic fruit.**
- Willingness of donors to provide technical assistance to support organic agriculture.

The chemical ethylene dibromide (EDB) was banned as a quarantine treatment in 1990 on the grounds that it was considered a carcinogenic. Fiji adopted HTFA treatment as a non-chemical replacement that uses only hot air to kill fruit fly. This opens up the prospect of Fiji exploiting remunerative organic export markets. The expanded treatment facility is designed to allow for organic certification. Competitors in Australia and Hawaii has moved to irradiation as a quarantine treatment, which is not permitted by organic certifiers. This provides Fiji with a competitive advantage in developing organic markets.

The Marketing Study conducted for preparation conducted in the preparation of the ALP Project that there are immediate organic product prospects in New Zealand and Australia. Chantal[3], New Zealand’s largest organic distributor, is particularly interested in sourcing organic produce from Fiji and reports that the New Zealand organic market of around $NZ60 to $70 million is growing at about 10% annually. The main interest is for fresh produce that can be supplied during the winter window (April - October). Some fruit fly host products immediate candidates for organic certification are listed in Table 8.

[3] Chantal - distributors of organic produce and commodities 13 Nothe Steet, Napier, New Zealand; tel 64 6 835 7898; email chantals@xtra.co.nz

Table 8: Immediate Candidates for Certified Organic Supply to New Zealand

Product	Initial market potential	An evaluation of prospects for organic certification and market access
Papaya	20 to 30 tonnes – year round demand expanded. Could be of equivalent quality as available conventional product.	Approved market access with HTFA treatment (hot air treatment acceptable for organic certification. Certified organic rock phosphate commercially available. Could be supplemented with composted mill mud and goat manure. No major pest and disease problems.
Mango	10 to 15 tonnes during Fiji mango season. Likely to traditional Fiji varieties (peach, juicy and parrot). Likely to be seen as inferior quality to conventional mango available from Ecuador at the time.	Approved market access with HTFA treatment. BioGro (NZ) certified mangoes already available from Yaqara. No purchased inputs used in traditional mango production. Organic production systems likely to be more difficult for improved variety mangoes (particular problems in anthracnose control and flowering induction).
Eggplant	10 to 15 tonnes during the winter window. Market for main stream varieties such as black beauty – not the Fiji varieties.	Approved market access with HTFA treatment. Organic solutions to some major pest problems (thrips and mites) would have to be developed before exports could commence. Experimentation with neem insecticides recommended.
Pumpkin	Butternut pumpkin identified as the most suitable for organic market. A market of 2 tonnes a week during October to Dec (before New Zealand organic pumpkin is available.	As a cucurbit may not be a fruit fly host – however testing yet to be undertaken. Seen as relatively easy to grow organically
Cucumber	10 to 15 tonnes during the winter window	As a cucurbit may not be a fruit fly host – however testing yet to be undertaken. Work on organic production systems probably required.

The Australian organic market is even larger. The Australian Organic industry has grown from around $40m in 1996 to $300m in 2006 (around $50m in exports)[4]. USA, EU and Japan have similar trends. Papaya offers the best immediate prospects for organic produce exports to Australia and Japan.

It is expected that the NWC Field Services will be at the forefront of promoting organic and environmentally sustainable production techniques. It is also expected that the field officer will play an organic certifying role. The Fiji Organic Association is likely to be housed in NWC's expanded office complex. This will strengthen the fruit and vegetable industry's commitment to environmentally sustainable production practices.

10 Details of the Public Private Partnership

From the outset the success of Natures Way Cooperative has been founded a on strong public private sector partnership. This Project continues to build on this relationship. There will be a Project Management Team that reflects this partnership, comprising of:

[4] Andrew Monk, 2004. Survey of Organic Industry (Australia) by Biological farmers Australia for Rural Industries R&D Council, Australia.

- Project Director: Sant Kumar (General Manager Natures Way, Chairman of the Fiji Fruit and Vegetable Council and Chairman of the Fiji Organic Association). He will have overall responsibility for the management of the Project. The Director will be assisted by the Industry Field Officer that will be financed under the Project.
- Co-Director (Field Operations):
  - Kini Namoumou (ALP Project Implementation Coordinator – Western). The Co-Director (Field Operations) will ensure coordination between the Project and ALP/EU (National Adaptation Strategy) activities directed at the horticultural export industry. The Co-Director (Field Operations) will be assisted by Ilaitia Naiqani (SAO Nadroga/Navosa) and Rajesh Prasad (SAO Ba).
- Co-Director (Quarantine/Market Access):
  - Mere Salusalu (Senior Quarantine Officer Western). The Co-Director (Quarantine/Market Access) will directly link the project to efforts by FQIS to secure bilateral quarantine agreements for new markets and new products.

The NWC Board will have overall supervisory responsibility for the Project.

11 Costs

11.1 Capital costs

NWC is requesting a capital cost contribution of approximately $1,007,560 from ALP. A breakdown of this cost is summarized in table 9

Table 9: A summary of the proposed capital cost contrubution of ALP

	$
Component 1	
Two bay extension	255,200
New wide body treatment chamber	183,360
New wide 85kva generator	45,000
Purpose built cooler	40,000
Expanded administrative facilities	45,000
Improved fruit handling systems	85,000
Electric forklift	55,000
Sub-total	708,560
Component 2	
Field service	129,000
Field bins	180,000
Sub-total	309,000
Total	**$ 1,017,560**

11.2 Operating costs

The Project's operating costs are:

- The cost of treating the additional exports attributed to the Project. In 2005 the unit operating cost of treatment was 30.5 cents/kg. This unit cost can be expected to fall as the throughput increases and improved handling systems are implemented. Indicative estimates of the treatment operating costs for the increased exports attributed to the Project are presented in table 10.

Table 10: Indicative estimates of the treatment operating costs associated with the increased exports resulting from the Project

	2006	2007	2008	2009	2010	2011
Total projected treatments (tonnes)	1060	1330	1655	2150	2580	3210
Additional exports attributed to the Project (tonnes)	0	100	300	640	1560	1690
Indicative treatment costs ($/tonne)	300	298	296	294	292	290
Treatment cost of the additional exports ($)	**0**	**29,800**	**88,800**	**188,160**	**455,520**	**490,100**

- The cost of operating the field service. From the outset NWC will meet all the operating costs of the field service, with the exception of the wages of the field officer. After 3-years these wages will also be meet by NWC. Indicative operating cost estimates for the field service are presented in table 11. NWC plans to spend around $30,000 on the field service in 2007, increasing to over $100, 000 over a 5-year period.

Table 11: NWC's indicative costs of operating the field service ($)

	2007	2008	2009	2010	2011
Wages				27,000	27,000
Vehicle purchase					48,000
Vehicle operating expenses	9,600	10,560	11,616	12,778	14,055
Communications	2,000	2,000	2,000	2,000	2,000
Workshop and training expenses	3,000	3,000	3,000	3,000	3,000
Material purchases (including seeds)	5,000	5,000	5,000	5,000	5,000
Contingencies	10,000	10,000	10,000	10,000	10,000
Total	29,600	30,560	31,616	59,778	109,055

12 Industry's contribution to the proposed project

12.1 The ongoing capital investment contribution

Over the last decade NWC has invested retained earnings in a program to increase treatment capacity and to enhance product quality. The total value of this investment has been around $250, 000, which is summarised in table 12 below.

Table 12: Investments made by NWC to expand treatment capacity and to enhance product quality

Item	Cost ($)	Comments
Fruit reception shelter	3,000	
Building security system	4,000	
Equipment to increase the efficiency grading and packing operations (conveyer track, table, stools, scales)	3,400	
Speciality electronics and probes	14,000	Two parallel systems (Omega and Intec) now in place. Provides the treatment facility with a high level of insurance.
Computer equipment and programs	7,300	
Generators	23,300	20 KV generator installed in 2003. The back-up generator has greatly reduced the risk of operation.
Boilers	11,500	
Water storage tanks	11,500	Treatment facility was vulnerable to unreliable water supply. In future, commercial charges for water expected. As a

		good corporate citizen, NWC should not be wasting water. This is now to be achieved via an additional 20,000 litre water tank rather than a cooling tower. The tank installed in early 2005.
Additional treatment bins and lugs	13,500	150 additional treatment lugs acquired with the purchase of the second hand wide-body chamber from Hawaii.
Pallet jack and aluminium ladder	2,400	
Wide-body treatment chamber (second hand) purchased from Hawaii.	125,000	Strategic Plan projections identified that it would be necessary to purchase a new treatment chamber plus ancillary equipment in 2006. The estimated cost of a wide bodied chamber. (capacity 3.6 tonnes papaya) at the time was $245,000. This Investment was brought forward with the availability of a second-hand widebody unit from Kauai (Hawaii) plus the availability of grant assistance from British American Tobacco (BAT). The purchase price of the chamber plus ancillary equipment was $NZ87,000. A grant of $F43,000 was obtained from BAT. NWC paid the cost of shipping ($7,000) plus VAT ($12,000). An additional $15,000 had to be spent on wiring plumbing and the purchase of a new boiler.
Incinerator	2,590	Rubbish including reject fruit left behind by exporters was disposed by burning in the open. This practice was seen as unlikely to meet quarantine and environmental standards.
4WD vehicle	25,000	Required for General Manager to provide field support.
Maintenance of quarantine security. Building improvements, insect control equipment etc.	25, 000	
Certification costs. Consulting engineer cost, fruit purchases etc.	25, 000	
Total	**$ 246,490**	

NWC's projected cash flow position is such that it is in a position to make incremental capital investments in the order of $25, 000 per year. However, there is not sufficient accumulated retained earnings to make the large scale capital investment required to take the export fruit and vegetable industry beyond its current level and into the future. The request to ALP for assistance to help the industry make this quantum jump.

12.2 Operating costs

NWC is committed to meeting all operating costs associated with the proposed Project. A summary of the indicative estimates of these costs is presented in table 13.

Table 13: A summary of NWC's indicative operating costs associated with the proposed Project

	2007	2008	2009	2010	2011
Operating cost associated with expanded capacity ($)*	29,800	88,800	188,160	455,520	490,100
Field service operating costs ($)**	29,600	30,560	31,616	59,778	61,055
Total ($)	59,400	119,360	219,776	515,298	551,155

* Derived from table 9; ** Derived from table 10

12.3 Industry cost sharing between ALP and the fruit and vegetable export industry (NWC)

The cost sharing between the ALP (representing public funding) and NWC (representing the fruit and vegetable export industry) is summarized in table 14. The total cost of the project over a 5-year period is estimated at $2.74 million. ALP's share of the total cost is $1.10 million (40%) and NWC's share is $1.64 million (60%). Under the proposal ALP meets 85% of the capital cost and the industry 15%. NWC meets 95% of the operating costs and ALP 5%.

Table 14: A summary of ALP and Industry (NWC) Project cost sharing

	2007	2008	2009	2010	2011	Total
Capital costs ($)						
Component 1: Increasing treatment capacity						
ALP	708,560	-	-	-	-	708,560
NWC	25,000	25,000	25,000	25,000	25,000	125,000
Component 2: Field service						
ALP	309,000					309,000
NWC					48,000	48,000
Total capital costs	1,042,560	25,000	25,000	25,000	73,000	1,190,560
ALP share (%)						85%
NWC share (%)						15%
Operating cost ($)						
Component 1: Increasing treatment capacity						
ALP	-	-	-	-	-	-
NWC	29,800	88,800	188,160	455,520	490,100	1,252,380
Component 2: Field service						
ALP	27,000	27,000	27,000	-	-	81,000
NWC	29,600	30,560	31,616	59,778	61,055	212,609
Total operating costs	86,400	146,360	246,776	515,298	551,155	1,545,989
ALP share (%)						5%
NWC share (%)						95%
Total cost ($)	1,128,960	171,360	271,776	540,298	624,155	**$2,736,549**
ALP share ($)						**$1,098,560**
NWC share ($)						**$1,637,989**
ALP share (%)						**40%**
NWC share (%)						**60%**

13 Comparing benefits with costs

The projected benefits of the proposed Project are compared with projected costs in Table 15. The benefits are measured in terms of the fob value of the additional exports attributed to the project. The results show a hugely economically viable Project. Over a 5-year period the Project has a benefit cost ratio of 3.3. The internal rate of return (IRR) for Project is 109%[5] , with Net Present Value (NPV) of $3.7 million (applying a 12% discount rate).

[5] This is the rate of interest that equalizes the present values of economic cost and benefits that accrue to fresh fruit and vegetable industry and the national economy.

Table 15: Comparing Project Benefit with Costs

	2007	2008	2009	2010	2011	Total
Capital costs ($)	1,042,560	25,000	25,000	25,000	73,000	1,190,560
Operating costs ($)	86,400	146,360	246,776	515,298	551,155	1,545,989
Total costs ($)	1,128,960	171,360	271,776	540,298	624,155	2,736,549
Benefits(fob value of additional exports attributed to the Project) ($)	210,000	630,000	1,344,000	3,276,000	3,549,000	9,009,000
Benefits-Costs ($)	- 918,960	458,640	1,072,224	2,735,702	2,924,845	6,272,451
B/C	**3.3**					
Internal Rate of Return (IRR)	**109%**					
NPV (interest rate 12%)	**$3.7 million**					

Strategies

13.1 Planning

NWC's 5-year Strategic Plan - Nature's Way Cooperative (Fiji) Ltd. Strategic Plan (2002-2006) - provides the basis for the proposed Project. The Project document was prepared by the NWC Board, under the coordination of the Cooperative's Chairman, Deputy Chairman and General Manager. This exercise involved close consultation with the industry and government stakeholders. The Project was endorsed by a General Meeting of shareholders held in the Sigatoka Valley on August 17th.

Dr Michael Williamson (HTFA Consulting Engineer), based in New Zealand, provided advice on all aspects relating to Component 1. He will be visiting NWC in late August 2006 to assist with implementation details.

13.2 Implementation time table

Completed

- Overall project planning
- Project approval by the fruit and vegetable industry (final endorsement at NWC AGM Aug 17th)
- Preliminary design for the two bay extension and office complex
- Quotation for the two bay extension obtained from BlueScope Lysaght.
- A preliminary quotation for the expanded office facilities - further quotes will be obtained once the final specification have been determined

August/Sept 2006

- ALP funding approved
- Project Management Team formed and commences work
- Dr Michael Williamson, Consulting Engineer, visits to finalise details for the local manufacture of the new wide-body chamber and to advice on other implementation details.
- Specifications for the new wide body chamber provided by Dr Williamson.
- Final design specifications agreed to and final quotes obtained.
- Building approvals applied for and obtained.
- Request make for duty free exemption for the importation of field crates.

October

- Contracts given for the two bay extension and for the office expansion.
- Field Officer position advertised

November/Dec

- Two bay extension construction commences.
- Field Officer appointed and commences duty.

- 4WD vehicle purchased for Field Service.
- Office expansion commences.
- Order placed for bulk purchase of field crates

January/Feb 2007
- Two bay extension completed
- Papaya seed quality improvement program commences
- Field crate program commences
- Study of fruit handling systems undertaken
- Office expansion completed
- Construction of new body chamber commences

March/April
- New wide body chamber completed, commissioned and certified by importing authorities.
- New folk lift purchased.
- New grading and packaging equipment purchased and commissioned.
- HTFA facility obtains organic certification.
- NWC field officers involvement in organic certification commences.

April/May
- Approval given for HTFA treated breadfruit and eggplant exports to Australia
- Approval given for HTFA treated jakfruit, bitter melon, sponge gourd and wi New Zealand.
- Application lodged to USDA/APHIS for HTFA treated papaya and breadfruit for export to the US.

June/July
- Approval given for HTFA treated mango (pickling and traditional varieties) for Australian market

Annex 1: Details of proposed expansion in the packing area

1. A return path for the fork lift will be created by opening up a new entry/exit door on the side of the building adjacent to the incinerator. This new door system will consist of a walled space with a roller door and maybe a curtain on the right side, a solid wall straight ahead and, on the left side, the new purpose built cooler will face the roller door. This space will be part of the fly free packing area. Thus, the space enclosed will be supported by the container cool room, a wall and then the roller door access back along an open drive way to the receiving area. This approach allows access to the new cool room from the new packing room and access back to the front of the building from the anywhere in the fly free zone. Access from the new packing area will be provided through the current aircraft loading space to the new cool room. Also from the new cool room back to the aircraft loading area. The fly free zone consists of the existing packing area plus the new packing are (old cool room) plus the new door space to and including the new container cool room plus the aircraft loading area.

2. A wall between the packing area and the existing cold room will be opened directly behind the dual zone chamber. This area can be the new packing area with unloading of the bins and lugs occurring either just inside the new door way or just outside it and using roller conveyors to carry the fruit to the packing tables. Either way it will be easy to pick up the empty bins or lugs and run them out of the packing area into the new side door, out along the wall back to the receiving area.

3. The new office will be built adjacent to the existing office. It will utilise the space currently used to park cars all day. The existing office will still be usable, the telephone connections etc. will be there. Also the receiving functions can be monitored from a doorway or hatchway right where the unloading will be done.

Annex 2: NWC 2005 Audited Accounts