ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

ENHANCING COOPERATION IN TRADE AND INVESTMENT BETWEEN PACIFIC ISLAND COUNTRIES AND ECONOMIES OF EAST AND SOUTH-EAST ASIA

VOLUME II: PRODUCT STUDIES

UNITED NATIONS

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The overview, studies, conclusions and recommendations of the meeting held in Port Vila, Vanuatu, from 8 to 12 July 1996 under phase one of the project "Enhancing cooperation in trade and investment between Pacific island countries and economies of East and South-East Asia in the 1990s" are published in two volumes. This, the second volume, contains product studies discussed at the meeting, while volume I contains issue papers. The project, which received generous financial support from the Government of Australia, was carried out under the ESCAP special programme for the least developed, land-locked and island developing countries.

PREFACE

Pacific island countries have identified trade and investment as an important vehicle for improving their economic growth record which has been disappointingly low thus far. In light of the fact that the economies of East and South-East Asia are expected to remain robust into the twenty-first century, Pacific island countries have stated their intention of enhancing their trade and investment relationships with these dynamic Asian economies.

In response to these concerns, ESCAP organized an Expert Group Meeting on Enhancing Cooperation in Trade and Investment between Pacific Island Countries and Economies of East and South-East Asia which was held at Port Vila, Vanuatu, from 8 to 12 July 1996. The purpose of the meeting was to look at ways and means of promoting trade and investment links between countries of the two sub-regions. The meeting was attended by 35 participants and experts, including resource persons from 16 Pacific island countries, Malaysia and Singapore.

The issues discussed at the meeting included understanding and internalizing the implications of the changing patterns of global, regional and sub-regional trade, enhancing the investment linkages between Pacific island countries and Asia, expanding the role of private sector in trade and investment, and the concomitant need for sustainable development of natural resources which are exploited for export. The need to formulate and implement flexible and consistent macroeconomic and financial policies, supplemented by appropriate sector support policies to enhance the use of exports as an engine of growth, was also discussed. The five issue papers which formed the basis for discussion at the meeting are reproduced in a separate publication as volume I. The five product studies which appear in this volume were used by the participants to discuss practical issues relating to the feasibility of production policies and further development of exports of the products.

In discussing the product studies contained in this volume, the participants were guided by a number of questions: What are the major obstacles faced by Pacific island country producers in developing the product for export and what types of actions are required to overcome them? What is the appropriate role of government in assisting the industry, and what should be the responsibility of the private sector? What are the problems with existing policies concerning the industry? Is there scope for regional cooperation in the development and export of the product? The areas of concern often centred on questions of market access, financial requirements, quality and quarantine control, and the availability of market and price information. The conclusions emanating from the practical exercises were used by the participants as inputs to formulate the recommendations of the meeting, and these are reproduced in this volume.

The product studies in this volume could be useful for those currently engaged on or intending to venture into the production and export of the products under review or of similar products and for governments wishing to design market-based support policies. However, volumes I and II need to be consulted together for a better grasp of the overall perspective of the issues involved in the production and export of such products from Pacific island countries.

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EXPLANATORY NOTE

Reference to "tons" indicates metric tons.

The term "billion" signifies a thousand million.

In dates, a hyphen (-) is used to signify the full period involved, including the beginning and end years; and a stroke (/) indicates a crop year, a fiscal or a plan year.

In tables, two dots (..) indicate that the data are not available or are not separately reported, a dash (–) indicates that the amount is nil or negligible, and a blank indicates that the item is not applicable.

Details and percentages do not always add up because of rounding.

RECOMMENDATIONS

A. Policy recommendations addressed to national governments of Pacific island countries

1. Base macroeconomic policy on the need for sustained competitiveness in international trade. Sustained competitiveness largely depends on performance of the key prices in a small open economy, including the exchange rate, taxation, wage levels, costs of access to land, natural and financial resources and non-financial costs, e.g. time.

   - The agencies responsible for trade and investment in a country should play an important role in formulating coherent macroeconomic policies.

2. Devise or revise Pacific island country investment guidelines and procedures to be simple, transparent and readily accessible and publicize these. The procedures should not discourage investors by being too restrictive, complicated or time consuming, and should not be secretive. Mechanisms for enforcement of contracts and dispute settlements involving both domestic and foreign investors should be put in place.

   - The Forum Secretariat should collect, analyse and disseminate on a periodic basis up-to-date information on the comparative experiences of investment regimes in Pacific island countries as well as other Pacific rim countries.

3. Improve access to investment finance by local entrepreneurs, particularly by helping them to meet guarantee and collateral conditions of financial institutions, and linking access to finance to use of other business support services. Widen the scope of small business credit finance schemes to include export orientation.

   - Pacific island countries should share their experiences in this area and seek assistance from international and bilateral agencies on implementation modalities.

4. Promote understanding of international trade and investment rules and agreements, e.g. the implications of undertaking World Trade Organization (WTO) commitments, trade dispute settlement mechanisms, intellectual property rights, etc. and the implications of the trade related actions of trading partners. The undertaking of Papua New Guinea to establish an Asia-Pacific Economic Cooperation (APEC) forum centre to assist Pacific island countries with information, research and training on APEC was welcomed.

- Assistance should be requested from relevant agencies such as WTO, the United Nations Conference on Trade and Development (UNCTAD) and ESCAP.

- Consideration should be given to setting up a joint office in Geneva by Pacific island countries which are members of WTO, with others having access to its services and information.

- In relation to APEC, the Forum Secretariat was urged to be more effective in its undertakings including preparation of reports and dissemination of information for Pacific island countries.

5. Arrange ready access to export credit finance, pre and post shipment finance and export insurance finance. Pacific island countries' central banks and development banks, as well as non-bank institutions, could play important roles in trade financing.

   - ESCAP should be requested to undertake a study of existing arrangements in Pacific island countries and other developing countries and make recommendations.

6. Use some portion of taxes, levies etc. raised from a sector within that sector itself. This is especially relevant to environmental taxes and industry-based levies.

7. Reduce trade and investment barriers, work towards harmonizing rules for trade and increase cooperation in transport and communication among groups of Pacific island countries. Investigate the feasibility of growth areas involving developed or more advanced developing countries.

   - Agencies responsible for trade and investment should take the lead, undertake research and make proposals in these areas.

B. Recommendations on institution/ capacity-building addressed to governments of Pacific island countries

8. Build institutions and capacity of governments in trade and investment-related activities. Make a clear distinction in terms of autonomy between the decision-making role of politicians in setting policies and the role of the technocrats in proposing and implementing these policies.

   - Assistance for capacity building can be accessed through advisory services and training including utilizing technical cooperation among developing countries (TCDC) opportunities in East and South-East Asia and among Pacific island countries.

9. Develop and/or strengthen composite agencies responsible for trade and investment such as trade and investment boards and assign them well defined functions. Such functions include development of information

systems on external markets, sponsoring trade and investment missions, assessing and providing advice on pre-feasibility studies. Promote exchanges of information among these agencies on potential investors to help reduce the incidence of fly-by-night operators.

10. Foster exchanges of information and periodic meetings among agencies responsible for trade and investment in the subregion and their counterparts in East and south-East Asia, and collaborate in trade and investment promotion activities. Expand and make full use of networks for trade and investment promotion such as the South Pacific trade commission offices.

11. Institute and/or strengthen mechanisms for government/private sector dialogue in the trade and investment area. Strengthen private sector bodies such as chambers of commerce, producers' associations, exporters associations and find ways for them to provide advice on policy-making.

- Exchange of experience among Pacific island countries, as well as with East and South-East Asian countries, on the modalities of this dialogue would be useful.

12. Put in place mechanisms for ensuring the respect of internationally recognized quality and measurement standards for export products. Where such standards do not exist, they should be developed in line with world standards and efforts made to obtain international recognition. The standards adopted should be harmonized and mutually recognized among Pacific island countries. This would also facilitate intratrade and transit trade in the subregion.

13. Institute inspection facilities for meeting quarantine, other health-related requirements, environment-related requirements and other certifications for exported food and agricultural products.

- Donors should be approached to provide technical and financial assistance to help to establish and operate these facilities.

14. Build capacity in public and private sectors for negotiating better deals in marketing export products. This will include understanding pricing mechanisms and the assessment and management of risks, including exchange rate risks. It also includes considering new ways of collecting rents from renewable resources.

- Assistance and training in these areas should be sought from UNCTAD, the World Bank, ESCAP and UNCTAD/WTO-ITC as well as other bilateral agencies with the relevant expertise.

15. Review and, when necessary, revamp support services provided to producers (infrastructure, extension services, training, research and development etc.) to ensure that these are responsive to the needs of the private sector. Some of these services can and should be provided by the public or private sector for payment. Some can be linked with the provision of investment finance.

- Exchange of experience with East and South-East Asian countries should be fostered, including the use of TCDC facilities and dissemination of information.

C. Recommendations addressed to regional agencies

16. Study the comparative experience with privatization/corporatization within Pacific island countries, and disseminate and discuss the results of the study.

    - The ESCAP Pacific Operations Centre should be requested to undertake this study.

17. Undertake research on the characteristics of niche markets and their relationships to Pacific island countries' exports. This should include fishery products, agricultural products and tourism.

    - ESCAP should be requested to undertake this study, in cooperation with the South Pacific Commission in its areas of competence.

18. Conduct an annual survey of the costs of doing business in Pacific island countries and Pacific rim countries, and disseminate the results among governments. The costs should include the main cost elements affecting competitiveness of Pacific island countries such as costs of fuel, communication charges, land rents, taxes, housing, electricity, water, wages, etc.

    - The Forum secretariat should be requested to conduct the survey and disseminate its results.

D. Proposed activities under the second phase of the project

19. In light of these recommendations, the Expert Group recommended that the issues to be considered in the expert group meeting envisaged under the second phase of the project be:

    - A study on the elements determining competitiveness (related to recommendation 1 and 8)

    - A study on export credit finance, pre- and post- shipment finance and export insurance finance (recommendation 5)

    - A study on the delivery of support services (recommendation 15)

20. There should also be a follow-up on two of the product studies (bêche-de-mer and fruit products) in terms of what the counterpart businessmen in East and South-East Asia require to commence trade.

CHAPTER I

VANUATU'S SQUASH EXPORTS TO JAPAN

*by Elisapeci Talica Tuvoudradra**

I. BACKGROUND

Vanuatu's economy is dualistic in nature with the traditional subsistence sector comprising about 80 per cent of the workforce but contributing less than 20 per cent of gross domestic product (GDP). The modern sector includes plantation agriculture, particularly copra and cattle, tourism, the finance centre and government services.

The political disturbance in 1980 led to a significant contraction of the economy, but by 1983 with restoration of political stability, the economy showed some recovery. Although economic growth has been poor, the economy experienced certain favourable structural changes during the mid 1980s. In terms of agricultural exports, changes in relative contribution of major primary products became apparent in the early 1990s with declining real product prices for copra and the emergence of squash as a significant export industry.

In 1995, total domestic exports (f.o.b) had increased by 6.2 per cent from 1994 which was attributed mainly to the relatively high earnings from copra and squash (table 1.1). Copra production increased by 7.9 per cent while world market prices increased by 14.1 per cent over the same period. In the case of squash, value of exports increased by 14.7 per cent while volume increased 24 per cent from 2,088 tons in 1994 to 2,605 tons in 1995. However, figures also indicate the declining trend in beef and cocoa exports over the last 3 years because of strong competition in the Japanese beef market and low production in cocoa.[1]

In the new trade environment, the terms of trade can be expected to continue to move against bulk commodities as demand for these commodities grows relatively slowly compared to world income. In contrast, the demand for goods such as horticultural products, specialty foods and sophisticated services (e.g. tourism) can be expected to grow rapidly compared with world income. In this context, the emergence of the squash industry in Vanuatu is seen as a significant development in the diversification of a commodity-based economy.

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* Trade and Development Office, Suva, Fiji.

The opinions, figures and estimates set forth in this paper are the responsibility of the author, and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations.

1 Vanuatu Reserve Bank, *Quarterly Economic Review*, December 1995.

Table 1.1. Value and quantity of Vanuatu's major export commodities, 1993-1995

	1993	*1994*	*1995*
Squash (t)	**1,456**	**2,088**	**2,605**
Value	**1.1**	**0.9**	**1.3**
Copra(t)	28,140	26,441	28,520
Value	6.0	7.7	9.5
Cocoa(t)	1,401	1,706	1,035
Value	1.3	1.9	1.08
Beef(t)	1,619	1,612	1,502
Value	3.9	3.9	3.7
Timber(t)	6,612	4,128	3,257
Value	2.3	2.6	2.2
Others (t)	n.a.	n.a.	n.a.
Value	5.3	4.4	5.4
Total value	**19.9**	**21.4**	**23.18**
Squash contribution as a percentage of total value	**5**	**4**	**6**

Source : Reserve Bank of Vanuatu, *Quarterly Economic Review,* 1995.

Notes: t = metric tons.
value = US$ million.

II. THE COMMODITY

Buttercup Squash *(curcubita maxima)* is a popular vegetable in Japan and widely used in traditional Japanese dishes such as *Tempura, Teppanyaki* as well as western recipes. Total consumption in Japan is estimated at 360,000 tons per annum and has steadily increased over the last 5 years.

The main squash cultivar grown for export is the hybrid type which produces dark green fruits with lighter green striping when matured. It is flattened in shape and has a bright orange flesh. The Japanese name *"Ebisu* or *Delica"* is sometimes used to describe this cultivar and is the most popular with Japanese consumers. This variety is perceived to have a firm flesh and better taste. The tough rind, sunken stalk, and small crown enable the commodity to store well during shipping. With adequate ventilation, the product stores satisfactorily for about two months. Other cultivars similar to the hybrid are available but fruit size are smaller and these should only be used where fruit quality is known.

The cropping period is 90 to 120 days depending on location. Squash requires fertile and well structured soils with good drainage. It also needs around 400 cubic m of water on a rising plane from planting until harvest and irrigation

is necessary if rainfall is insufficient or unevenly distributed. Warm days and cooler nights are ideal for squash which thrives well under conditions where there is at least 10 degree C difference between night and day temperatures. Squash is usually grown on rotation with other crops or pasture.

III. THE JAPANESE MARKET

A. The structure of the Japanese market for vegetables[2]

In the last 30 years, considerable structural change has been taking place in the Japanese vegetable industry, basically due to scarcity of rural labour, pressure on available land due to urban encroachment, and an ageing and declining farming population. While vegetable consumption is increasing in Japan, the production base has continued to decline while imports of fresh vegetables and fruits have increased significantly. Another interesting feature is the shift away from production of root vegetables towards western fruits and leafy vegetables (e.g. celery, lettuce, cauliflower). Vegetable consumption has also changed. While consumption of meat, fish, marine products and fruits have increased over the last 30 years, rice and vegetables (particularly root vegetables) have declined. The decline in total consumption has been caused by a number of factors including increased affluence, greater urbanization, increased number of working women, growing demand for convenience food and increased preference amongst the Japanese to eat out. This changing pattern in vegetable production and consumption in the Japanese markets offer a wide range of opportunities for potential exporters.

B. The Japanese auction system[3]

In Japan, most vegetables are sold by auction through the central wholesale markets. Selling by auction is essentially a tender process and the system provides a quick and effective mechanism to establish prices and clear the produce from the market. There are about five types of auction systems in Japan of which *sakidori* is the most complicated. Produce are auctioned either by:

(1) *Yoyakuaitai* or "ordering by request": a contract system involving producers contracting with wholesalers and wholesalers contracting with retailers. Contracts can be for prices and periods. This system is infrequently used because of concern that in the contract period, auction prices may vary considerably thereby causing loss to either or both parties. Contract periods are usually about 3 months. The general trading practice associated with yoyakuaitai is to allow for weekly fluctuation of around 20 per cent.

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2 This section draws heavily on Vinning (1992).

3 Ibid.

(2) *Wholesaler purchase:* auction houses may buy produce in their own name.

(3) *Sale by private treaty:* this is allowed to stabilize prices, particularly during disaster.

(4) *Sakidori:* buying before the auctions opens – this system is allowed by law to accommodate supermarkets and distance buyers in getting their produce on the shelves early in the day. It is alleged that about 70 per cent of sales is through *sakidori* and the practice increases with sudden reduction in supply and quality. Arguments exist that the practice of sakidori causes prices of subsequent auction to be higher than what it should be because of limited supply and/or causes prices to drop in a subsequent auction than what it would be otherwise because of the lower quality of produce. However, Vininng and Kobayashi in a study suggested that *sakidori* leads to higher prices and concluded that *sakidori* was inhibiting prices from being driven down to clear the market due to less volume available at the auction. This also confirms the view that the Japanese do compete on price and not merely quality because every quality has a market. It also confirms that the nature of the sakidori system also contributes to instability in price movements on the Japanese produce market.

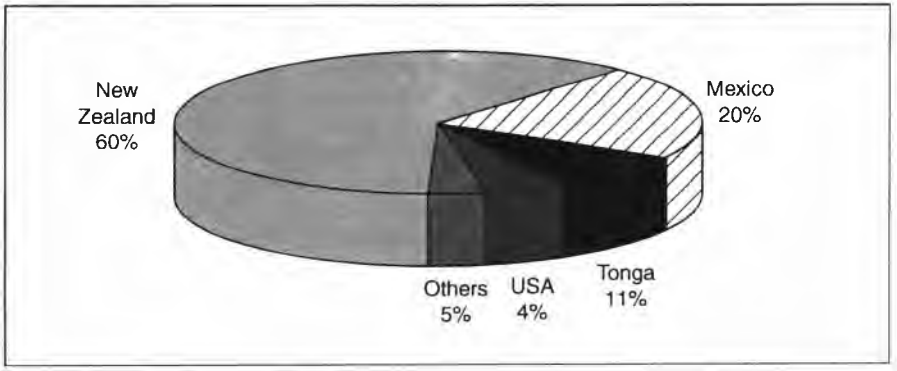
C. The Japanese squash industry

Squash is grown in Japan in Hokkaido, Honshu, Kyushu and total domestic production is about 200,000 tons supplying the market from May/June to September with the final harvest in Hokkaido. The Hokkaido crop is normally held until imports arrive in October/November. Squash imports into the Japanese market is during the off-season and the size of this market depends on the size of domestic production.

D. Squash imports into Japan

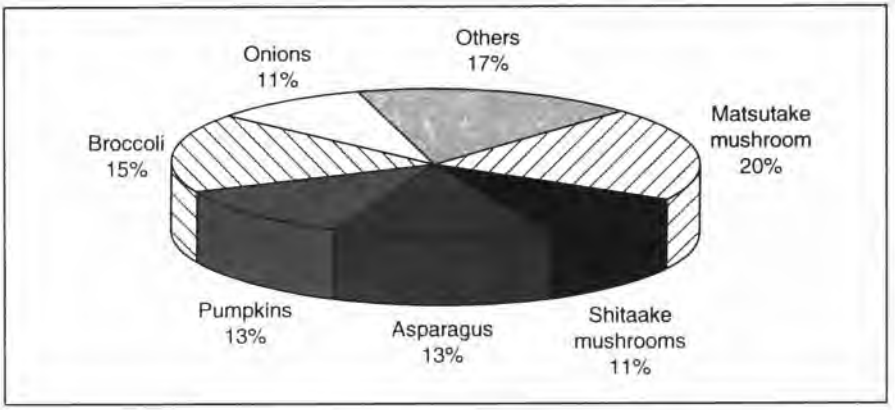
New Zealand is the largest supplier of squash in the Japanese market accounting for 60 per cent of total imports in 1994, followed by Mexico 20 per cent, Tonga 11 per cent, United States of America 4 per cent and Others 5 per cent which includes Vanuatu, New Caledonia, and Australia. (figure 1.1) Japan imported a total of 581,700 tons of fresh vegetables worth US$2.4 billion in 1994. Squash or (pumpkins) accounted for 27 per cent of total imports. Squash imports is always a large item and in 1993-1994, it had increased by 24 per cent in volume to 156,700 tons and by 11 per cent in value to US$112.8 million (figure 1.2). Japan's imports of fresh fruits and vegetables are undoubtedly growing and will continue to do so in the foreseeable future as the president for Dole (Japan) predicts: "Japan will experience a 30 per cent decline in domestic production of fruits and vegetables during the next five years. Even if the decrease happens more slowly, the trend towards increased reliance on imports is clear" (Market Asia, 1995).

Figure 1.1. Squash suppliers to the Japanese market, 1994



Source: Market Asia, July, August 1995.

Figure 1.2. Composition of Japanese imports of fresh vegetables, 1994



Source: Market Asia, July, August 1995.

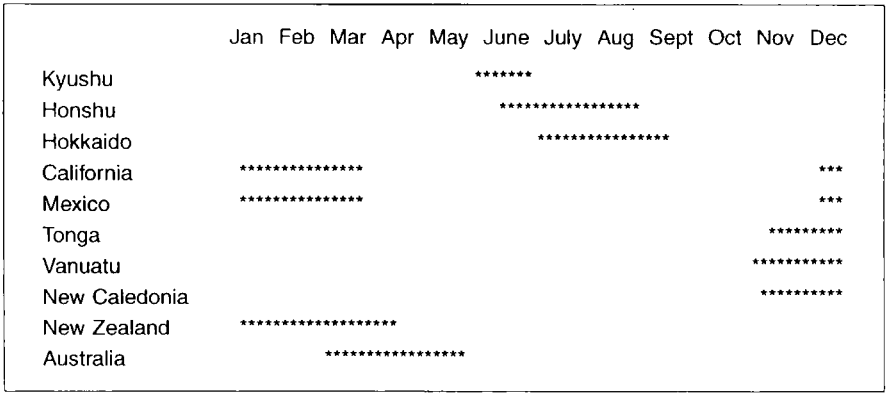
E. Quality standards

The Japanese market is the most demanding in terms of quality. It has very strict Phytosanitary regulations which bans products from many countries. Exporters need to be patient and it can take ages to make a breakthrough in the market. Once accepted as a supplier into the Japanese market, maintaining quality is imperative. According to several studies, Japanese consumers are willing to pay higher prices for quality products and importers choose suppliers based on this criterion. Only the best is acceptable in terms of quality, appearance and presentation – there is no room for second grades.

F. The nature of the "seasonal window" for Pacific island suppliers

United States (California) and Mexican squash supplies enter the market in December with New Zealand squash arriving in January. The period, November to mid-January is normally one of short supply and relatively high prices. This supply pattern offers a "seasonal window" for Pacific island producers who are able to supply squash into the Japanese market all at the same time. (figure 1.3). Because squash is traded in the auction market as described in section A, wholesale prices can change abruptly in response to expected shipments. Furthermore, in the occasional seasons of excessive domestic production in Hokkaido, the high profits expected in November-December may not last as long as expected or may not materialize at all.

Figure 1.3. Monthly supply sources



Source: Paradise Growers Ltd., 1993.

Thus, while returns from exploiting this niche market can be considerable, so too are the risks, with timing being crucial. Poor planning at the beginning of the season can lead to all sorts of problems. Important lessons were learned from the Fiji experience in1988. "Misjudgment of the growing period meant production came on-stream too early. The objective was to reach the market in early December when expected prices were at their maximum. Thus, production planning was based on harvesting by late October (based on MAFF advice that it takes 90-95 days to mature) and shipping early November. However, the realized maturity period was only 65-70 days, hence, the crop arrived 20 days earlier than planned which created major logistical and shipping problems. Moreover, the crop missed the expected price peak, and Fiji squash received the lowest price in the market at the time." (McGregor and Eaton, 1989, p. 48)

The Fiji experience clearly illustrates the volatile nature of market prices which are closely pegged to supply but also demonstrates how vulnerable this "seasonal window" can be. Squash suppliers from Vanuatu and Tonga now sell on contract price to hedge against the risks of prices collapsing on the spot market but at the same time, one may lose out on the high returns if the spot price is higher than the contracted price.

The Tongan experience in 1991, however, is another classic example of what can happen when suppliers ignore Japanese quality standards. The quantity exported in one shipment was far too much for the market to bear but also stretched inspection capabilities of the Tongan quarantine authority. As a result, a high percentage of under-size, immature and poor quality squash slipped through the system. The shipment was a total disaster and everyone lost heavily. Fortunately, prompt action by the Tongan industry and authorities saw the introduction of stringent grading standards and a production quota system in the following season .This revamped the confidence of the Japanese importers and placed the Tongan squash industry back on track as being the largest squash supplier from Pacific island countries.

IV. THE SQUASH INDUSTRY IN VANUATU

A. How the industry developed

Japan is an important trading partner for Vanuatu and imports around 25 per cent of Vanuatu's total domestic exports which is mainly beef and squash. For more than a decade, Vanuatu has been exporting quality beef to Japan which is quite exceptional for a Pacific island country considering the high quality demands of Japanese consumers. Vanuatu's reputation of being a reliable, quality supplier of beef in Japan and the involvement of D.M. Palmer Company in Vanuatu, (one of New Zealand's largest squash agents) has to some extent, assisted in the marketing of squash in Japan. As with Tonga, the industry was initiated by Paradise Growers Ltd. trying to extend their supply season on the Japanese market However, one of the major overriding factor which preempted the development of squash in Vanuatu was market reforms introduced by the Tongan squash industry after the crisis of 1991. The introduction of a production quota system in 1992, not only stablized market prices for Tongan squash but at the same time created favourable market conditions which attracted new entrants in the market place. Vanuatu, through Paradise Growers Ltd. took advantage of this opportunity and started exporting squash to Japan in 1992 during the "seasonal window" which at that time was primarily dominated by Tonga. New Caledonia also entered the Japanese market at about the same time as Vanuatu.

The Fiji ginger industry is another good example. In 1986, there was an over production situation and Fiji ginger exporters flooded the North American market by shipping 1,200 tons in one shipment. By 1987, the Government intervened and introduced market reforms by fixing prices, restricting the number of importers and restricting supply through quotas. It worked well in introducing orderly marketing and stabilized prices but it also encouraged the entry of Indonesian and Chinese suppliers who now dominate the North American fresh ginger market.

B. Role of entrepreneurial developers

Past experiences in Pacific island countries have shown that the development of an export industry cannot be sustained with exporters securing supplies from farmers in an informal and ad-hoc fashion. (McGregor and Eaton, 1989). Squash in Vanuatu, with the involvement of Paradise Growers Ltd and tobacco in Fiji with Southern Development Company are excellent examples. These companies or so called entrepreneurial developers usually bring with them new technology, and provide financial and technical advisory services to growers. In doing so, the growers acquire entrepreneurial skills and also learn new ideas and the importance of quality by strictly following a set of agronomic package of practices.

Numerous agri-business studies worldwide also tend to show a strong trend that whenever and wherever agri-business is present in rural areas and manages to prosper, it becomes a compelling force of change and development within that community. In this respect, the role of entrepreneurial developers or the direct involvement of private sector in marketing of agricultural produce is seen as a pre-requisite to successfully developing commercially sustainable agro-based export industries in Pacific island countries.

C. Agronomic suitability

All squash production in Vanuatu is concentrated in Efate. Squash is grown on alluvial soil which have high nitrogen levels and organic matter. Soil pH ranges from 5.6 to 6.7 which is excellent for squash but phosphorous levels are low, therefore, application of phosphorous fertilizer is usually recommended at planting. To maintain soil fertility, product quality, good yields and minimize pest and diseases, squash is grown in rotation with other crops and pasture for grazing. Although, the other islands of Santo and Tanna are also suitable for growing squash, it would be logistically costly to expand because of the lack of adequate inter-island shipping services and the associated high cost of freight.[4]

Access to good arable land is not a constraint in Vanuatu. Paradise Growers Ltd. rents from leaseholders on an annual basis, most of its farmland on which squash is grown. A pre-condition to these leases is that the company clear the shrubs and replant pasture after cropping is completed.

In Vanuatu, squash takes 90-95 days to mature. It is planted in July and harvesting starts in October to target early entry into the market before the Tongan squash arrives.

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[4] Expansion would mean diseconomies of scale and at 2,500 tons export per annum as the upper limit, Pacific Growers Ltd maintains that the market is now saturated and exports over and above this limit will tend to force market prices downwards.

Irrigation is necessary as squash requires 400 cubic m of water from planting to harvest. Irrigation also improves yields and quality of the fruit. It is uneconomical to commercially farm squash in Vanuatu without irrigation.

Good bee population which is essential for proper pollination is not a problem in Vanuatu but is a constraint in Tonga.

D. Production performance

Paradise Growers Ltd established its operations in Vanuatu in 1991 and now grows 300 acres of its own squash. Other growers plant a further 170 acres of which the largest (a French grower) has 75 acres. The average farm size for ni- Vanuatu small growers is 5.0 acres which is about the same in Tonga. First, commercial exports of squash to Japan commenced in 1992. Since then, Vanuatu has gradually increased its exports from 502 tons in 1992 to 2,500 tons in 1993. Similarly, with improved agronomic practices, average yield per acre has also increased from 1.25 tons per acre in 1991 to 3.7 tons per acre in 1994.

Production is highly mechanized but the company also employs up to 500 farm labour each season for planting, harvesting and machine operating. Additional staff (8) are brought in from New Zealand during harvest as packhouse supervisors and quality controllers. Although, this may seem an expensive exercise, the need for qualified and experienced quality controllers and supervisors is critical for better quality control. There is no room for mistakes. Timing of entry into the market, producing sufficient quantity per shipment and quality is so important but it all relates back to production planning and proper management.

Until such time the company is in a position to fully train the local workforce to take over these responsibilities thus minimizing production costs, it seems logical to continue with the current practice of employing expatriates at management and supervisory levels.

Table 1.2. Japanese squash imports from Pacific island countries, October–December

(tons)

	1991	*1992*	*1994*
Vanuatu	–	**501**	**2,087**
Fiji	225	470	–
Tonga	21,114	11,390	16,993
New Caledonia	–	58	1,420
Total	**21,339**	**12,419**	**20,500**
Market Share of Vanuatu (per cent)	**0**	**4**	**10**

Source: Tonga Ministry of Agriculture and Quarantine.

At maturity, Paradise Growers Ltd coordinates harvesting to coincide with shipping and market requirements. All grading and packing is done by Paradise Growers Ltd in 4 large packhouses which are also being rented. The company charters vessels on a share basis with the Tongan shipments. This is a crucial time for the company as they must ensure that there is sufficient volume to fill up the vessel to avoid penalty for dead weight.

Paradise Growers Ltd maintains that 2,500 tons per annum is all the market can take. Over and above this limit, the market will be saturated, forcing prices downwards. The company is now focusing on increasing productivity (yields/acres) and improving quality, thus minimizing the rate of rejects.

E. Structure of the industry

Paradise Growers Ltd is the only squash exporter in Vanuatu but also grows 60 per cent of total exports. At present, Paradise Growers Ltd contracts to about 30 ni-Vanuatu small growers and one French grower. The industry therefore, is basically being run by Paradise Growers Ltd. The initial involvement of a private sector and the Government playing a more supportive role has perhaps contributed to the significant progress of the squash industry in Vanuatu. The involvement of another exporter, Turner and Growers from next season would assist in the servicing and marketing of small growers production and perhaps introduce some competition within the industry in improving quality and returns to growers.

F. Role of Paradise Growers Ltd

Paradise Growers Ltd is the sole exporter of Vanuatu squash. It is a private company of New Zealand with D. M. Palmer Co. as one of the major shareholders which is one of New Zealand's largest squash marketers. The involvement of a bonafide entrepreneurial developer such as D.M.Palmer Co. has played a crucial role in the marketing of Vanuatu squash in Japan. Paradise Growers Ltd is also involved in marketing squash in Tonga and New Caledonia. The next season may see the entry of Turners and Growers as another exporter who is also involved in marketing Tongan squash. Besides managing their own farm, Paradise Growers Ltd also provides support services to small growers. These include technical advice on:

- soil analysis and fertilizer recommendations
- providing chemical spray programmes
- providing production planning – to coincide with shipping and marketing requirements
- seeds, fertilizer and spray chemicals
- providing field bins and machinery
- determining and enforcing quality control and grading standards
- providing training for growers, quality controllers and supervisors

At the beginning of the season, Paradise Growers Ltd offers growers a minimum contract price of about 40 vatu/kg so growers are able to secure loans for working capital from the Vanuatu Development Bank. At an average yield of about 2.5-3.0 tons/acre, this price is quite profitable for growers and in some seasons, the final payout can be as high as 55 vatu/kg.

In the 1994/1995 season, Vanuatu squash was sold on contract price of 85-90 yen/kg while spot price ranged from 85-170 yen/kg. New Caledonia sells on spot price and therefore was able to take advantage of the high prices. Paradise Growers Limited has indicated that the break-even price is about at 75 yen/kg. Cost of production and shipping is relatively high at a contracted price of 85 yen/kg. Therefore, there is not much room to increase production without increasing costs.

The Paradise Growers Ltd has been primarily responsible for the development of squash in Vanuatu while the Government has played a more supportive role. However, the production and marketing of squash in Vanuatu has presented new challenges to Paradise Growers Ltd and small growers because of the focus on quality and reputation, unlike the commodity markets for copra and cocoa. Growers and farm workers have had to learn the importance of quality, especially the individual handling necessary to meet the appropriate quality and appearance for the Japanese market. Such skill has taken time to develop, as did the cultivation practices under local conditions to improve quality and minimize disease. Much of the industry's success is that the marketing has been exclusively handled by Paradise Growers Ltd and because the company also produces a large proportion of its own export requirements, it is in a better position to control and secure sufficient supply to coincide with shipping and market demands.

Numerous studies have shown that the performances and experiences of Governments and statutory agencies involved in the marketing of horticultural export commodities has been dismal in other Pacific island countries. Likewise, it would be counter-productive to the future development of the squash industry in Vanuatu if the Government decides to be directly involved in squash marketing – it would be best left in the hands of the private sector.

Table 1.3. Average wholesale price of squash in Tokyo

(yen/kg)

	1992	*1993*
Vanuatu	**95.6**	**106.4**
Tonga	107.5	101.0
New Caledonia	103.7	106.0
Mexico	103.8	105.7
USA	98.3	87.1
Australia	98.7	97.1
New Zealand	81.4	78.6

Source: Tonga Ministry of Agriculture Report, 1993.

G. Contribution to Vanuatu economy

First commercial squash exports was in 1992 and since then, its overall performance can be considered to have had a positive impact on Vanuatu's economy in terms of its contribution in creating employment (about 500 labour per season), in generating foreign exchange earnings and real income to small growers and leaseholders. Although, the overall contribution of squash in the economy is small by industrial country standards (6 per cent of total domestic exports or US$1.5million/annum) in foreign exchange earnings, in small island economy heavily relying on copra and cocoa and with limited export opportunities, the emergence of the squash industry is a significant development towards diversifying its agricultural export base.

H. Vanuatu's competitive advantage with Tonga

1. Climatic and soil conditions

Vanuatu has excellent soil for squash and other high-value horticultural crops. All squash is grown on the alluvial soils of Efate which has high nitrogen levels and rich in organic matter. Soil pH is non-acidic ranging from 5.5-6.7. Phosphorous levels are low hence inorganic fertilizers are recommended. Its climate although suitable is warmer in the nights. Squash requires at least 10 degrees of difference between night and day temperature which is barely achieved in Vanuatu. Tonga, on the hand, has the advantage as temperatures are cooler at night.

2. Disease status

Vanuatu is free of mediterranean and melon fly as is Tonga, which is a real threat to squash production and markets. The risk of entry of melon fly from the Solomon islands is high, therefore strict quarantine is vitally important and the Government has a crucial role in ensuring stringent quarantine surveillance and penalties, particularly at the airports where "passengers" may carry prohibited plants and fruits. Data from the South Pacific Regional Fruitfly Project have shown that squash is a non-host for fruitfly in Vanuatu and once authorities can obtain clearance, there may be openings in the New Zealand market for around 500 tons of second grade squash.

3. Enter the market early

Vanuatu's season is such that squash is able to enter the Japanese market slightly earlier in October before the Tongan season starts. This is an advantage because Vanuatu is able to sell part of its crop before the Tongan and New Caledonian produce enter the market in November. Unless production is coordinated between these Pacific island countries suppliers, there is a high risk that prices may collapse during years of surplus production as shippers try to push extra volumes on the market. In this respect, perhaps Vanuatu has an advantage that it can enter the market earlier in October and being a new player in the market, it must be able to effectively compete in terms of entry time, quality and price.

4. Longer shelf-life

While Tongan squash has established a reputation for excellent flavour, it is more prone to post-harvest rot and shorter shelf-life. Vanuatu is free of the pathogens which causes post-harvest rot and therefore, its squash is highly regarded for its shelf-life. Japanese importers are able to hold Vanuatu squash longer in store, which provides the buyers flexibility in managing in-store stock.

5. Better pollination

Tonga has problems with low bee population for increased pollination. Vanuatu does not have this problem, therefore there is potential to improve yields.

6. Lower labour cost

Cost of farm labour in Vanuatu is lower compared to Tonga. Average farm wage rate is about US$5-6 per day compared to US$12-18 per day in Tonga.

I. New market possibilities

There are market possibilities for squash on the east coast of the United States but freight and overland trucking cost is high. Squash prices in the United States market vary widely according to variety, quality, season and origin. The abundance of squash from domestic producers and Mexico means that prices are low when compared to the Japanese market. While it may be possible to lower costs of producing squash in Vanuatu, the shipping costs alone negates any benefit to the growers. There is a period in February – March when prices of another type of squash – butternut squash go above US$1.00 per kg. One strategy may be to investigate the possibility of diversifying the varieties of squash grown in Vanuatu to include those varieties that command higher prices in the United States (Scott, 1994). The other possibility is to develop exports of other agricultural products e.g. taro and ginger on which squash could "piggy-back", thereby lowering unit transport cost.

New Zealand is a potential market for undersize fruits (about 500 tons per annum) once quarantine clearance is obtained. Data from the South Pacific Regional Fruitfly Project has shown squash to be a non-host for fruitflies in Vanuatu. However, authorities in Vanuatu will need to compile and present the data to the New Zealand authorities. A risk assessment of other pests will also be required. Tonga, for some reason is reluctant to try and develop a protocol to export squash to New Zealand. MAFF believes that this may put at risk their export to Japan.

J. Potential of developing new industries through squash

The existence of the squash industry lends itself to open up new market opportunities in Japan for other horticultural products that will be able to "piggy-back" on the industry. These include:

1. Fresh mango

Vanuatu grows excellent local mango varieties but these need to be selected for taste, be free of fibre and blemishes and particularly have red skin colour. Although Japanese buyers prefer improved varieties such as Hayden, Keit and Tommy Atkins, there is a small "seasonal window" for the traditional varieties (e.g. parrot variety) from late November to early December before the Australian mango enter the market. The market is estimated at 200-300 tons per annum or possibly more after the recent outbreak of Papaya fruitfly in Australia which has suspended exports to Japan until an acceptable quarantine treatment is put in place. This "seasonal window" not only coincides with the Japanese gift season but also coincides with the squash shipments from Vanuatu. While Fiji is already supplying this "seasonal window", volumes are well below market demand. Airfreighting from Vanuatu will be costly. However, a strategy would be to seafreight with squash under controlled temperature.

2. Organic squash

Japan market is strong for organic squash as compared to conventionally grown squash but the product needs to be certified and marketed through committed and established operators – there is danger of unskilled players dropping prices. Prices for organic squash is usually 20 per cent higher and also sold at contract prices. Although, organic squash offers great market opportunities in Japan and other markets as an ingredient for baby food, developing the production base will require good planning and may be costly in the development stages depending on the quality of land and inputs required. Quality standards for organic squash is as stringent as the conventional products. Powdery mildew and virus (aphids) can be a problem. However, control measures are also available through cross-protection technology.[5] This opportunity may be worth exploring given Paradise Growers Ltd's association with D. M Palmer Company which also market organic squash from New Zealand.

3. Processing

Vanuatu with its high cost structure would have no competitive advantage in processing.

4. Onions

Onions are very popular in Japan and like squash, account for 11 per cent of Japan's total vegetable imports (figure 2.) Paradise Growers Ltd sent a small shipment of onions last season to test the market. The response has been

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[5] Cross-protection technology was developed through the University of Hawaii. For information, contact:
Dr. John Cho,
Professor of Plant Pathology,
University of Hawaii at Manoa,
Maui Agricultural Research Center, Kula, Hawaii 96790.
Fax: (808) 878-6804

very encouraging and the company have plans to contract ni-Vanuatu small growers this season and target to ship between 400-500 tons in November this year. The market potential is estimated at 30,000 tons. The Japanese consume one million tons of onions per annum. Paradise Growers Ltd's diversification into onions will assist in stablizing income for the squash growers.

V. CONSTRAINTS

A. A "crowded niche"

Recent market reports indicate that this "seasonal window" for squash in Japan is becoming increasingly competitive and "crowded" as suppliers continue to improve on lengthening shelf-life of their products and extending their season. In such circumstances, the market tends to increase its quality standards and accept only the best. Evidently, Japanese squash importers in response to market demand, continue to narrow down the weight range of Grade I squash. For instance, in the late 1980s quality specification for Grade I: minimum 1.25kg to maximum 2.2kg per fruit, while latest specifications requires weight range between 1.6kg – 2.0kg. This in turn will put a lot of pressure on South Pacific island suppliers to ensure that at least more than 50 per cent of their production falls within this range. Agronomically, it is not an easy task as current reject rate is at times 50 per cent. Basically, the industry had taken off adopting the New Zealand agronomic practices. As a result, the first crop of squash produced in Vanuatu in 1991 was not exported due to poor quality and high reject rate. Because of low volume, there is limited option for processing and if virus (aphids) is not effectively controlled, reject rates can be higher. This can become a bit of a worry for the industry. Package of practices needs to be tested for its suitability under local conditions and the Government can play an effective role in carrying out trials to determine appropriate agronomical practices for squash production in Vanuatu. For Pacific island country suppliers, the only way to survive in the Japanese market is to be able to successfully compete in quality, price and entry time.

B. Isolation and vulnerability to cyclone

Like other Pacific island countries, geographic isolation and vulnerability to cyclones are important constraints to economic development in Vanuatu. Its isolation from major export markets, limits the opportunities for internal and external trade. Fortunately, the squash production season is outside the normal cyclone season but this does not totally dismiss the fact that if a cyclone arrives early (which sometimes happens), the risk and cost of losing the entire mature crop will be devastating. With a small population, economies of scale is difficult to achieve on domestic markets and investments infrastructure are more costly and often uneconomical.

C. Labour costs

Farm labour costs, although relatively cheaper than Tonga, the costs of management, marketing and supervision are higher and dilute any saving on mechanization. However, overall cost per kg squash tends to be higher in Vanuatu due to high management and specialised expatriate labour costs, taxes on inputs and 3 per cent on f.o.b.value.

D. Pest and disease

Viral (aphids) disease is a major problem with squash in Vanuatu. Identification of this particular virus is unknown – it could be Yellow Zucchini Mosaic Virus. There is an urgent need to have a survey to determine virus status in Vanuatu. Paradise Growers Ltd has been spraying heavily with chemicals, which is probably not a good idea because if the aphids (which transmit the virus) are not completely killed, it becomes immune to the chemical and effectively continues to transmit the virus. Technology for Yellow Zucchini Mosaic Virus cross-protection in squash is available through the University of Hawaii. A similar project was carried out in Tonga, Samoa and Fiji. The data collected, clearly suggest that virus damage to curcubits was primarily due to yellow zucchini mosaic virus, which made cross protection a logical way for controlling the virus diseases in curcubits. The cross protection trials carried out in Tonga and Samoa showed that the mild strain can provide effective protection against severe strains of yellow zucchini mosaic virus.

E. Farm input cost

Most internal inputs have to be imported and since the tax system is heavily dependent on import duties, this has an adverse impact on production costs and profitability.

F. Inefficient agronomic practices

Squash is a new crop to farmers in Vanuatu. It requires timely application of a stringent package of practices in order to achieve economic yields. Timing of farm operation is crucial especially planting, fertilization, weed control, powdery mildew control and harvesting. The high reject rates warrants devoting efforts on training local growers, farm workers, supervisors and quality controllers. Paradise Growers Ltd provides expatriate extension supervisors throughout the growing and harvesting season which is costly, and reduces competitive advantage of Vanuatu squash.

G. High reject rate

One of the main problems of squash for suppliers in Pacific island countries is the high percentage of export rejects which is about 50 per cent in some cases and as yet, there is no real option for processing particularly, when volumes are low.

H. Other business costs

Infrastructure is costly to develop in a small island country. Electricity and telecommunication costs in Vanuatu are among the highest in the South Pacific.

I. Government policies

Inappropriate government policies can also be an important constraint to private sector development. Vanuatu has achieved success in attaining macroeconomics stability but policies have done little to improve its international competitiveness.

VI. THE ROLE OF THE GOVERNMENT IN DEVELOPING THE INDUSTRY

A. Creating a conducive environment for private sector development

The very nature of the squash market is such that the direct involvement of the ponderous government marketing agencies in the production and marketing of squash in Vanuatu may not be the best option and prove counter-productive. Furthermore, government's extension services tend to be too diffuse for an intensive short-term crop such as squash. The structure of Pacific islands agriculture is such that the development of horticultural export industries is best served by small farmers under the direction of commercial marketers, exporters and processors. The papaya industry in Hawaii and the ginger industry in Fiji are good examples. The success of the squash industry in Vanuatu to date is also a good example of how foreign investors can establish a viable new export industry. It also shows how a major industry can be based on a small specialised export market niche. The linkage between the New Zealand and the Vanuatu squash industry is encouraging in terms of marketing and transfer of technology. The Government, on the other hand, has a crucial role to play in creating an environment that will sustain private sector investment.

B. Protecting and enhancing Vanuatu's favourable quarantine status

Vanuatu is free of melon fly and Mediterranean fruitfly. The onus is on the Government to ensure that strict quarantine measures are in place. Entry of melon fly and other fruit flies is more likely to enter the country through "passengers luggage" smuggling in host fruits and vegetables. Strict surveillance and heavy penalties have proved to be an effective deterrent and will go a long way in safeguarding the squash industry in Vanuatu. A good example is the recent outbreak of the Mediterranean fruitfly in New Zealand which prompted the

Government of Fiji to step up its surveillance in its two international airports and introduce a three-year jail sentence for anyone found smuggling-in prohibited plants, fruits and vegetables. Latest report from Fiji Quarantine is that the new law is proving very effective – the fruit bins at the airports are full of prohibited produce. Public education and awareness of the adverse effects of foreign pest and disease and its implications on agricultural exports and the environment in general will be of great help. The Government should now seriously consider initiating dialogue with New Zealand authorities on the compilation of data now available with South Pacific Regional Fruitfly Project, so it could be commercially used in enhancing Vanuatu's fruitfly-free host status for squash.

C. Appropriate fiscal environment

There is no direct personal tax or corporate tax in Vanuatu. Import duties provide the main sources of revenue- two-thirds of tax revenue and over half of total revenue. Business licence fees for companies operating in Vanuatu are the next most important source of tax revenue, which is already a quasi income-tax. For small businesses, there is a fixed annual fee. For other businesses, the rates are levied on the value of turnover, with different rates levied for different types of businesses in a rough attempt to take account of different cost structures. There is intention by the Government to broaden its tax base and eliminate "distortion" in the economy that is created from the inefficient tax system. (Fallon, 1994)

Agri-business are given tax-free concession on imported equipments and machinery but exports from Vanuatu are subject to 3 per cent export tax levied on f.o.b value which is economically inefficient and a disincentive to developing and increasing export revenue. Whilst government policies on one hand encourages diversification of its agricultural export base, the imposition of an export tax on the other hand does little to attract investments in the export sector. Less reliance on import duty in the tax base would help in improving cost competitiveness. However, much will depend on the government's decision to hasten the process to broaden its tax base.

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CHAPTER II

THE OPPORTUNITIES AND REQUIREMENTS FOR THE DEVELOPMENT OF FRESH FRUITS FOR EXPORTS IN PACIFIC ISLAND COUNTRIES

*by Andrew McGregor**

INTRODUCTION

In the new world trade environment, the terms of trade can be expected to continue to move against the bulk of the commodities as the demand for them grows relatively slowly compared to world income. In contrast, the demand for goods such as horticultural products, speciality foods and sophisticated services (e.g. tourism) can be expected to grow rapidly. The last decade has seen rapid growth in the consumption and trade in fresh fruits – Asia has been a part of that trend (table 2.1). Certain Pacific islands countries have an opportunity to share part of this rapidly growing market.

1. Which fruits?

The fresh fruits which have been identified as having the greatest potential are papaya, mangoes, and pineapples. Additional market opportunities exist for these fruits produced organically (grown in a sustainable manner without artificial chemicals) or minimally processed to extend shelf life while maintaining freshness. The fruits identified are based on an assessment of production capability, available quarantine treatments, and market opportunities

2. Which Pacific island countries?

Fiji has an excellent opportunity to taking advantage of Asian fresh fruit markets, while Tonga and Cook Islands' prospects are assessed as reasonable. Vanuatu and Samoa have limited, and only longer term prospects of taking advantage of these market opportunities. However, Vanuatu's prospects would be greatly enhanced if it becomes feasible to "piggy-back" fruit exports with squash exports. It is highly unlikely that the Solomon Islands and Papua New

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* Trade and Development Office, Suva, Fiji.

The opinions, figures and estimates set forth in this paper are the responsibility of the author, and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations.

Table 2.1. Asian imports of selected fruits, 1990-1994

Country/Product	*1990*	*1991*	*1992*	*1993*	*1994*	*Key suppliers and % share, 1994*
Japan						
Bananas						
• tons	757,521	603,339	777,175	913,335	929,380	Philippines (70%), Ecuador (14%),
• value	419,623	465,271	522,394	480,845	441,849	Taiwan Province of China (10%)
Pineapples						
• tons	128,250	137,789	127,466	120,963	113,527	Philippines (98%),
• value	57,310	53,008	56,880	53,063	52,821	Taiwan Province of China (2%)
Mangoes						
• tons	5,510	6,885	8,059	9,264	7,606	Philippines (85%), Mexico (12%),
• value	16,016	19,056	20,497	21,663	23,303	Thailand (2%)
Melons						
• tons	16,772	21,359	20,695	22,420	36,622	New Zealand (14%),
• value	20,764	24,958	21,413	24,701	39,435	United States (9%)
Papaya						
• tons	5,368	5,271	5,197	4,774	5,161	Hawaii (100%),
• value	19,992	19,616	18,667	17,251	18,447	Mexico (less than 1%)
Singapore						
Bananas						
• tons			35,854	60,585		
• value			13,273	18,793		
Pineapples						
• tons			15,713	17,029		
• value			3,165	4,133		
Mangoes/Avocado/ Guava/Mangosteen						
• tons			8,022	10,298		
• value			12,086	14,557		
Melons						
• tons			48,461	53,498		
• value			23,237	30,556		
Papaya						
• tons			14,574	21,921		
• value			5,607	9,098		
Other mangoes (tons)						
• Hong Kong	6,291	14,706				Philippines (88%), Thailand (6%)
• Republic of Korea,	0	1	less than .5	4		Philippines (100%)
• Dubai	13,776	18,637	21,636	n/a		Pakistan (51%), India (41%)
• Taiwan Province of China			71			Thailand (100%)

Source: *Market Asia, Food and Horticultural Industries,* (various issues).

Note: Value = US$'000.

Guinea would be able to export fresh fruits to the Asian markets, with the possible exception of minimally processed fresh fruits. An assessment of the prospects of various Pacific island countries to exploit the Asian fresh fruit markets is summarized in table 2.2. This assessment is based on a consideration of quarantine status, present production base, and transportation links. These constraints are discussed in some detail in section III. The Pacific micro-States, with the exception of the Cook Islands, were not considered. Problems of production and isolation of these micro-States make the prospect of viable fresh fruit exports unrealistic for the foreseeable future.

3. Which Asian markets?

At present, only Japan and the Republic of Korea are seen as realistic Asian markets for Pacific island country fruits. This is based on the expectation that fruits such as papaya and mangoes will be exported by air given their high value, volume, and perishability. Papua New Guinea has air links to some Asian markets but faces intractable quarantine and internal transportation constraints. Development of controlled atmosphere sea freight containers, together with shelf life extending waxing technology, offers the prospect of sea freight shipments in the future for fruits such as papaya and mangoes to the very substantial markets of Singapore and Japan (table 2.1).

I. THE SUB-REGION'S COMPETITIVE ADVANTAGES IN FRESH FRUIT EXPORTS TO ASIA

A. Fiji

Fiji, and to a lesser extent other Pacific island countries have important inherent advantages in the production of certain high value fruits that are in high demand in Asia. These advantages are discussed briefly below:

1. Optimum growing conditions for quality fruits

Certain areas in Pacific island countries offer optimum growing conditions for quality fruits.

Papaya: The western side of Fiji's main island of Viti Levu offers an ideal growing environment for the sunrise solo papaya cultivar. Maximum solar radiation, coupled with irrigation and adequate fertilization, provides for early plant maturity, superior fruit quality,[1] and relative freedom from serious infection of the major fungal pathogens *(Phytophthora spp. and Phytium spp.)*. Parts of Tongatapu in Tonga and Rarotonga in the Cook Islands are almost as well suited.

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[1] Internationally renowned papaya authority, the late Professor Emeritus Henry Nakasone from the University of Hawaii, visited Fiji in 1995. He declared Fiji papaya to be the "sweetest in the world" after reading a 18° brix for sunrise papaya grown by Sant Kumar at Nadi.

Table 2.2. A summary of prospects of Pacific island countries exporting fresh fruits to Asian markets

	Cook Islands	*Fiji*	*Papua New Guinea*	*Samoa*	*Solomon Islands*	*Tonga*	*Vanuatu*
Fruit fly status	Good	Good	Very Poor (but not fully determined)	Fair	Poor (but not fully determined)	Fair	Good (but not fully determined)
Expected time frame for quarantine treatment	HTFA[a] unit already certified	HTFA[a] unit certified in 1996	Highly unlikely with existing technology	minimum of 1 year to generate required data and other 2 years before a certified unit was in place.	Highly unlikely with existing technology	HTFA[a] unit to be certified in 1997	at least 2 years for generation of required data and other 2 years before a certified unit is in place
Current production base	Good for papaya	Good	Limited	Limited conditions unsuitable for mango	Limited	Limited	Limited
Transportation links	Fair	Very good	Good	Fair	Poor	Fair	Fair
Overall assessment of development potential	Reasonable	Excellent	Highly unlikely	Limited	Highly unlikely	Reasonable	Limited

Note: [a] HTFA = high temperature forced air quarantine treatment.

Mango: This fruit is tolerant to a range of temperature and rain fall conditions, provided the wet season is followed by a strong dry season to initiate flowering. The crop is relatively drought tolerant, is efficient in extracting nutrients from the soil, can withstand flooding, and the tree will survive hurricane force winds. Thus, the north west of Viti Levu in Fiji is ideal for mango production. So too is Vanuatu's main island of Efate.

Pineapple: This fruit does best in terms of flavor, colour, and resistance to bruising when grown on somewhat acid soils in areas of high sun light (2,500 hrs/year or greater), and cooler night temperatures (19 deg. C – 20 deg. C). In this respect, the dry zones of Fiji's main islands offer ideal conditions. In addition, pineapples grown from planting material sourced in the area have a high natural resistance to fungal diseases (particularly Phytophthora), giving a significant advantage in terms of chemical usage and even organic production. Excellent growing conditions can be identified in other Pacific island countries. Pineapples offer the additional advantage of not being a host to any known fruit fly in any Pacific island country. Thus, with quarantine protocols in place, exports could commence to identified markets.

2. Isolation has meant relative freedom from major pests and diseases

Fiji, Tonga, Cook Islands, Samoa, and Vanuatu all have fruit flies of quarantine significance for New Zealand, Australia, and the United States. Yet, they are free of the more economically devastating fruit fly species such as Mediterranean fruit fly *(ceratitis. capitata),* Oriental fruit fly *(Bactocers. dorsalis),* Melon fly *(B. cucurbitae),* Papaya fruit fly *(B. papayae)* and Queensland fruit fly (B.tryoni). These fruit flies are either far more damaging to fruits (e.g. cucurbits are almost impossible to grow commercially in the presence of melon or papaya fruit flies) or they are more difficult to kill with quarantine treatments, or usually both. This enviable quarantine status has given access to some markets from which competitors are excluded or restricted – e.g. Fiji's mangoes and papaya can currently be shipped to Japan without quarantine treatment, while Australia is now excluded because of the existence of Papaya fruit fly.[2] Similar preferential access could be obtained for the Republic of Korea market through negotiations with the Korean authorities.

The relative absence of major pests and diseases extends beyond fruit flies. The papaya production areas on the Big Island of Hawaii have been decimated by Papaya ring spot virus. Hitherto, Hawaiian supplies had dominated the markets in the West Coast of the United States, Canada, and

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[2] Papaya fruit fly (Bactocera papayae) is a particularly devastating fruit fly because of the wide host range amongst commercial fruits and vegetables and its ability to attack fruit while it is still green. The 210 known fruit and vegetable species it is known to attack include: avocado, banana, breadfruit, capsicum, carambola, chillie, citrus, custard apple, cucurbits (squash, zucchini, cucumber, and watermelon) eggplant, guava, mango, papaya, Pacific almond, plantains, sour sop, and tomato.

Japan. Hawaiian production is now 60 per cent of pre-papaya ring spot virus levels to stand at around 18,000 tons and market prices have risen sharply. Hawaii's papaya ring spot virus problem has created supply shortages in Japan which have pushed cf. prices above US$3/kg and importers are anxious to find alternative supply sources, including Fiji and other Pacific island countries. The dry zone of Fiji's main island of Viti Levu where most fruit export crops are grown also has relative freedom from serious infections of the major fungal pathogens (Phytophthora sp. and Phytium sp.). This substantially reduces the need to use chemicals and lowers production costs.

3. A scientific data base on fruit fly status

The South Pacific Commission's Regional Fruit Fly project, has been operating in Fiji, Tonga, Samoa, and the Cook Islands for the last 5 years. As a result, verifiable data can be presented on which fruit flies are present, their distribution, and their host status. Armed with these data, Pacific island countries are in a position to negotiate quarantine agreements with importing countries. The Regional Fruit Fly project has just been extended to cover Vanuatu and the Solomon Islands but is yet to commence in Papua New Guinea.

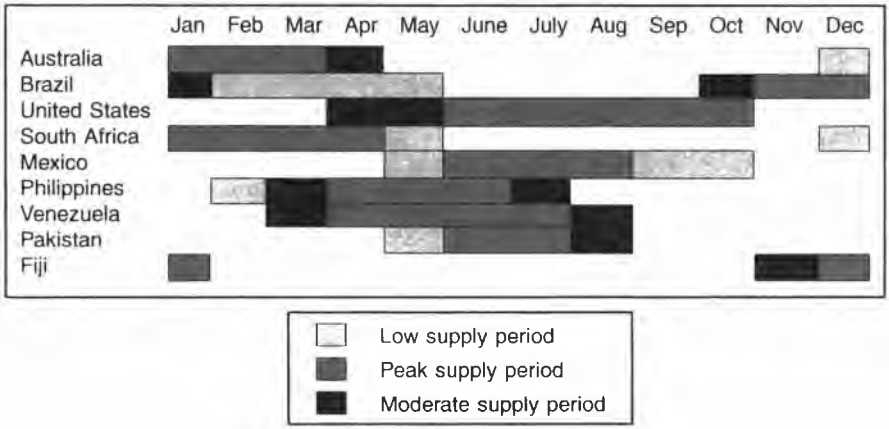
4. An accepted quarantine treatment

Until a few years ago, ethylene dibromide was the accepted quarantine treatment for fruits. While ethylene dibromide was cheap and easy to use, it was highly toxic and deleterious to fruit quality and shelf-life. This fumigant has now been banned by all importing countries. For papaya and mangoes, it has been replaced by high temperature forced air treatment. This technology was developed jointly by the United States Department of Agriculture and the University of Hawaii. Several Pacific island countries are now at the vanguard of adopting this quarantine treatment. The Cook Islands has been exporting high temperature forced air quarantine treated papaya to New Zealand since 1994, and is in the process of obtaining certification for mangoes. Fiji and Tonga, via USAID assistance, have high temperature forced air quarantine treatment facilities in place. The Fiji unit will be certified in August 1996 for the treatment of papaya and eggplant for New Zealand and in December for mangoes. Certification in Tonga will be in the following year contingent on there being sufficient papaya production. A major advantage that the high temperature forced air quarantine treatment units in Fiji and Tonga have is that they can be adjusted to meet the vapour requirements of Japanese quarantine authorities. Faced with the Papaya fruit fly crisis, Australian mango and papaya industries are now turning to high temperature forced air quarantine treatment to facilitate inter-state trade and to reopen the Japanese market. However, research and data requirements for certification mean that it is expected to take at least 18 months before a certified facility for Japan and other markets is in place. Samoa and Vanuatu are now looking for donor assistance for high temperature forced air units. However, it will be 2 to 3 years before a facility can be in place and certified.

5. Strategically located in the southern hemisphere

Pacific island countries have an opportunity to be off season suppliers for a range of horticultural products. The most prominent example of this is mango exports to Japan. Japan imports between 8,000 to 10,000 tons of mangoes annually, mainly from Mexico and the Philippines. However, because of the seasonality of mango production, no supplies are available from late November to the end of January. This coincides with the main season in the South Pacific. Australian mangoes enter the market in late December. However, they are currently excluded from Japan because of Papaya fruit fly. Fiji's strategic advantage as a mango exporter can be seen in figure 2.1.

Figure 2.1. Seasonality of major mango exporters



Source: *Market Asia,* October 1994.

For papaya, the seasonality advantage is not as marked as it is for mangoes, although it is still significant. Hawaii is the dominant supplier of the Japanese market, and its winter off-season coincides with Fiji's peak summer production.

6. Direct air links to Japan and the Republic of Korea

There are 8 weekly flights from Fiji to Japan (Air Pacific 4, Air New Zealand 4),[3] and 5 to the Republic of Korea (Korean Air 3, Air New Zealand 2). Tonga, the Cook Islands, and Vanuatu do not have direct flights and thus transshipment through Nadi or Auckland would be required. While Fiji exporters have access to direct air links, high freight rates, particularly to Japan is a constraint that needs to be addressed. The critical role that a national airline can play in horticultural export development is shown by Thailand's Thai International

[3] Air Pacific – 2 flights to Narita and 2 flights to Osaka.
Air New Zealand – 1 flight to Narita and 3 flights to Nagoya.

Airways and Holland's KLM. In the past, the Government of Thailand has utilized the IATA regulation allowing for Government Ordered Rates 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.

7. Linkages with tourism

Hawaii provides a model for linkages with tourism. The development of Hawaii's papaya and floriculture export industries was a direct bi-product of the outward freight capacity at reasonable cost created by tourist arrivals in Hawaii. Similarly, Kenyan horticultural export industries have also benefited from tourism. For some high value products, tourism can provide a domestic demand base upon which an industry can be established. Hawaii's macadamia nut industry, the largest in the world, is built around exporting via the "suitcases" of tourists, particularly from Japan and increasingly from other Asian destinations. There are currently around 40,000 Japanese tourists visiting Fiji and around 4,000 from the Republic of Korea, with much smaller numbers going on to visit neighboring island countries. Fiji has not taken full advantage of the Japanese custom of gift *giving omiyage,* by offering conveniently and attractively packaged Fiji products such as fruits at the Nadi international airport. The Hawaiian experience has shown that fruits such as pineapples and papaya are highly sought after by Japanese tourists. Not only do these tourists offer an immediate market for Fiji fruits, but they also provide a nucleus for creating demand for these products when they return home. The demand for Hawaiian papaya in Japan shows the close links between tourism and the creation of niche-markets for exotic tropical fruits.

8. Environmental and health concerns of markets

Pacific island countries have an opportunity to develop markets based on environmental sustainability which capitalize on the increasing health concerns and environmental awareness of consumers in importing countries, notably in Europe and Japan. The Pacific island countries have a number of distinct advantages in developing significant certified organic (products grown in a sustainable manner without artificial chemicals) industries including fruits which are in high demands. These advantages include:

(a) General market perception of the Pacific island countries as unpolluted and relatively unspoiled.

(b) An opportunity to build on, and market, existing traditional and sustainable production systems.

(c) Technically, feasible to produce quality organic fruits particularly in Fiji. This includes the availability of locally available resources (e.g. "mill mud", the residue from the clarifier in sugar processing) to provide sufficient nutrients to organically produced quality fruits.

(d) A non-chemical quarantine treatment that will allow the export of organic fresh fruits.

(e) Willingness of donors to provide technical assistance to support the development of organic agriculture.

II. AN ANALYSIS OF THE MARKETS OF JAPAN AND THE REPUBLIC OF KOREA

A. Japan

Japan potentially offers the most remunerative market for Pacific island papaya and mangoes, and there are some opportunities for pineapples. Japan is also the most demanding in terms of quality and presentation requirements.

1. Papaya

The 560 gm hermaphrodite (bell shaped) Kapaho solo fruit is the standard of what a papaya is for the Japanese market. This was established by Hawaii which developed the market, and remains virtually the only, albeit a declining, supplier. The Kapaho solo is a yellow fleshed fruit that was developed for the lava rock and high rainfall of the Kapaho area on the Big Island of Hawaii. Kapaho Solo has not performed well in the Pacific islands – being characterized by undersized fruit. In contrast, the Sunrise variety, developed for growing in soil on the island of Kauai, has performed exceptionally well in the dry zone of Fiji's main island and on Tongatapu in Tonga. Sunrise has the same size and shape characteristics as the Kapaho, but the flesh is red rather than yellow. Indications are that a red fleshed fruit would be very acceptable to the Japanese market. Red skinned mangoes are preferred in Japan. Sunrise papaya has proven to be popular amongst Japanese tourists as a carry-on item, and it sold very well when small quantities were previously exported to Japan. Discussions with Japanese importers and supermarkets indicated, they would be able to develop a substantial market for quality Sunrise papaya.[4]

In 1994-5,160 tons of papaya were imported from Hawaii at a landed value of approx. US$15.6 million. Supply shortages caused by papaya ring spot virus pushed cf. prices above US$3/kg and importers are anxious to find alternative supply sources. Fiji already exports a small quantity of papaya to Japan through the carry on purchases of tourists. With expanding Japanese tourism to Fiji, these sales have the capacity to grow to some 15 tons annually. Currently, Fijian papaya can be exported to Japan without any

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[4] Organizations and persons met included:

Goroh Umeda
Vice Chairman
Imported Fruits and Vegetable Committee
PO Box, Ohta-Market, Japan
Tel 03-5492-3000

K-Morimoto, President
Kaien Trading
Tel # 03 5566 1611 fax # 03 5566 1689

The Daiei Inc.
Hamamatsucho Office Center
2-4-1, Shibakouen, Minato-ku
Tokyo 105
Japan

Ms Grace Lu
Food Line Planning & Coordination Dpt.
Tel # 03-3433-9154, Fax # 03-3433-9372

quarantine treatment. Thus, with eight direct flights to Japan and expanding tourism growth expected, there is an opportunity to establish significant exports of papaya and mangoes to Japan. Depending on the future availability of air cargo capacity and the establishment of reasonable freight rates, it is estimated that a market of between 100 and 150 tons is available for Fijian papaya in Japan. To this, add a further 10 and 20 tons per year sold to the tourist carry-on market.

2. Mangoes

Japan is the most important market for Fiji mangoes, with 15 tons exported in 1994 (virtually nothing was exported in 1995 because of a small season). In 1994, Japan imported 7,500 tons of mangoes (9,200 tons in 1993 and 8,000 tons in 1992). The Philippines and Mexico are the main suppliers (table 2.1). The total landed value of these imports is approximately US$ 20 million (or US$2.60/kg). However, in late November and early December, Fiji has virtually no competition. In the past, Australian supplies entered the market in December which restricted the varieties and quality that could be shipped to Japan. However, with the outbreak of the Papaya fruit fly, the Japanese market has been closed off to Australian exporters until they have an acceptable quarantine treatment. It is fortunate that Fiji's exports coincide with the Japanese gift giving season and command premium prices. The Japan average landed price for Fiji mangoes in 1994 was about US$5.60/kg compared with US$4/kg for Australian mangoes that arrived later and in large volumes. The Japanese market is selective in terms of quality and variety[5] and became more demanding as Australian mangoes entered the market. Given Fiji's high transportation costs, only large red skin mangoes that are free of fibre and without blemish can be successfully sent to this market. It is estimated that a market for 200-300 tons of premium quality mangoes from Fiji is available. As with papaya, the major constraints are air cargo capacity and Air Pacific's unreasonable freight rates. Once Australia re-enters the market, Fiji will need to be careful not to price itself out of the market. The large Australian industry has made substantial progress in developing varieties to meet Japanese requirements. The industry was also able to negotiate, in collaboration with their Japanese importers, very competitive freight rates with Qantas airline.[6]

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[5] According to K. Morimoto, President of Kaien Trading, an importer of Fiji mangoes for some 20 years, the only acceptable mangoes from Fiji are the Mexican/Florida varieties: Haden, Keit, and Tommy Atkins. Early in the season, before Australian mangoes are available, he will accept Kensington. He maintains that many of the improved varieties that have been promoted by MAFF (e.g. White Pirie/Pope, Mapalapu, Momi Cross) are unacceptable to the Japanese market. He said "he would prefer traditional Parrot mangoes to these varieties" which because of their unique appearance, maintains a small market.

[6] A rate of equivalent to US$.87/kg (AU/3.5 ton container) has been established for mangoes from Cairns to Narita. This is less than a third of Air Pacific's Nadi-Narita rate.

3. Pineapples

Despite the quality of Pacific island pineapples in terms of sweetness, the volumes are too small and the cost are too high to consider competing against the main stream pineapple production from the Philippines and Thailand. Pineapples can be grown all year round, thus, unlike mangoes, there are no seasonable opportunities for Pacific island producers. However, even for pineapples there are niche-market opportunities that can be considered for export to Japan. These are specialty air freighted pineapples, organic pineapples, and minimally processed pouched fresh pineapples.

The smaller rough skinned pineapples which are common in the islands have a very favourable brix/acid ratio which makes them exceptionally sweet, particularly if they can be harvested at the quarter ripe stage or later. There are niche-markets for such pineapples in Japan at considerable price premiums over those from the Philippines and Thailand. These markets could be developed if air freight rates can be reduced to reasonable levels. The market opportunities for these specialty pineapples, and their ability to sustain the cost of air freight, would be further enhanced if they could be organically certified.

B. Republic of Korea

The Republic of Korea is identified as a potential market for Fiji tropical fruits, with 5 direct Nadi-Seoul flights per week. The papaya market in the Republic of Korea would have to be developed from scratch as the fruit is not known at all in the country. This is what Hawaii had to do for Japan twenty years ago – the 560 gm Kapaho solo became the definition of what papaya was for the Japanese market. With the Hawaiian industry now in no position to develop the Korean market, an exciting opportunity exists for Fiji, and later other Pacific island producers.

Melon is the main fruit consumed by the Koreans. It is estimated that 50,000 tons of melons are grown annually (National Horticultural Research Institute, Horticultural Crop Production in the Republic of Korea, 1995). None are imported for quarantine reasons. Interestingly, a very popular variety of melon is known as "papaya melon", which may cause some initial problems in market penetration. However, the main problem Fiji and other Pacific island exporters would face is phytosanitary. Fruit imports into the Republic of Korea are restricted to New Zealand and the mainland of the United States, with pineapples permitted from Thailand and Hawaii and bananas from the Philippines and Thailand. There is an overriding concern with Melon fly on account of the large domestic melon industry. Data generated by the Regional Fruit Fly Project shows that the Pacific island countries (outside Papua New Guinea, Solomon Islands, and Nauru) do not have melon fly – nor for that matter the other major economically serious fruit flies. Armed with the data generated by the Regional Fruit Fly project, the Fiji Ambassador, based in Tokyo, has commenced the process of obtaining quarantine clearance from the Korean authorities. If this representation proves successful, Fijian papaya and mangoes would virtually have the Korean market to themselves. These imports would still have to

contend with the very high import duties (30 to 40 per cent) that currently apply to imported fruits. Mr. S.K. Suk, of Sooil Commerce & Transport Ltd.,[7] who imports avocado from New Zealand[8] and expressed interest in handling Fijian papaya, summed up the Korean market as follows: "the Korean regulatory system and restriction with respect to fruit and vegetable imports is like Japan 10 years ago. However, the prospect of this now loosening up would create immense opportunities for exporters".

Export of pineapples to the Republic of Korea, as elsewhere, would face less quarantine problems than other fruits.[9] However, as with Japan, they are not going to be competitive with large scale production from the Philippines and Thailand. Again, the opportunities lie with specialty pineapples that could be airfreighted. Fiji may have a particular advantage in establishing a niche-market for her pineapples into the Republic of Korea since the major grower is a Korean national who has connections with fruit importers in his country.

Mangoes, unlike papaya, are at least known to a few Korean consumers – with large quantities imported from the Philippines (table 2.1). The Republic of Korea has become a realistic market opportunity with the establishment of direct air links. However, mangoes will face the same phytosanitary obstacles as papaya. Thus, the onus is on the Fiji Government to negotiate a bilateral quarantine agreement with the Republic of Korea to open up this potentially lucrative market. The starting point of these negotiations would be to present to the Korean authorities data generated by the Regional Fruit Fly project that shows that Fiji is free of melon fly and other fruit flies that attack cucurbits.

C. Organically certified fruits

There is strong demand for organically grown tropical fruits but supply is very limited. Thus, substantial market premiums can be expected. Quality organic mangoes, papaya, and pineapples are technically feasible to grow in a number of Pacific island locations. Mangoes probably posess the least difficulty, with the control of fungal diseases that blemish the fruit being the major problem. The production of quality papaya on Pacific island soils requires substantial input of nutrients. In Fiji, this can be largely achieved through the addition of

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7 S.K.Suk, President
Sooil Commerce and Transport Inc.
Rm. 304, 98-7, Geobookyi B/D
Karak-Dong, Songpa-Ku
Seoul, Republic of Korea
Tel 409 8967; Fax 409 8593

8 They handle LD3 per month of Hass avocado at a current landed price of W1,200/5 kg carton.

9 The author carried samples of fully ripe fresh pineapples from Fiji into the Republic of Korea and faced no difficulties from quarantine officials.

composted mill mud.[10] Pineapples would technically be the most difficult, although it is easier for the rough skinned varieties that have become adapted to local conditions. A challenge for pineapple producers would be organic flower induction to ensure year-round production necessary for sustained market development.

The last 2 years have seen producer groups in Fiji and Tonga become organically certified. They have been working with Bio Gro, the major New Zealand organic certifying organization, and Organic Crop Improvement Association[11] from the United States. Thus, the Pacific island countries are starting to be known internationally as suppliers of organic products. Most significant in terms of fruit is South Pacific Foods Ltd. in Fiji, which has become significant supplier of certified fruit purees (bananas, mangoes, and guavas) to Europe and the United States. They have also had inquiries from Japan – but the company needs to invest in ultra high temperature processing facilities before it expands into other markets.

New Zealand's "clean green" image in Japan and the Republic of Korea makes Bio-Gro organic certification acceptable to consumers and is recognised by the certifying organizations in those countries.[12] No data was obtained on what the price premiums for organic certified mangoes, papaya, and pineapples might be able to command in Japan and the Republic of Korea – essentially because these organic products are currently not supplied. However, taking the Los Angeles market as a guide, they would be very substantial.[13]

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10 Mill mud is the sludge from the clarifier. The product contains a reasonable level of nitrogen, and is very rich in calcium, phosphorus, zinc, and iron. It is quite low in potash and in an organic production system, an adequate level of K would have to be obtained through such sources as seaweed material.

11 Discussions between Bio-Grow and the Organic Crop Improvement Association are currently underway for reciprocity between the two certifying organizations.

12 The main Japanese Organic Certifying Organizations are:

NYNK Japan Organic Agriculture and Marine Product Association
Ikkie Morimura, Shinwa Bldg., 9-17 Sakuragaoka-cho Shibuya-Ku
Tokyo 150, Japan
Phone:+81-424-63606067 Fax:+81-424-691016

Nature Farming International Research Foundation
Tomoaki Kimura, 9-1 Tawarahon-cho
Atami 413, Japan
Phone:+81-557-842240 Fax:+81-557-842492

The main Korean organization is:

Korean Organic Farming Environment Inst.
3-98-600, Garack-dong, Songpa-gu, Seoul
Republic of Korea
Phone:+81-2-4064462

13 In July 1995, when the author visited the Los Angeles Wholesale Produce Market, organically certified pineapples were wholesaling for US$30/7 count carton This was more than double the price of conventional pineapples at the time, and was sufficiently high to justify air freighting pineapples from Nadi to Los Angeles.

D. Minimally processed fresh fruits

Minimally processed fruit products are those which have been prepared from fresh fruits (or vegetables) by cleaning, peeling, cutting, slicing, packaging or processing by any means short of killing the tissues. This compares with conventional processing such as drying, canning, or freezing in which the fruits are made stable, less perishable, and can be stored for long periods. Use of compounds such as preservatives or stabilizers are omitted or at least minimized in minimally processed foods. Minimum processing technology allows the fruits to be harvested, packaged, and sold as fresh or a near fresh products with optimum ripeness and flavour, and offering an extended shelf-life and convenience.

Dr Richard Bayer, head of the Institute of Applied Sciences at the University of the South Pacific in Fiji, has been at the forefront of developing minimally processed pouched fruits. Peeled whole fruits (pineapples, papaya, or mangoes) or slices are blanched and placed in a clear plastic pouch with specific permeability characteristics. This is a fresh product – with no additives, preservatives, or colour added – thus it could be organically certified. Fruits such as pineapples have been held for 12 months under refrigeration (2 to 4 deg C) – but 2 months is recommended.

1. The markets for minimally processed fruits

This process allows the fruits to be harvested, pouched, and sold to the consumer at optimum ripeness and flavour. It thus allows the maximum exploitation of the comparative advantage that Pacific island country fruits have in terms of flavour. It is encouraging to note the comment of Bryan Silbermann, Executive Vice President of the Produce Marketing Association "that taste is making a comeback as the major force driving product development for produce marketers"[14] By the year 2000, the global market for minimally processed fruits and vegetables is predicted to grow to between US$4,000-8,000 million (Hurst and Schuler, 1992).

The market potential for freshly prepared tropical fruits is likely to be considerable and growing, both in the whole fruits and food service sectors. There is a significant market trend toward freshness with convenience. In Pacific rim markets, this was found to be most advanced in the United States and Japan. Within these markets, a premium price niche can be expected for certified organic products. Bryan Silberman describes this trend:

> "Perhaps the greatest consumer trend driving the U.S. food industry in general – and produce in particular – is convenience. We want our food fresh, fast, tasty, easy, and nutritious... It's the fresh cut produce arena, however, where we have seen the greatest action. This category of item has simply exploded in the past three years, going from almost zero share of department sales to 5 to 10 per cent in many stores. General estimates are that fresh cut produce could comprise 25 per cent of produce sales by the year 2,000."

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[14] Presentation to Australian Horticultural Corporation, Marketing Edge Conference, Sydney, 2 May 1995.

For retailers, the extra long shelf-life of minimally processed fruits do not constitute a major advantage once they reached the store. All products displayed in the fresh produce section must be sold in 4 to 5 days. The advantages of a peeled long life product to the retailer lie with consumer convenience and space saving. These characteristics are particularly important for urban Asian consumers and specially applies to bulky and messy products such as pineapples.

For the food service industry, the extended shelf-life represents a significant advantage. For the food service, there are some distinct advantages in purchasing freshly prepared pineapples. A 100 per cent of the product is usable (including the core in the case of pineapple). There are considerable preparations, labour savings, savings in storage space, and almost complete elimination of the cost of waste disposal which is considerable for pineapples.

It is difficult to assess the demand for a new innovative product and the author is forced to rely on anecdotal evidence. Last year's samples of pouched pineapples were shown to food service companies and distributors in New Zealand, Australia, United States, Japan and the Republic of Korea.[15] They all expressed interest in the product which they saw as having unique advantages. Karen Holzberg of KHI International, a large United States dealer in imported frozen fruit products, indicated that her company "would be interested in handling 10 to 15 tons sea freight container per month if the price was right and the quality could be assured". Apart from pineapples, Holzberg was particularly interested in pouched mangoes.[16] Such volumes are of course totally unrealistic for the foreseeable future but do give an indication of what the long term

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[15] These companies include:

Ron Bass, Manager
Ready Fresh (a stand alone company owned by Turners and Growers)
PO Box 43271, Auckland
New Zealand
Tel: (09) 275-8800
Fax: (09) 275-8822

Paul Stuart, Marketing Manager
Service Foods (South Island) Ltd.
PO Box 11338, Stockburn
Christchurch, New Zealand
Tel: (03) 343 0835
Fax: (03) 348 3793

David Cox, General Manager
All States Food Service Pty Ltd.
Flemington Markets, Sydney, NSW
Australia
Tel: (02) 764 3711
Fax: (02) 746 6342

Karen Holtzberg, President
KHI International Trade
PO Box 15119
Atlanta GA 30333
United States
Tel: (404) 371 9797
Fax: (404) 378 5331

Shiro Tozuka, Director Production Headquarters
ITO EN Ltd., 47-10 Honmachi 3 Chome
Shibuya-ku, Tokyo 151, Japan
Tel: (03) 5371-7193
Fax: (03) 5371-7199

[16] It is of note that KHI has subsequently placed orders for frozen organic mango pulps with South Pacific Foods.

potential might be. In the absence of being able to leave samples for evaluation and without having any indication of price and supply (quantity and availability), it was very difficult to be more specific about what the realistic demand level might be. However, it can be concluded that this is the unique product where the demand is likely to grow in line with supply. A sample of the long life pouched pineapple was shown to Mr. Michael Casazza, Divisional Vice President for Delmonte Fresh Produce.[17] He expressed the view that "this was the correct strategy for a small producer like Fiji to follow as it carved out a niche that was probably too small for large companies like Dole and Delmonte to bother with".

III. CONSTRAINTS TO EXPLOITING THE PACIFIC SUB-REGION'S COMPETITIVE ADVANTAGES

Profitable opportunities have been identified for some Pacific island countries to export certain high value niche-products. These include, fresh fruit exports to Japan and the Republic of Korea. Exporting high value products to niche-markets is not new in the sub-region. More significant examples are fresh ginger from Fiji to North America, Tongan and Vanuatu squash to Japan, Fiji mangoes to Japan, Cook Islands papaya to New Zealand, organic banana purees from Fiji to France and Germany, Tongan vanilla to the United States and kava to Germany from Vanuatu, Samoa, and Fiji. The lesson from this long experience is that marketing, and not markets per se has been the major constraint. Quality and continuity of supply are seen as marketing problems and for high value exports, they are the hallmarks of success, even more important than price competitiveness.

A. The quality imperative

Constraints of land availability, capital, and freight capacity mean that the Pacific island countries will always be small producers. Small volumes of average to below average quality bulk commodities, such as copra, cocoa, and coffee, can always find a market – albeit at substantial price discounts. This, however, is not always the case for high-value products such as fresh fruits. Because of their size and isolation, Pacific island country producers must always be at the premium end of quality scale if they are to be competitive – 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. Thus, the net gains to the exporter and the grower attributed to quality can be huge and usually represents the difference between profitability and non-viability.

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[17] Michael Casazza
Divisional Vice President
Delmonte Fresh Produce Inc.
100 W. Broadway, Suite 650
Long Beach, CA 90802, United States
Tel (310) 436-2344
Fax (310) 437-6115

B. Supply as a marketing problem

Sustained high-value product market development requires the product to be in the hands of the buyer in the amount required and when required on an ongoing basis. Market driven quality standards relate to every stage of the production process from site selection to final shipment. As shown below, for Fijian papaya grown for the Japanese market, any weak link in the production/ marketing chain means quality standards will not be achieved:

1. Site selection

A protected site to reduce wind damage should be chosen – the planting of wind breaks is usually necessary. A free draining soil is required to minimize fungal diseases. The soil should not be too acid if sufficient nutrients are to be released for optimum fruit growth. Export grade papaya requires large volumes of water (30 to 95 litres/tree/day depending on the amount of supplemental water), thus growers must have access to irrigation to produce export quality fruits. Fruits under moisture stress develop hard lumps in the flesh which makes the fruits unacceptable to the market (unfortunately these lumps cannot be observed from outside the fruit). A soil test should be mandatory to determine specific fertilizer requirements.

2. Seed selection

Export quality fruits cannot be obtained from poor seed or the wrong cultivar. Only certified Sunrise solo seeds (preferably as a seedlings) must be planted. The seeds should be sourced from the University of Hawaii or, better still, obtained from selected trees in Fiji. Farmers should never collect their own open pollinated seeds because of cross-pollination from local varieties.

3. Site preparation

Pre-plant a leguminous crop and dig in animal manure and mill mud (if available) to build up organic matter to allow for the release of nutrients. Papaya must be planted on ridges to avoid water logging.

4. Planting date and frequency

To minimise the risk of hurricane loss and a break in the continuity of supply to the market, the optimal time for planting is at the beginning of the hurricane season. Thus, if a hurricane hits, the seedlings are small and the losses are minimal and at least one crop is assumed before the next hurricane season. Commercial papaya must be replanted after 3 years.

5. Husbandry practices

Type, quantity and frequency of fertilizer is critical for quality fruit production. Requirements need to be determined by soil tests and subsequently by leaf analysis. The frequency and volume of irrigation is also crucial to fruit quality. Other requirements include the thinning of the fruit. Bait sprays are required to minimize the risk of fruit fly damage.

6. Harvesting

Harvesting must be coordinated with shipment, but at least twice a week during the main season. The fruits should be harvested at colour break and only hermaphrodite fruits should be picked for the Japanese market. The fruits should be harvested by hand. Export grade fruits should be gently placed in specially designed bins for transport to treatment facility and packing shed. Over-ripe and undersized fruits are removed from the trees as they attract birds and pests including fruits fly.

7. Post-harvest handling

Selected export grade papaya must be transported to the Nadi high temperature forced air quarantine treatment facility with the greatest of care. Here, they receive a pre-treatment wash. The treatment is in plastic lugs and involves heating the fruit cavity to 47.2 deg C for 20 minutes. (with a lead up ramp of 4.5 hours) and then hydro cooled. Papaya from Fiji can be exported to Japan without quarantine treatment – but treatment is recommended to ensure quarantine integrity. Treatment is likely to become mandatory in the future with heightened Japanese concerns with the Papaya fruit fly.

8. Grading and packing

Final grading and packing is then undertaken in a fly free zone by the quarantine treatment business (Nature's Way Cooperative Ltd.) on behalf of the individual exporters. Cartons must be of the best quality to protect the fruit and to enhance presentation.

Past efforts to develop papaya and mango export industries in Fiji have not been sustained and fallen well below market potential because of breakdowns at one or more points in the production/quality chain. These efforts have been based on small exporters securing supplies from farmers in an informal ad hoc fashion or utilizing the National Marketing Authority, a parastatal marketing organization (Eaton, 1989).

Larger scale commercial plantations serving as production and marketing nucleus, could be a solution to the quality, continuity of supply problem faced by the Pacific island countries, and should be encouraged if they bring with them the technology and capital for industry development. In Fiji, the Tailevu Development Ltd. establishing an improved variety mango plantation, adjacent to Nadi airport is an example. However, the availability and distribution of land in Fiji and other Pacific island countries means that the Tailevu Development Ltd. type developments are likely to be an exception. By necessity, production will be largely small-holder based. Furthermore, a small-holder production system, if well managed and directed, can offer major advantages in the production of crops such as papaya, as the Hawaiian example has shown. Thus, with the structure of Pacific island country agriculture, the development of horticultural industries will be best served by small farmers under the direction of commercial exporters and processors, and with quarantine treatment facilities being operated as commercial businesses. Fiji, after nearly 20 years of industry development is

Table 2.3. Fiji papaya and mango exports, 1988-95

(tons)

	1988	*89*	*90*	*91*	*92*	*93*	*94*	*95*
Papaya	106	148	262	28	50	–	5	1
Mango	43	60	58	10	20	35	19	less than 1

Source: Ministry of Agriculture, Fisheries, and Forests *Annual Reports* (various issues).

finally making this required transition. The Government has a key supportive role to play in empowering the industry to set and enforce the quality standards. In turn, the Government needs to be proactive in negotiating and enforcing bilateral quarantine agreements.

The last few years have seen some encouraging developments that indicate that Fiji's growers, if well managed, can successfully meet the quality and continuity of supply requirements of fruit export markets, including the very demanding Japanese market. These developments, which are providing a much needed confidence boost to the agricultural sector, include:

(a) The entry of Southern Development Company into the papaya industry

The Southern Development Company, which is owned by Rothmans (Aust.), has successfully managed small-holder farmers for the last 20 years. Faced with a sharp decline in its Fiji tobacco demand, the Southern Development Company has looked to other crops to utilize its extension and management infrastructure and to provide alternative opportunities to its farmers. Papaya has been chosen as the initial crop for this programme, with Southern Development Company entering into a joint venture with the main papaya exporter. Tobacco, with its delicate nature and demanding requirements, is an excellent "tutorial" crop for other high value horticultural crops. Southern Development Company provides seedling, undertakes land preparation, supplies irrigation and other inputs, and supervises adherence to a specified package of practices for contracted farmers.

(b) Establishment of an industry owned and operated high temperature forced air quarantine treatment facility at Nadi airport

The certification of the high temperature forced air quarantine treatment unit will see the removal of a binding constraint to fruit (papaya and mangoes, and latter eggplants, and breadfruit) exports. Fiji now has a quarantine treatment that enhances fruit quality compared with the previous ethylene dibromide chemical treatment that was deleterious to fruit quality and shelf-life. Most importantly, the facility is owned and operated by the industry – with Government being only responsible for certification that treatment has been

conducted to the specifications required by the importing countries. The industry has a strong vested interest in ensuring that the treatment facility works. In the past, in common with all Pacific island countries, the quarantine facilities were operated by the Government which has led to conflict of interest, inefficiency, and was open to corruption (Eaton, 1989).

(c) The involvement of SIAS-MPA in the fruit processing industry

The South Pacific Foods Ltd fruit processing operation came under ownership of the large French food processing company (SIAS-MPA) in 1991. SIAS-MPA undertakes all market research and market linkages for South Pacific Foods Ltd, and provides investment capital. South Pacific Foods Ltd, under local management, is left with the responsibility of fruit pulp production for defined markets. It sources raw material from small mango, guava, and banana farmers. SIAS-MPA involvement has opened up access to European, Asian and North American markets, which hitherto would not have been possible. At present, any expansion is constrained by freezer storage space. A decision is now pending on whether to invest in aseptic packing facilities, which would allow for a substantial expansion in puree production.

(d) Export of mangoes to Japan

The Tailevu Development Ltd is now successfully exporting mangoes to Japan, the most demanding of markets. Discussions are underway to utilize Tailevu Development Ltd as a marketing and management nucleus for contracted small growers. The concept is for the company to supply the varieties to be planted, determine the package of practices, and enforce grading standards. It is suggested that Ministry of Agriculture extension staff be seconded to the company to support these efforts.

(e) The establishment of a bilateral quarantine agreement for exports to New Zealand

In the past, it has been difficult to enforce quality standards. There were no restrictions on small exporters shipping produce purchased from municipal markets. In the absence of any legal authority, Ministry of Agriculture extension officers have had little or no influence on the package of practices adopted by the farmers. This has all changed with the requirement of New Zealand for a bilateral quarantine agreement for the export of any product regarded as a fruit fly host. Growers from which the fruit is sourced must be registered, so too must exporters and their packing facilities. The package practices as they relate to quarantine (e.g. field sanitation, the removal of fruit fly host material, the use of bait sprays) are prescribed, with non-compliance resulting in loss of registration. While the focus of the bilateral quarantine agreement is on quarantine, the requirements and associated discipline also have an impact on quality. Quality requirements are now becoming institutionalized, which benefits exports to all markets.

(f) The emergence of commercial horticultural seedling suppliers

Papaya and mango seedlings are now supplied by commercial nurseries. Hitherto, they were supplied by Ministry of Agriculture. These commercial nurseries are much more responsive to the industry and particularly, the market needs.

Other Pacific island countries are behind Fiji in commercially led horticultural export development. The successful Tongan squash and vanilla industries have been private sector led. However, this has not yet extended to the development of the papaya industry which is entirely a Ministry of Agriculture led-initiative. In the Cook Islands, a growers cooperative, is responsible for papaya exports. However, the operation of the quarantine treatment facility has been undertaken by the Government with adverse consequences, particularly with that country's deepening financial crisis. In Samoa, the Department of Agriculture re-acted very negatively to the recent Asian Development Bank Agricultural Sector Strategy that proposed private sector led agricultural development (ADB, 1995). The development of the Vanuatu squash industry has been led by a New Zealand company. The Government resisted the temptation to make squash a prescribed commodity under the Vanuatu Commodity Marketing Board as it had for kava and cocoa. As the Fiji experience with the National Marketing Authority has shown, fruit export development through a parastatal marketing board is doomed to failure. The Vanuatu Department of Agriculture and Horticulture took the recent interesting initiative of contracting out its tissue culture laboratory to a private New Zealand company.

C. Quarantine-an ongoing constraint

With the loss of ethylene dibromide (regarded as a carcinogen) as a quarantine treatment for fruits and vegetables in 1992, exports from the Pacific island countries ceased. The exception was mango exports from Fiji to Japan that continued without treatment. Some Pacific island countries have responded quicker than most of their competitors to the loss of ethylene dibromide by obtaining non-chemical quarantine treatment technology. The Cook Islands already export high temperature forced air quarantine treated papaya to New Zealand. Fiji is in the process of being certified for papaya, egg plant, and mango for export to New Zealand and Tonga is expecting to be certified in 1997. The University of Hawaii patented high temperature forced air quarantine treatment units in Fiji and Tonga have sufficient flexibility to meet the current Japanese vapour heat (higher relative humidity) standard if required. However, it will be a long time before any other Pacific island countries have a commercially operating high temperature forced air quarantine treatment unit in place. With the current research methodology and the rate of data generation, it will take Samoa and Vanuatu at least 3 years. The ending of the South Pacific Regional Fruit Fly project in Samoa at the end of 1996 will make it more difficult to do this work.

Even for those countries with high temperature forced air quarantine treatment units in place, the specter of having markets closed off again hang over them. Papaya fruit fly recently became established in parts of Queensland.

In the short term, this has further enhanced market opportunities for Pacific island fruits to Japan. However, should papaya fruit fly arrive in Fiji, then the mango and papaya export industries would be closed down until a high temperature forced air quarantine treatment protocol for this fly in Fiji is developed and accepted. This would take time, for no such protocol currently exists for other countries. Mediterranean fruit fly was recently discovered in the Auckland area (although the rapid response of New Zealand Ministry of Agriculture appears to have averted it becoming established). The consequences of the arrival of the Mediterranean fly into Pacific island countries would be the same as Papaya fruit fly – although it may take somewhat less time to establish an accepted treatment protocol, since high temperature forced air quarantine treatment is being used in Hawaii for Mediterranean fly in papaya and for citrus exported from California to Japan. A similar threat lies in the north with the Melon fly that has found its way to Guadalcanal in the Solomon Islands from Papua New Guinea and continues its inexorable journey southward.

A new fruit fly is most likely to be introduced through fruits smuggled by inward bound passengers and not through commercial fruit shipments. Pacific islanders are regarded as high risk group in this respect. The authorities in Pacific island countries have been slow to react to the huge risk arising from fruit smuggling. However, Fiji has now enacted emergency legislation that imposes 3 years gaol for smuggling plant material. With the assistance from the South Pacific Commission, posters have been prepared warning incoming passengers of the dangers and consequences of smuggling fruits and other plant material. Also thanks to the South Pacific Regional Fruit Fly project, all participating countries, at least have surveillance systems in place although, some are probably not as effective as they might be and there is concern about the sustainability of these systems with the ending of the project. The Pacific island countries do not have the emergency response plans, or the implementing capacity, to contain the arrival of any new exotic fruit fly as occurred in New Zealand. This is evidenced by the establishment of the Giant African snail in Samoa and the taro beetle in Fiji.

Quarantine concerns do not only apply to fruit flies. For example, the absence of Papaya ring spot virus currently offers a major opportunity to Pacific island country producers, but it also poses a major threat to the future of these industries.

D. The air freight constraint

The perishability of fresh fruits such as mangoes and papaya means that shipments to Asian markets must for the present be by air. As volumes increase and shelf-life extending technology advances, sea freight will become an option. For example, Vanuatu could ship mangoes with squash to Japan. Fiji already has sufficient direct flights to Japan and the Republic of Korea to develop a significant fruit export industry to these markets. For Tonga and the Cook Islands, exporting to these markets will require transshipment – which will substantially increase costs and reduce capacity. However, even for Fiji,

excessive freight rates currently limit this opportunity.[18] Air Pacific with a monopoly position, and faced with heavy demand for space from sashimi tuna, has adopted a policy of extracting maximum freight rates. This 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 term interest, to diversify its exports to the lucrative Japanese market by setting reasonable (not subsidized) freight rates. The critical role a national airline can play in horticultural export development is evident from Thailand's Thai International Airways and Holland's KLM. In the past, the Government of Thailand has utilized the IATA regulation allowing for Government ordered rates 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.

E. Finance and investment

For a farmer to consistently produce export quality fruits such as papaya requires considerable upfront investment in inputs such as seedlings, irrigation equipment, land preparation, fertilizer, field bins etc. Yet, most Pacific island country development banks have become increasingly reluctant to advance working capital to farmers. The Tongan development bank has been an important exception, where the development of the highly successful squash industry was largely attributable to the provision of working capital by the Tongan development bank. Thus, unless small farmers can obtain finance through an exporter, or a company such as the Southern Development Company, they usually cannot successfully grow a horticultural export crop.

Financing problems extend beyond the working capital needs of small farmers. Investors, including financiers, see agriculture as a risky venture due to the nature of its susceptibility to large and sudden changes in weather, market prices, or market access due to quarantine problems. Commercial banks in Pacific island countries generally need to have 100 per cent security on lending to agriculture. This has restricted the levels of investment in horticultural export development. In Fiji, even the Fiji development bank, has become increasing reluctant to lend to agribusinesses, even where financial and economic viability can be shown. The difficulty faced by the high temperature forced air quarantine

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[18] A comparison of international air freight rates as of June 1995.

Destination	Product	Container size	US$/kg
Nadi/Narita	mango	LD3 (capacity 1.45 tons)	2.91
Sydney/Narita	mango	LD3	1.45
Cairns/Narita	mango	AU (3.5 tons)	.87
LA/Narita	mango	Pallet	1.76
Auckland /Narita	persimmon	LD8	1.05
Nadi/Auckland	general	LD3	.63
Nadi/Sydney	general	LD3	.67
Nadi/LA	general	LD3	1.03
Nadi/Vancouver	general	LD3	1.77
	ginger	LD3	1.03

Source: McGregor, 1995.

treatment business in obtaining a modest start-up working capital loan, exemplifies the finance problems now facing the sector. No doubt, the crisis faced by the National bank of Fiji have accentuated the adverse lending environment for agribusinesses.

F. Land availability

High value niche-exports such as fresh fruits have been identified as an area where some Pacific island countries have a competitive advantage. The high unit value of the products means that significant industries can be built on relatively small areas of land. This is a favourable characteristic, with access to suitable land as a prime constraint to agricultural development. For example, a papaya industry based on 100 hectare could generate US$2 million to US$3 million in exports – which would be very significant in the context of a small Pacific island country economy. To find 100 hectare of suitable and available land, made up of 1 hectare holdings, would normally not pose a problem. An exception would be in Fiji for a long term crop like mangoes. Existing farmers have been reluctant to plant improved varieties of mangoes required by the market because of uncertainty regarding renewal of their leases administered under the Agricultural Landlord and Tenant Act.

IV. POLICIES TO FACILITATE FRESH FRUIT EXPORTS DEVELOPMENT

Experience has shown that successful fruit export development must be led by the commercial industry. The private sector should identify the markets and undertake the marketing (post harvest handling, grading, quarantine treatment, packing, and shipping). If the private sector is not in a position to develop these industries, it would be counter-productive for the Government to proceed until it is. However, the Government has a critical facilitating role to play in the development of successful horticultural export industries. An environment ought to be created that will facilitate sustained private sector development. The most crucial areas in this respect relate to quarantine, the enforcement of quality standards, facilitating the establishment of industry associations, and environmental protection. If the horticultural sector is to prosper, Departments of Agriculture must ensure the timely negotiation, and effective enforcement of bilateral quarantine agreements. Quarantine rules and regulations must be formulated and implemented that minimize the risk of importing serious pests and diseases, yet, facilitate trade and allow farmers access to improved seeds. Effective ongoing quarantine surveillance programmes must be maintained. Industry associations have been identified as having a critical role in improving quality standards and in determining research priorities and other industry needs. Industry associations also provide the conduit for getting growers and exporters inputs into the government's policy formulation and implementation. Experience has shown that the Government has a critical catalytic role to play in creating industry associations and empowering them to set and enforce quality standards and to raise funds to support their activities. Some of the important facilitating roles for the Government can be listed as:

1. Enhancing quality and consistency of supply

(a) Support for industry-directed extension efforts – industry funded and directed extension efforts have proven to be far more effective than the traditional widely dispersed and costly government services. However, these industries are often too small to fully fund their own extension services, at least initially. Thus, it may be necessary for the Government to second subject-matter specialists to industry-sponsored extension efforts. The Government can also use its good officers in direct aid and technical assistance to industry extension efforts.

(b) Legislation to support industry determined and enforced quality standards. The industry is in the best position to determine the grading standards required for export markets and has a vested interest to see that these are adhered to. However, this requires the legal empowerment of the organization representing the industry.

(c) Full commitment for bilateral quarantine agreements – both in their negotiation and enforcement. The export of horticultural products, particularly if they are regarded as a fruit fly host, will require a bilateral quarantine agreement between the Governments of the exporting and the importing countries. If Pacific island country fruit exports are to expand, their respective Departments of Agriculture have to be proactive in negotiating these agreements and vigilant and efficient in their enforcement.

2. Safeguarding and commercially exploiting favourable quarantine status

(a) Strengthening of quarantine services to ensure quarantine security, the enforcement of bilateral quarantine agreements, and the effective certification of quarantine treatments. At a time of increasing pressure to reduce the size of the civil service in the Pacific island countries, this strengthening will probably require a reallocation of staff from traditional extension to the quarantine service.

(b) Reducing the incidence of smuggling through increased surveillance, enforcement, the preparation of effective emergency response plans, and education programmes.

(c) Ensuring the ongoing sustainability of the South Pacific Regional Fruit Fly project, through funding and personnel to undertake adequate quarantine surveillance, and quarantine treatment research.

(d) Gaining maximum commercial advantage from South Pacific Regional Fruit Fly project and the high temperature forced air quarantine treatment facility, by giving priority to quarantine treatment research and utilizing this data to negotiate timely quarantine agreements with importing countries.

3. Improving export market access

(a) Proactive negotiation of quarantine agreements with importing countries. Only Governments can negotiate quarantine agreements.

(b) Reasonable (not subsidized) freight rates by Air Pacific, particularly to Japan. The onus is on the Government as the majority shareholder to ensure that the broader interests of the nation are taken into account.

(c) Improved trade representation in overseas Missions, particularly in Asia. These appointees should be nationals of the host country with wide knowledge of the importing industries.

4. Revitalization of agricultural research and access to technology

(a) Giving priority to quarantine treatment research – quarantine remains the major ongoing constraint to horticultural exports.

(b) Public funding of non-government research organizations in horticultural development. Traditionally, agricultural research in the Pacific island countries has been undertaken by government research stations. This approach has not been cost-effective or met industry needs. Thus, to get maximum benefit from the public funds devoted to agricultural research, other research organizations need to be able to compete for these funds. The Government still needs to be involved in setting research priorities; allocating funds to research projects from competing research institutions that are in line with these priorities; vetting the research undertaken in the capacity of a client; and, disseminating research findings through subject-matter specialists.

5. Rationalizing and focusing extension efforts

(a) To facilitate "private-sector-led" horticultural development, the extension service requires fewer staff, with a higher level of technical expertise and a much more focused and industry-directed work programme: This approach does not imply doing less for the small subsistence-orientated farmers. Three key roles for extension officers are: assisting industry directed extension services; technology transfer, particular the promotion of profitable sustainable and organic production practices; and supporting the implementation of bilateral quarantine agreements.

6. Improving supply and effectiveness of credit

(a) Development banks need to review outlook and policies for agricultural lending, particularly in the light of input requirements for horticultural export industries.

(b) Working capital is a major constraint to small holder involvement in horticultural export industries. Development bank's utilization of proven exporters, processors, and management companies is seen as a means of overcoming this constraint.

(c) Support for the development of the informal credit sector which is seen to be more capable of assessing credit risk without the high cost that the formal sector incurs.

7. Public investment in critical infrastructure

(a) Further strategic road and port development.

(b) Accessing funding and technical assistance for the development of high temperature forced air quarantine treatment facilities. Due to the size of Pacific island country horticultural industries, the good offices of the Government are required to facilitate this technology transfer.

8. Support for industry organizations

(a) Facilitate the establishment of industry organizations. The Government can play a catalytic role in forming industry associations through such actions as convening industry-wide conference. It may also be called upon to provide some of the initial funding required to establish an effective industry association.

(b) Legislation to allow industry self-management and regulation. In the longer term, an industry association can only be successful if it is empowered to set and enforce quality standards and to raise funds from its members to support its activities.

9. Attracting investment in agriculture

(a) Promotion of the incentives available to the agricultural sector.

(b) Promotion of horticultural agroprocessing export opportunities to overseas investors.

(c) Facilitate the development of export insurance cover to reduce the risk of exporting horticultural products.

10. Ensuring horticultural export development is environmentally sustainable

(a) The Government has regulatory and educational functions to ensure that export expansion takes place within environmentally sustainable limits. The increasing environmental and health concerns of the market place have been identified as providing commercial opportunities for Pacific island country farmers. However, ensuring sustainable agricultural development cannot be left to market forces alone.

(b) Departments of Agriculture, in their transfer of technology role, needs to be in the forefront of promoting environmentally sustainable production practices. This would include the appointment of trained subject-matter specialists in organic agriculture.

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CHAPTER III

PROSPECTS FOR EXPORTS OF TAHITIAN PEARLS TO ASIAN COUNTRIES

*by Didier Sibani and Patrick Schlouch**

I. DEVELOPMENT OF TAHITIAN PEARLS

A. Identification of the product

Polynesian divers have always found real pearls in their lagoons. These pearls were so-called "black" pearls, compared to the classical white pearls. In fact, they had a very extended variety of colours, from the lightest to the darkest, with blue, pink or green glints.

During the sixties, it became exceptional to find such real pearls. Starting from this period, some pioneers tried to apply to the Polynesian mother-of-pearl – *pinctada margaritifera* – the grafting techniques created by the Japanese for their *akoya* pearl.

After some problems, results started to become very satisfactory at the beginning of the seventies. A high quality cultured pearl was obtained. Today, it is called "Tahiti cultured pearl" and is specified (still unofficially today) according to size criteria (generally between 8 and 13 mm, more rarely up to 16 mm and even, exceptionally up to 18 mm), to shape criteria (spherical, half-spherical, pear-shaped, baroque, etc.), and to surface and luster criteria.

B. Production and exports

Production and export of Tahiti cultured pearls on the industrial scale really started in 1987. In fact, production and export are one and the same because sales of pearls on the local market are of negligible amount.

In 1987, French Polynesia exported 407 kg of pearls for a total value of 2 billion FCFP (US$ 21.05 million with US$ 1 = 95 FCFP in May 1996). In 1995, French Polynesian exports reached 3.24 tons for a value of 9.4 billion FCFP (US$ 98.95 million) (table 3.1).

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* Respectively Director General, Maison Sibani Perles and Counsellor, External Trade, Government of France, and Director, Media Conseil Pacifique.

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Table 3.1. Direction of exports of Tahiti pearls, 1995

Country/area	*Weight (gr.)*	*Value (FCFP)*	*Average price per gr. (FCFP)*
Japan	2,455,306	6,753,488,361	2,750.57
United States	325,187	1,160,442,059	3,568.54
Hong Kong	287,734	809,766,277	2,814.29
Republic of Korea	18,582	136,577,420	7,349.98
Australia	42,137	130,567,880	3,098.65
France	34,218	127,977,450	3,740.06
Singapore	27,232	106,799,890	3,921.85
Germany	16,655	44,263,819	2,657.69
Thailand	5,437	27,126,820	4,989.30
New Zealand	4,373	26,610,960	6,085.29
New Caledonia	9,436	21,117,400	2,237.96
Switzerland	3,466	12,773,050	3,685.24
Taiwan Province of China	2,087	9,121,600	4,370.68
Philippines	1,031	6,312,630	6,122.82
Oceania	2,106	5,500,000	2,611.59
Italy	378	3,360,777	8,890.94
Malaysia	1,331	3,358,520	2,523.31
Belgium	1,209	2,370,850	1,961.00
Czechoslovakia	141	1,008,780	7,154.47
Austria	61	727,874	11,932.36
Canada	344	679,626	1,975.66
West Indies	33	534,720	16,203.64
United Arab Emirates	43	393,210	9,144.42
Aruba	54	280,000	5,185.19
Netherlands	23	141,800	6,165.22
China	80	140,000	1,750.00
Bahrain	68	16,100	236.76
Chile	7	15,250	2,178.57
Others	986	2,238,720	2,270.51
Total	**3,239,745**	**939,371,843**	**2,899.57**

Source: GIE Perles de Tahiti, Service des Douanes.

The quantity of exported pearls was multiplied by 8.1 over nine years. However, in the same period, their total value was only multiplied by 4.7.

Japan was almost the sole importer of Tahiti pearls during this whole period. Japan bought 84.6 per cent of the French Polynesian pearl production in 1994. But the economic slump that has hit Japan since 1991 (worsened by the earthquake in Kobe, the pearl's capital, in 1995) combined with the quick increase in the production of Tahiti pearls resulted in a sharp fall in price in recent years.

French Polynesian exporters therefore tried to expand to new markets. A start of diversification could be observed in 1995, when Japanese purchases amounted to only 76 per cent of total exports of Tahiti pearls in weight and 72 per cent in value.

The United States of America has mostly gained by this diversification but Asia as well, with a high growth in exports towards Hong Kong, the Republic of Korea, Singapore, and Thailand. Some other countries in Asia like the Philippines, Taiwan Province of China and Malaysia are interesting targets (table 3.1).

The Tahiti pearls are produced mostly in the Tuamotu-Gambier archipelago and to a smaller extent, on the Leeward Islands. About 5,000 people in French Polynesia earn their living through the pearl production, but half of the production is controlled by one person, Mr Robert Wan. The other half is divided into about ten "medium-sized" producers and several hundred small-holders.

C. By-products

The Tahiti pearls are mostly produced and exported as a raw material. Most of the pearls are sent in bulk to foreign markets where they are sorted and their value is enhanced for the use in the jewellery business (necklaces, pendants, rings, bracelets, earrings, etc.).

French Polynesia is also an exporter of *keshis* (small pearls with an irregular shape), of *mabe* (half-pearls inserted in nacre shells) and nacres (used for the making of clothes accessory especially, jewels and buttons). The value and the volume of these products are far below the value and the produced volume of pearls.

D. Technology

The Tahiti pearl is made from a mother-of-pearl with black edge, *pinctada margarifera*. The nacre is grafted through an insertion of a spherical nucleus made from the shell of a fresh water mussel to be found mostly in the United States. The grafting is a very difficult surgical operation which can be performed only by specialists. Japanese grafters still remain the best and the most sought-after.

During the (roughly) eighteen month period of maturation in the lagoon water, the mother-of-the-pearl will secrete successive layers of nacre around the nucleus in order to form the pearl. The quality of the pearl varies very much as it depends on numerous parameters which are very difficult to control. It is usually estimated that, on average, in 100 collected pearls, 20 are of very good quality, 60 of average quality and 20 are unsalable. It should be noted that, in recent years, pearls of superior size and therefore often with a higher value, have been obtained through an "overgraft" technique, that is to say a graft of a nacre that has just produced a pearl with a bigger nucleus.

Pearl culture is made in pearl farms built next to lagoons or even occasionally on piles on lagoons. 1,218 farms of this type have been officially allowed in French Polynesia but, also from official sources, about 500 only would really be in operation (annex 2).

E. Investment

The minimum investment in order to set up a pearl farm amounts to about US$ 2.5 million (annex 3). First, a maritime concession has to be granted from the local government on a part of a lagoon to be used. These concessions cost almost nothing (annual rents are a trifle), but it has become more and more difficult to obtain a concession because of the higher demand. Furthermore, a concession will not be granted to people or firms not originating from the related island or at least, from French Polynesia. Afterwards, buildings should be built, diving equipment, arrangements made for nacre storage, ships, etc. should be bought. When everything is ready, nacres for the graft should also be purchased. A very important part of the investment (sometimes up to 50 per cent) goes to nacre grafting. The running of the farm takes three years before the first pearls are collected.

F. Joint-ventures

Inhabitants of the Tuamotu-Gambier islands who hold maritime concessions can very seldom afford such an investment. Occasionally, they can borrow from banks but banks are getting more and more cautious.

An alternative is to create a joint venture with a partner who brings technical and financial means in order to run the concession. The partners are almost always Polynesians or at least French partners. Foreign investment in the Tahiti pearl remains almost non-existent up to now.

G. Markets to be developed and partners to be established

Until 1995, almost all pearls produced in Tahiti were sent to Japan. Previously, very little was done in marketing because the total production was systematically bought anyway. This established fact went together with a fall in price which was inversely proportional to the steady growth of production.

Things started to change in 1994. An association founded by leading Tahiti pearl buyers (4 or 5 importers) in Kobe, the Japan Black Pearl Association demanded that French Polynesia should put up half the money for the promotion of its pearl in Japan. As a result, leading pearl producers together with the territorial government created a *groupement d'interet economique* (GIE),[1] the *GIE Perles de Tahiti* (GIE PdT), whose main task is to ensure and finance the promotion of the Tahiti pearl world-wide. In 1995 and 1996, an amount of US$ 1.05 million was allocated to the Japan Black Pearl Association which totally controls the use of these funds.

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[1] Firms which gather capital for a special project.

With the slump of the Japanese market and the need for market diversification, the GIE PdT has an important part to play. Its budget is financed mainly by subsidies from the territorial government. They are equal to 45 per cent of the total tax revenues levied on the exports of the Tahiti pearls. Since 1994, in order to encourage their exports, this tax is calculated on the basis of the weight of pearls. The tax rate is 1.62 FCFP per gramme of exported pearls.

Because of the continuous increase in the export volume of pearls, this fiscal treatment was rather profitable. The budget of the GIE PdT increased considerably. It rose by 22 per cent in 1996 from US$ 2,505,200 to 3,063,200. With the increasing funds (US$ 210,000 or US$ 1.26 million if one includes Japan), the GIE PdT could start ambitious marketing operations in the United States, Europe and to a lesser extent in Asia.

Traditionally, the importers of Tahiti pearls are wholesalers who select them before selling them to the jewellers. In future, in order to diversify the markets, one has to select them in Tahiti with the target to sell them directly to the jewellers. The markets to be conquered in Asia are those countries where there is jewellery industry. In this respect, Hong Kong, Singapore, Thailand, Malaysia, and the Philippines are the most prosperous countries and therefore are prospective markets.

H. Does government policy influence the production and commercialization of pearls?

As we have seen, the government is the key element for the production of pearls because it is the body which grants the maritime concessions without which the pearls culture could not exist. Equally, it is the the government which fixes the export taxes levied on the weight. The Government's total revenues have steadily increased over recent years even though the price of pearls continued to decline.

If one reviews the number of maritime concessions over the last couple of years (annex 2), there is no doubt that the policy of the government was to encourage production. With respect to the commercialization of the Tahiti pearls, there was a policy of laissez faire. There is no single rule – with the exception of customs declarations and of the payment of export taxes. Anybody can sell whatever he likes to anybody and at whatever price. There is widespread practice which is disastrous for the image of the product. Small lagoonholders being over-indebted are often forced to sell pearls at ridiculously low prices to foreign traders at home or outside French Polynesia.

Several years ago, the organization of the pearl trade and the official classification of the pearl qualities was requested, but until now, there has been no constructive initiative being taken.

II. OBSTACLES TO INCREASING PRODUCTION AND EXPORTS OF PEARLS

A. Production constraints

1. Lagoons

The pearl culture operates essentially in lagoon areas. However, the legal status of Polynesian lagoons remained rather vague until the implementation of the new autonomy regime of French Polynesia in April 1996 which recognizes that the lagoons belong to the public sector of the Territory. Nevertheless, the latter behaved already as if it had the property rights since 1984 by granting or refusing the occupation of lagoons requested by individuals or enterprises. The legal status is now clear and official.

The pearl farms dispose of maritime concessions which have the size of between one hectare (considered as the minimum) and 230 hectares per lagoon. These concessions were granted without any difficulties in the past. In 1994, the territorial government announced a more restrictive policy in order to be concerned more about the protection of the environment. However, under the pressure of the Paumotu (who are the inhabitants of Tuamotu and whose political weight is rather strong since the islands are "over-represented" at the Territorial Assembly or local parliament), the Government pursues a rather soft policy.

The acquisition of a concession is not based on price. The rent of a portion of a lagoon is about US$ 1,000 to US$ 2,000 per year. Even without any important financial input, the inhabitants of Tuamotu who own the land at the lagoon border can easily obtain a concession which is granted for the long term.

Since the early 1990s, a vast research programme has been implemented with the help of the French Satellite Spot which allows a better geographical knowledge and administration of the vacant Polynesian lagoons. There is still French vacant space of lagoons which could be exploited by pearl culture. French Polynesia possesses more than hundred atolls and high islands with big size lagoons which are favourable for pearl culture. There are estimates that the maximum pearl production of French Polynesia is about 7 tons per year which is twice the production of 1995. Beyond this maximum, the environment concerns seem to be too important.

2. Investment

Until 1993-1994, the access to credit to invest in pearl culture was rather easy in French Polynesia. For political, social and economic reasons, the Government has encouraged the creation of pearl farms on the atoll of Tuamotu and more recently on the Leeward Islands. The objective was to favour the return of hundreds of families to the islands who had emigrated to Tahiti since the installation of the *Centre d'Experimentation du Pacifique* during the 1960s.

There was an euphoric evolution of pearl culture. Enormous fortunes had been realized in a short time and there was a real "rush for pearl". But in most cases, the farmers did not have any knowledge of their new job and no experience in business administration. The difficulties arose with the sharp decline in prices. Small farmholders being highly indebted, sold their pearls at extremely low prices enhancing a further fall in prices.

For several years, banks have become very cautious in granting credits for pearl culture. Consequently, the farmers have had the greatest investment difficulties for improving their activity. The actual tendency is the concentration of investment and the takeover of farms in difficulties by the most important farmholders.

As a matter of fact, this tendency was in full contradiction to the social policy of the Government which wanted to maintain the employment level on the islands. One possible outcome of this dilemma could be that it considers more favourably the implementation of joint ventures between local farmers and foreign investors.

3. Contacts with possible foreign investors

It is obvious that these contacts are rather difficult. The inhabitants of Paumotu who own maritime concessions are very often relatively less educated people with insufficient knowledge of French and even less of the English language. They are unable to search for a financial partner – and even less for a foreign one.

For several years, the Government of French Polynesia has been encouraging investors from outside the Territory. Pearl culture figures among the favourite Clauses on the Investment Code. However, until now, foreign investors are rare for the pearl culture in French Polynesia.

4. Availability of water and electricity

On the atolls of Tuamotu, there are neither rivers nor sources of water. The inhabitants have to stock rain water. Fortunately, rainfalls are frequent, such that there is no water problem. In addition, with the growing income level as the consequences of the expanding pearl culture, the inhabitants of Tuamotu are increasingly importing bottles of water which is a general tendency in French Polynesia, since water is not drinkable except in two districts (Papeete and Bora Bora where the water distribution system has been privatized).

5. Wages

The legal minimum wage in French Polynesia is US$ 895 per month. It is indexed according to the evolution of consumer goods prices. Since 1988, it is adjusted automatically with a rise of prices exceeding 2 per cent. The annual inflation rate in French Polynesia was on average 1.5 per cent.

As additional wage costs, one has to add the social security contributions which amount to 14.62 per cent for the employer and 9.56 per cent for the employee. The total minimum wage per month amounts to US$ 1,026.

6. Qualified labour

Pearl culture requires very skilled labour (administrators, divers, transplanters) and unqualified labour (mother-of-pearl). For the moment, there is no problem for skilled labour except for business administration (that is a general rule for all activities in French Polynesia), but the problem of general qualified labour could emerge with the extension of pearl culture.

As far as the grafters are concerned, Japanese specialists are still in demanded since they obtain the best result. In recent times, there was a general trend by the Government to refuse labour permit for Japanese grafters. This refusal represents a major obstacle to the development of the Tahiti pearl industry.

With respect to small farmholders, many are employing Chinese or even local grafters in order to reduce costs. Even, they themselves graft the mother-of-pearl. A school of grafting was opened recently by the Government in Rangiroa, which is the most important atoll of Tuamota.

The problem with respect to the divers is a very different one. There are a huge amount of applicants for the job but, some loopholes in the law and a systematic laissez-faire from the authorities, essentially for economic reasons, have led to the recruiting of many divers who lack the appropriate qualification. This situation has resulted in accidents, sometimes fatal ones. These issues are being discussed in the country at the moment. However, it should be pointed out that the Government, through its specialized department, regularly organizes training sessions for diving and for pearl culture techniques.

7. Understanding the customs and commercial principles

There is obviously a curb on the expansion of trade for the Tahiti pearls. Until now, as already noted, a total mess prevails on the Tahiti pearl market with many marketing systems for the pearls. More than half of the production is systematically exported to Japan, in bulk, by the largest producer (Mr. Wan). What is left is sold according to various methods.

About ten small producers in a GIE (GIE Poe Rava Nui) benefit by organizing an annual auction. However, in recent years, this organization has lost much of its power. At the beginning of 1995, a new GIE (Tahiti Pearl Producers – GIE TPP) was created in order to gather "middle" size producers. This new GIE successfully organized its first auction in April.

In fact, these auctions affect just a very small part of the French Polynesian pearl production. As an example, the GIE TPP auction realized roughly US$ 3.9 million (compared with US$ 98.95 million from exports in 1995).

Small pearl producers are most of the time, contacted by foreign buyers who move around in the islands. Sometimes, when they urgently need cash, they may even go on the foreign markets in order to sell a few lots of pearls, often smuggled and generally at slashed prices. All these methods have been denounced many years ago and the Government promised some trade control which have not yet been implemented.

There are some opportunities of a better training for management and business in French Polynesia through the Civil Service or through private bodies.

B. Trade constraints

1. Infrastructure

Infrastructures are not a hurdle to pearl trade development. Pearls are not bulky products: Pearls are sent by plane from production settings in the islands to Tahiti where they are exported. Almost every atoll where there is pearl culture has a landing runway.

2. Control of quality and packaging

There is no problem concerning packaging because pearls are mostly exported either in bulk or in lots in plastic bags.

The control of quality, on the other hand, is not maintained as it should be in order to give an absolute trust for importers. Up to now, there is still no official classification of the pearls. This classification was promised by the Government and by the GIE PdT in 1996, but its implementation comes up against specific interests and established habits. A draft text should nevertheless be passed very soon by the whole professional organization of producers and the Territorial Government. At the moment, every pearl producer and every wholesaler use their own classifications. This creates a muddle which is very harmful to the product's image.

Pearls are generally classified (according to size, shape, colour, surface and shine criteria) in categories A, B, C to which are added sub-categories in terms of A1, A2, etc. in order to specify the level of quality. Unfortunately, with no accepted official control, this classification does not give the buyer any guarantee.

3. Knowledge and up-to-date marketing techniques

It is difficult to find a proper place for the Tahiti pearl in markets, because it still remains quite unknown in the world.

First, pearls have various levels of quality. Should it be a spherical pearl, with a large diameter, with perfect colour and luster or a poor quality pearl, without any shape, small and lack-lustre? All pearls have the same name and are governed by the same regulations, the same tax system, etc. It creates a confusion, which is very harmful for the up-market image of the product, an

image which the Government, producers and all contributors in the pearl industry would like to apply to the Tahaiti pearl. The search for new openings for pearl production is carried out by producers and merchants and by the Government as well, working together with the GIE PdT which receives a major part of export tax-revenues for the pearl.

4. Adaptability to changes

It cannot not be said that French Polynesia, from an economic point of view, can adapt to change very easily. The pearl industry is no exception to this general rule. The current habits in the pearl industry is very strong. Nevertheless, with the end of the nuclear testing and the end of the *Centre d'Experimentation du Pacifique*, French Polynesians are starting to become conscious of the need for better adaptation to commercial and economic constraints. The phenomenon is, nevertheless, very new and French Polynesians still need more time to adopt to these changes.

III. MEASURES TO OVERCOME OBSTACLES

A. Possibilities for producers/exporters

1. Feasibility studies

There was never any reliable statistical study on the Tahiti pearl industry. The industry has developed with complete vagueness. Of course, to begin with, there was no real need for such studies since almost the whole production was systematically sold at satisfactory prices to Japanese buyers.

With the steady increase in production and the subsequent fall in prices and with the slump in the Japanese market, the need for feasibility studies becomes more relevant. But feasibility studies are expensive. Beside, the use of these methods is still not part of the local economic culture. Such initiatives are generally expected to be taken by the Government.

Only big exporters are expected to carry out reliable feasibility studies to determine if there is a need for any increase in their production. As far as small farmers are concerned, the GIE grouping them together could perhaps put up the money for such a studies. Nevertheless, according to available information, Tahiti pearl producers do not seem to consider undertaking feasibility studies as a priority.

2. Providing information for potential investors

The pearl industry is traditionally a very secret one. It has only opened up a few years ago and certain producers in the pearl industry are starting to realize the importance of having reliable information. French Polynesia is not exception to the rule. No reliable piece of information, except official statistics from the Customs and from the Sea service, is available until very recently. Even the local media did not have any reliable piece of information on the pearl industry.

Since the beginning of 1996, the GIE PdT created two bimonthly information letters – Tahiti Pearl News and *Perles de Tahiti* News – which finally offer some clear information. The first of these letters, written in English, is distributed to economic and commercial partners of Tahiti pearls producers all over the world. The second letter, written in French, is intended especially for producers of the pearl industry in French Polynesia.

3. Training possibilities

The French Polynesia Government attaches utmost importance to the pearl industry which is regarded as one of the main resources of the country and which will replace progressively, financial transfers from the French State after the stopping of the nuclear tests.

A few years ago, the Government has been aware of the need for a better training for pearl producers. Nevertheless, this training is limited to professional techniques. A school for the jobs of pearl culture was opened in Rangiroa, the main town on Tuamotu. Initiation training courses or refresher courses are regularly conducted every year.

Training in management, accounting, commerce and creation of firms, have just started. Such training is going to expand throughout territory. There are already specialized private schools in this field but Paumotu pearl producers seldom attend them due to language problems, travel problems to Tahiti, information problems, etc.

4. Observation of market trends through the media

Training is still not part of local culture. However, big producers, who are mostly well-educated Chinese businessmen or "halfs" (half-breed), do keep up with economic and commercial trends. In the atolls of Tuamotu, small farmers get news through the local television, radio, and newspapers in some atolls, but information about their professional activity is scarce and unreliable.

5. Development opportunities through joint ventures and the use of new production techniques

As already noted, joint ventures are still not very common for pearl production and even less with foreign partners in French Polynesia. Yet, the situation is favourable to the development of joint ventures with foreign partners. However, much caution and care are required from potential foreign investors. It is necessary to get correct preliminary pieces of information on the quality of their local partner. Above all, one should take into account the cultural aspect of the investment and as much as possible, integrate local people into the project. However, some pearl producers are going to be more and more interested in joint venture operations and are going to show much reliability. Concerning new techniques, producers, whenever they can get appropriate information, which is rather difficult, are relatively open to them.

B. Role of government to promote the expansion of pearl industry

1. Possible incentive measures

Pearl culture is listed as a favourite activity in the investment code in French Polynesia. The investment code is at present, the major government tool for promoting investment. With this code, tax exemptions exist for expenses concerning infrastructure, environment planning, furniture, equipment, and other appended miscellaneous items.

Through the GIE PdT and in association with major pearl producers, the Government, as a member of the GIE takes part in promotion activities of the Tahiti pearls all over the world. The GIE organizes events such as the international days of the Tahiti pearl that took place recently in Papeete. The GIE usually provides a stand for Polynesian people in major international fairs (Basle, Las Vegas, Hong Kong). It also finances advertising campaigns and public relations operations. All these various types of activities are likely to be expanded in the future. However, a cut in export taxes, except if one replaces them by other taxes, should not be considered as realistic. This tax (of an amount of US$ 1.62 per gramme of exported pearl) is the main source of revenue of the GIE. The Government pays back 45 per cent of this tax, that is to say US$ .73 per gramme, to the GIE PdT. Therefore, the more pearls Polynesia exports, the more money the GIE gets in order to finance the promotion of pearl. Nevertheless, as the amount of this tax is a fixed one, with the sharp decline in the average price of the pearl, the impact of taxation keeps increasing.

2. Access to investment

In the eighties, access to pearl investment was particularly easy. In accordance with instructions of the authorities, the SOCREDO bank (company of credit and of overseas development), a bank for Polynesian development, was lending money very easily at low interest rates. Very soon, private banks did the same, because they were impressed by the dazzling success of some pioneers. The Government urged the Paumotu to return to live in their own islands, thanks to this new industry.

However, even if a few people became extremely wealthy, since the late eighties, banks had to face the financial difficulties of many small farmers who were struggling with the high and unexpected production costs and a sudden decline in the price of pearls. These days, people have become more cautious and loans are very difficult to obtain. Nevertheless, with the general decline in interest rates, the investment funds still remain accessible.

3. Identifying and developing new markets

The Government does not act directly to promote pearl culture and the Tahiti pearls. This is the role of the GIE PdT. In 1996, the GIE will spend more than US$ 3 million for marketing, advertising and promotion activities, especially in Japan (US$ 1.05 million), in the United States (US$ 630,000), in Europe and in Asia (except Japan) (US$ 210,000 for each).

This represents an important effort. Yet, the promotional budget of the Tahiti pearls accounts only for 3 per cent of the turnover of the French Polynesian pearl industry. Besides, of these 3 per cent, 1 per cent is paid directly to the Japan Black Pearl Association which is a partner of the GIE in the United States.

This means that almost half of the promotion budget for the Tahiti pearls is not given to the French Polynesians. This money is given to two partner associations which manage it as they like.

Every year, French Polynesia spends about US$ 10 million for the promotion of its most important industry, tourism. It is therefore clear that the Government of French Polynesia, together with the profession, could improve considerably the promotion of the Tahiti pearls on world-wide markets. The target of 5 per cent of total turnover of the industry, US$ 5 million at present, seems to be a reasonable one to be achieved (the luxury industry usually spends up to 12 per cent and more of its turnover for advertising and marketing, but the Tahiti pearls is unfortunately not yet considered a luxury product).

4. Development of human resources and training

There is a lot to be done in training and human resources. Training of divers should be improved. Regulations concerning diving should be improved as well in order to avoid numerous accidents that take place every year in the lagoons.

Pearl producers should be trained in production techniques in order to protect the quality of the product and to stop the decline in pearl prices. Pearl producers should also be especially trained to run their businesses.

The Government is active, but still remains too cautious. In Rangiroa, there is a centre of pearl culture and of mother-of-pearl jobs. This centre, which is an agency of the sea and aquamarine territorial service, is aimed at training the future pearl producers. Future pearl producers are taught the access to resources (diving and sailing), exploitation (collect, culture, graft) and how to run a pearl farm. However, there are far more applications than the centre can accommodate.

5. Development of infrastructure

A rather small infrastructure is needed for pearl culture. A few bungalows made with wooden boards by the lagoon are usually enough for pearl culture. On the other hand, aerodromes and telecommunication facilities are crucial installations for the development of the pearl industry and these are under the responsibility of the territorial Government. Concerning aerodromes and telecommunication, the Tuamotu atolls are quite well-off. Almost every atoll has a runway and a landed station which can offer telephone, fax, television and even Internet.

6. Quality control, packaging and marketing

The Government is concerned about the development of pearl culture in French Polynesia. Pearl culture is a very profitable activity and it is very well adapted to the local population, because now people have an incentive to settle in the islands or even those who left want to return and live in the islands.

However, this political wish is hampered by conflicting interests. It is difficult to favour an increase in the number of pearl farms without at the same time working against interests of big producers, who account for about 75 per cent of the industry. It is also difficult to protect too openly these big companies, which have the tendency to concentrate more and more means of production, taking into account, in particular, the importance of the investments granted. (Production centres of the main actor of the industry, Mr Robert Wan, are scattered along five islands and account for an investment of more than US$ 30 million).

Until the last two years, big producers' interests have been bound with those of their Japanese wholesale buyers. The need for an outlets diversification, because of the Japanese slump, has given prominence to the importance of a revolution in thinking. A few years ago, one could just send tons of pearls in bulk at a fixed price in advance through an annual agreement but these days, one must enhance the value of the product, control the quality, display, and image of the product.

Theoretically, the GIE PdT does this job, but since the GIE stands for the Government and big producers, it is not really in a position to protect the interests of either small pearl farmers, or wholesalers and above all the interests of jewellers, who are completely out of the system.

This problem can be solved, either by the creation of a new structure comprising all contributors of the pearl industry in French Polynesia, or by the opening up of the GIE PdT to those who, at present, are excluded from it.

7. Incentives for private sector participation in joint-ventures

This issue has already been discussed earlier.

8. Wage reforms

The French system of guaranteed minimum wage is the rule for wage-earners in French Polynesia. This wage, as we already saw, is at the moment US$ 885 per month plus social security contributions, that is to say, about US$ 1,000.

Breaking off with France wage system is not yet in the topic for consideration. It is very unlikely that this minimum wage system would be given up. On the contrary, minimum wage is likely to be increased (automatically revalued every time consumer price index is more than 2 per cent).

In any case, pearl culture employs all skilled workers, whose wages considerably exceed minimum wages. Mother-of-pearl grafting, especially, is performed by specialists, whose wages account for almost 50 per cent of a pearl-farm total investment.

9. Land ownership reforms

The land ownership issue, in French Polynesia like in any other country of the South Pacific, is a very sensitive one. As far as pearl culture is concerned, there are two different aspects: land and maritime concessions.

Land is very often ruled by a joint ownership system. This system can pose problems but, as a whole, Polynesians live rather well with this system (annex 2). It is not conceivable, or even desirable, that land ownership system should be reformed in the near future in French Polynesia.

ANNEX 1

MARITIME CONCESSIONS IN FRENCH POLYNESIA

Since 1977, the year of the first autonomy status of French Polynesia, maritime concessions (parts of lagoons to be exploited) have been granted by local authorities.

However, many decisions of the *tribunal administratif*[a] of Papeete had challenged the competence of the territorial government, because, according to the tribunal, lagoons were part of the public domain of the French State. With the new status of extended autonomy from April 1996, the situation becomes clear, because lagoons are officially acknowledged as part of the territorial public domain.

A. Number of concessions granted

Between 1 January 1970 and 31 December 1995, the authorities have granted 2702 maritime concessions for pearl industry. Of this total, 1484 concessions are used for mother-of-pearl farming and 1218 concessions are used for setting the actual pearl farms, i.e. for mother-of-pearl grafting and for pearls collection.

Nevertheless, many concessions are not operated. An inventory, which started in 1993, and concerning 62 per cent of total concessions, shows that only 410 concessions are really in operation. This inventory will be carried on until 1997, but the total number of concessions is estimated not to be more than 500. Therefore, there is a great potential to increase production.

Furthermore, about 1700 authorizations to collect mother-of-pearl spat have been granted by the local authorities to maritime concession holders. These authorizations concern a whole lagoon where one can collect spat, in different spots according to climatic and ecological conditions.

B. Size of concessions

The Government sometimes grants tiny concessions (less than 100 square meters). In order to be profitable, a pearl farm must have at least one hectare of a lagoon. In fact, a proper pearl farm needs 10 hectares. The average Polynesian farm needs between 20 and 30 hectares. Regarding the biggest concession, it has a surface of 230 hectares (the same firm can have many concessions of this size).

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[a] Tribunal dealing with internal disputes in the French civil service.

C. Rate of granting concessions

Although the table below shows official statistics, some inconsistency can be noted because of bad data treatment in the 1980s and at the beginning of the 1990s. In 1993, a big effort was made to correct this anamoly and this explains the decline in the total number of concessions (table A).

Table A. Concessions granted, 1986 to 1995

Year	*Total per year*	*Cumulative sum since 1977*
1986	..	673
1987	..	..
1988	..	..
1989	315	1,601
1990	526	2,127
1991	916	3,043
1992	1,198	4,241
1993	323	3,802[a]
1994	438	4,240
1995[b]	162	4,402

Source: *Service de la Mer et de l'Aquaculture.*

Notes: [a] Corrected data.
[b] Data has not been published. They are estimates.

ANNEX 2
AMOUNT OF INVESTMENT

(Estimation over three years for a lagoon concession of about 10 hectares for 30,000 mother-of pearls per year)

Item	*US$*
Purchase of mother-of-pearls	
In order to obtain 30,000 grafted mother-of-pearls, 60,000 mother-of-pearls should be bought, as for various reasons, on average 50 per cent of mother-of-pearls cannot be grafted. At the price of US$ 1.60 per mother-of-pearl, over 3 years: (180,000 x 1.60)	288,000
Grafting	
The cost of a mother-of-pearl grafting is about US$ 3.70. For 90,000 mother-of-pearls: (90,000 x 3.70)	333,000
Nuclei	
A nucleus with an average quality and a middle size cost US$ 0.85. For 90,000 nuclei: (90,000 x 0.85)	76,500
Labour force	
For 10 people over 3 years with US$ 42,000 per month. For 36 months: (36 x 42,000)	1,512,000
Housing and tools	316,000
Total	**US$ 2,525,500**

CHAPTER IV

INDONESIA AS A POTENTIAL MARKET FOR FIJIAN FRUIT PUREES

*by Andrew McGregor**

INTRODUCTION

The Fiji economy has seen some diversification over the last decade with tourism and garment exports being the main growth areas. However, agriculture remains the main source of employment throughout the country with sugar and subsistence cultivation dominating. A "thumb nail" sketch of Fiji's agricultural sector is presented in table 4.1.

Sugar makes up over 95 per cent of Fiji's agricultural earnings. A major concern for Fiji is the long-term future of the 172,000 tons sold to the European Union under the Sugar Protocol of the Lome Convention. Over the last decade, this sugar has received 2 to 3 times the world market prices. However, with the successful conclusion of the Uruguay Round, this preferential market can no longer be assumed beyond the year 2,000. At best, Fiji faces the prospect of continuing erosion of preferential prices (there has been no increase in the European Union sugar intervention price since 1987), or at worst the complete loss of the European market. Thus, the need for Fiji to diversify its agricultural base in terms of products and markets has taken on a new sense of urgency.

The challenge for investors and policy makers is to identify products and markets that minimize Fiji's disadvantages of size and isolation and maximize the advantages of location and environment. There are certain high-value niche exports that best satisfy these requirements. In the new trade environment, the terms of trade can be expected to continue to move against bulk commodities as the demand for these commodities grows relatively slowly compared to world income. In contrast, the demand for goods such as horticultural products, speciality foods and sophisticated services (eg. tourism) can expect to grow rapidly. Premium quality fruit puree has been identified as one such product with favourable demand characteristics. The countries of Pacific rim and Europe offer the most obvious markets for this product. A less obvious market prospect that this paper explores is Indonesia, the South Pacific's nearest Asian neighbour.

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* Trade and Development Office, Suva, Fiji with assistance from Norman Lodge, Horticulture and Food Institute of New Zealand Limited.

The opinions, figures and estimates set forth in this paper are the responsibility of the author, and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations.

Table 4.1. Overview of the structure and performance of Fiji's agricultural sector

Subsector	*Value of production and trend*	*Foreign exchange earnings/or saving*	*Employment*[a]
Subsistence agriculture	30-40 per cent of agricultural GDP-steady growth	Substantial as foreign exchange saving	Majority of economically active population
Sugar	F$252 million slight growth	F$252 million	23,000 contract growers
Other bulk export crops (copra and cocoa)	F$4 million in decline	F$4 million	Large numbers earning meagre income
Horticulture and niche export crops	Small-but growing quite rapidly	F$10 million	250,000 days of employment generated by ginger. Equivalent employment estimated for taro export
Commercial food crops	F$120 million steady growth	Equivalent to the value of production	70 per cent of farms are non-sugar cane
Rice	F$6 million and declining	With most production now rainfeed almost equiv. to value of production	12,000 farmers grow rice, usually in rotation with sugar cane
Livestock	Poultry (F$35 million increasing) Dairy products (F$23 million – declining) Beef (1,600 tons declining) Pork (800 tons – increasing)	– Net savings small for poultry and pork and high for dairying and beef	Number of farms – Dairying 2,000 commercial – Beef 1,800 commercial – Pigs 14,500 (note: commercial piggeries not included in census) – Poultry

Source: Fiji Ministry of Agriculture, Forests and Fisheries 1996.

Note: [a] A rural employment study sponsored by UNDP is currently under way and generate much comprehensive data on agricultural employment.

I. THE USES OF PULPS AND PUREES

The terms "pulps" and "purees" are commonly interchangeable. These are usually "par-processed" products – ie. raw material (fruit) that has been processed to a stage which modifies the characteristics of the fruit but does not convert it into a fully processed product for direct consumer usage. The par-processed fruit is further treated by a food processor to convert it into a product

for consumer use or into a product which is a component of a foodstuff. An example of the former is the conversion of fruit pulp into a fruit nectar. An example of the latter is the conversion of fruit pulp into a fruit topping for inclusion in fruit yoghurt. Traditionally, fruit purees have been traded as frozen products (–18°C). However, ultra high temperature treated aseptic products are now regarded as the "leader" pulp products.

Fruit pulps can be diluted with water, sucrose (or other natural sweeteners), and citric acid to produce a fruit drink. A more sophisticated product is a fruit nectar, obtained by the addition of water, sucrose and citric acid as a fruit drink but "homogenizing" the pulp particles to stabilize the cloud. The International Code of Practice, *Codex Alimentarius,* recommends minimum levels of pulp in fruit nectars in order to qualify for the term, nectar. Most quality conscious food manufacturers adhere to *Codex* practices and define the amount of fruit pulp in fruit nectars on the label.

Fruit pulps can also serve as the par-processed products in the production of fruit leathers, more commonly called fruit bars. These are sweetened fruit pulps to which less costly pulps are added (e.g. apple) before they are dried in tunnel dryers to form thin slabs of fruit which are cut into various shapes, usually no more than 3 mm thick. Fruit leathers serve as healthy snacks and are particularly popular in North America, but are gaining world wide popularity.

Fruit yoghurts commonly contain fruit pulps which has been modified by addition of sweeteners and sometimes, emulsifiers or stabilizers to obtain the desired characteristics. Sometimes, whole pieces of fruit are added; a combination of fruit slices and pulps provide a particularly attractive fruit base in a fruit yoghurt. Pulps can be converted to fruit toppings for addition to ice cream, natural yoghurt or other foods rendered more palatable by this addition.

II. FIJI'S COMPETITIVE ADVANTAGE IN PREMIUM QUALITY PUREE AND PULP PRODUCTION

There are a number of factors that make Fiji have a strong competitive advantage in the production of high quality guava, mango, banana, and papaya purees. These factors include outstanding agronomic conditions, a strong raw material base, expected expansion of fresh exports of papaya and mangoes, strong private sector involvement, and Fiji's increasing recognition as a certified organic producer. These factors are considered briefly below:

A. Outstanding agronomic conditions

The drier side (western) of Fiji, two main islands of Viti Levu and Vanua Levu, offer ideal growing conditions for a range of tropical fruits. The combination of high solar radiation (more than 2,500 hrs/year) levels, a distinct dry season, and cooler night temperatures during the winter (19 deg C – 20 deg. C)

leads to exceptionally high brix (sweetness) levels.[1] These areas tend to be relatively free from serious infection of the major fungal pathogens (Phytophthora sp. and Phytium sp.). The wetter side of the island is well suited to growing bananas for processing. The offsetting disadvantage is the frequency of tropical hurricanes.

B. Strong raw material base

1. Guavas

Guavas grows wild in upper reaches of the Sigatoka river – Fiji's main river valley. Here, the fruit is gathered by villagers during the season to supply the factory. On the island of Vanua Levu, guavas grows profusely as a weed on largely abandoned coconut plantations and would provide a huge resource if a processing facility was established on that island. While guavas have not been planted on commercial basis, improved Thai varieties have performed well in trials. The introduction of protein fruit fly bait sprays for fruit flies means that high commercial yields could be obtained.

2. Mangoes

The North West of Viti Levu is regarded as ideal for mango production where there are estimated 10,000 trees of improved "local" types in scattered groves that are suitable for processing into pulp (Iqbal, 1992). While these trees have not been systematically planted or cultivated, they have become the commercial property of their owners. In the past, some of the better local varieties were exported to Australia, New Zealand, and Japan. Quarantine restrictions and changing market preference have closed-off the export markets leaving a substantial low-cost resource available for processing.

3. Bananas

Up until the mid 1960s, Fiji was the major supplier of bananas to the New Zealand. Disease, competition from Ecuador and the Philippines, and more recently quarantine restrictions have now closed off export markets. However, a residue of village-based banana farmers remained to provide the nucleus of growers supplying the Sigatoka processing facility.

4. Papaya

Unlike guavas, mangoes, and bananas, there has been virtually no papaya available for processing in recent years. The industry was virtually closed down by hurricanes and loss of export markets due to quarantine restrictions. It is only with the prospect of having an accepted quarantine

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[1] Internationally renowned papaya authority, the late Professor Henry Nakasone from the University of Hawaii visited Fiji in 1995. He declared Fiji papaya to be the "sweetest in the world" after reading 18° brix for Sunrise papaya grown at Sant Kumar's commercial fruit tree nursery at Nadi.

treatment in place that an export industry is now being re-established. Thus, a substantial quantity of export reject production suitable for processing will be available.

C. Expanding fresh exports of papaya and mangoes

In 1994, the fumigant ethylene dibromide was prohibited as a quarantine treatment for fruit fly by New Zealand quarantine authorities and severely restricted by Australia. This followed on the heels of hurricane kina in January 1993 which destroyed much of the existing stands of papaya and damaged Fiji's only improved variety mango plantation. Since that time, exports have been restricted to small quantities of mangoes to Japan without quarantine treatment and a few shipments of ethylene dibromide treated papaya to Australia (table 4.2).

Table 4.2. Fiji papaya and mango exports, 1988-95 (tons)

	1988	*89*	*90*	*91*	*92*	*93*	*94*	*95*
Papaya			262	28	50	–	5	3
Mangoes	43	60	58	10	20	35	19	less than 1

Source: Fiji Ministry of Agriculture, Fisheries, Forests Annual Reports, various years.

Fiji is now in the midst of a concerted private sector led effort to re-establish and expand it's papaya and mango industries. The impetus for this effort is being provided by the establishment of an industry owned and operated by the private sector, with high temperature forced air quarantine treatment facility at Nadi international airport. The unit has been certified by New Zealand for papaya. The expectation is that the whole production and post-harvest system (growing, post harvest handling, and quarantine treatment) will be approved for export to New Zealand in August 1996. Other fruits (mangoes and eggplant) will be certified for New Zealand over the next 12 months, while other markets (Australia, Canada, United States, Japan, and the Republic of Korea) are expected to come on stream over the next few years.

The removal of the binding quarantine constraint means the opening up of remunerative export markets for Fiji's fresh fruits. In response to this opportunity, Southern Development Company has selected papaya as the major diversification crop for their tobacco farmers. This involves 50 of their contracted tobacco farmers planting a total of 20 hectares of papaya a year for 3 years. This production will start coming on stream in 1996. Another 10 hectares have been planted by other growers. It is estimated that in the first year starting in August, 300 tons of fruit will be produced, increasing to 1,000 tons over 3 years and reaching 3,000 tons in 5 years.

The largest producer of export quality mangoes is Tailevu Development Ltd, which operates an orchid farm near Nadi International airport. Premium quality production (large, unblemished, red coloured fruit)[2] is exported to Japan, where Fiji is currently permitted to ship without quarantine treatment. These exports have averaged around 20 tons annually. Up until the 1994 season, residual production could be sent to New Zealand utilizing ethylene dibromide as a quarantine treatment. With the banning of ethylene dibromide, this market has been closed down and will not be re-opened until the certification of the high temperature forced air quarantine treatment facility for mangoes, hopefully in time for the 1996 season. A high percentage of current plantings are of the Kensington variety which is excellent for pulp.

Major mango plantings are expected with the commissioning of high temperature forced air quarantine treatment unit. Tailevu Development Ltd is planning to plant 37 hectare of improved variety mangoes on land adjacent to the airport. The Government is now actively promoting the growing of mangoes as a diversification crop for sugar-cane farmers. The concept is for 50 farmers each having 20 improved variety trees utilizing Tailevu Development Ltd as a nucleus. Fiji expects to be producing 240 tons of improved variety mangoes within 3 years, increasing to 750 tons in 5 years and 2,550 tons in 10 years.

If the recommended package of practices are followed for export quality papaya and mangoes, only 50 per cent and 65 per cent respectively will be produced of export grade. Most of the residual will be reject for reasons relating to the shape and size of the fruit, blemishes, colour, and ripeness in terms of lead time to reach overseas markets. This fruit would be suitable for various forms of processing. A summary projection of residual fruit that will be available and suitable for processing is made in table 4.3. For the year starting in June 1996, it is projected that there will be 175 tons of fruits available for processing, increasing to over 1,000 tons in 4 years. In addition, there are a further 500 to 700 tons of mangoes already available from the better local types. Thus, Fiji faces the prospect of having available a very substantial raw material base for two fruit purees that are in heavy demand.

Table 4.3. Projections of export residual fruit available for processing in Fiji

(tons)

Year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Papaya	150	300	500	1,000	1,500	1,500	1,500	1,500	1,500	1,500
Mango	25	50	80	175	260	435	540	680	800	890
Total	**175**	**350**	**580**	**1,175**	**1,760**	**1,935**	**2,040**	**2,180**	**2,300**	**2,390**

[2] These are the Mexican/Florida varieties.

D. Strong private sector involvement

Unlike other Pacific island countries, Fiji has had a long and strong tradition of private sector involvement in fruit processing. This dates back to the early 1950s when the Cottee family established a passionfruit pulp plant in Sigatoka. Cottee's grew into one of Australia's largest food processing companies and the Sigatoka valley established an international reputation as a producer of high quality passionfruit pulp. However, the last decade has seen the passion fruit industry faced with virus disease problems and the high cost of small holder production and thus has virtually closed. With strong market demand for passion fruit pulp, efforts are now being made by the current processor, South Pacific Foods Ltd, to revitalize the industry.

Cottee's sold out their Fiji interests in the 1960s, to another Australian fruit processor, Mangrove Mountain Ltd. The Sigatoka facility supplied Mangrove Mountain's Sydney facility with frozen passion fruit pulp and other frozen fruit purees. In 1991, the large French food companies SIAS-MPA and Pernod Ricard took over South Pacific Foods Ltd's Australian parent company together with its Fiji operations. SIAS-MPA undertakes most market research and development for South Pacific Food Ltd's and has provided capital for upgrading the factory which is in the process of obtaining ISO 9000 certification. The South Pacific Food Ltd, under local management, is left with the responsibility of fruit pulp production for certain markets. Raw material is sourced from small farmers in Ba (mangoes), Sigatoka valley (guavas), and Naitasiri/Tailevu (bananas). All these products are gathered by village groups. Through the energetic effort of South Pacific Food Ltd's local manager, they are now certified organic (produced in a sustainable way without the use of any artificial chemicals – pesticides, weedicides, or pesticides) through Bio-Gro New Zealand and the Organic Verification Organization of North America. Minimum chemical free processing is involved. The fruits are inspected and graded on arrival, washed with water, and then crushed. The resulting pulp is pasteurised at 80°C before being cooled to 10°C in a continous process spiraflo. The puree is packed into 20 kg bag-in-box and then blast frozen and stored at –18°C.

SIAS-MPA involvement, together with organic certification, has opened up access to European and North American markets. Current frozen puree sales are around 1,500 tons annually. Further expansion is constrained by freezer storage space. A decision is now pending on whether to invest in ultra high temperature/aseptic packing facilities to remove this bottleneck.

A recently completed Asian Development Bank's Fiji Agricultural Sector Review commented on the commercial strength of Fiji's fruit production and processing industries to develop export markets: To quote:

> "The last few years have seen some encouraging developments that indicate Fiji growers, if well managed, can successfully meet the quality and continuity of supply that high value export markets require. These developments, which provide a much needed confidence boost to the agricultural sector include:

(a) The involvement of SIAS-MPA in the fruit processing industry

(b) The entry of SDC into the papaya industry

(c) Establishment of an industry operated HTFA quarantine treatment facility

(d) The export of mangoes to Japan by TDL" (Asian Development Bank, 1996, p. 17).

E. A certified organic production base

The demand for organic products is the result of a combination of health (pesticide residues in food) and environmental (pollution caused by agricultural chemicals) concerns. Certified organic production is perhaps the fastest growing area of agricultural trade. World trade in organic products is currently estimated at about US$14 billion and growing at about 10 per cent per annum (Lampkin and Padel, 1994). Amongst certified organic products, fruit purees represents one of the strongest growth areas in terms of demand – with supply not able to keep up.[3] Organic banana puree is particularly sought after as an ingredient in baby food. The mangoes, guavas, and bananas currently sourced by South Pacific Foods Ltd are all produced by villages in the context of traditional and sustainable organic productions system. Through the initiative of the South Pacific Foods Ltd manager, these systems have now been officially recognised by organic certifying organizations in New Zealand and the United States of America. This in turn, has generated world wide interest in Fiji fruit puree products. South Pacific Foods Ltd now needs to invest in processing and storage capacity to take advantage of the demand that has been generated.

III. THE NEED TO GENERATE MARKETS FOR FIJI'S FRUIT PUREES

Fiji currently exports around 1,500 tons of banana, mango, and guava purees to markets in Australia, Europe, and the United States. Demand exceeds supply – thanks particularly to the South Pacific Food's ability to secure organic certification. However, if investment in ultra high temperature/aseptic treatment facilities is made and the projected expansion in the fresh mangoes and papaya exports is realized, there will be a substantial increase in capability to supply high value fruit purees. The positive linkages between fresh fruit exports growth

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[3] Personal communication from Tom Harding, Managing Director, Fresh and Healthy Foods Inc and immediate past president of the International Federation of Organic Movements.
125 West Seventh St.
Wind Gap, Pennsylvania 18091, USA
Tel: 610 863 6700; Fax: 610 863 4622

and processed fruit exports can be seen from the New Zealand experience. In 1995, New Zealand fresh fruit exports stood at $NZ869 million, while processed fruit exports were $NZ131 million (or approximately 15 per cent of fresh exports). Fiji could expect to follow this development trend. Thus, there is a need to explore new markets beyond these traditional outlets. Indonesia, Fiji's nearest Asian neighbour, has been identified as a potential new market. This market option is explored.

IV. INDONESIA AS A POTENTIAL MARKET FOR FRUIT PUREES FROM FIJI

At first glance, Indonesia as a huge but low-income, agriculture-based country would seem an unlikely choice as a potential niche-market for fruit purees from a small island country in the South Pacific. Yet, by the same token Fiji might seem as an improbable exporter of quality fruit purees to distant European markets.

Despite Indonesia's low per capita income (less than US$500), it has a skewed income distribution with a large and growing middle class. There is approximately 25 million (about 12 per cent of the population) with incomes in excess of those average received by workers in Australia and New Zealand. To cater for the *nouveau rich consumer* sector of Indonesia's major cities, supermarkets have emerged which stock a wide variety of up-market products. This is typified by one of the leaders in this field, "Kem Chicks" of Jakarta.[4] This store is frequented by a mixture of expatriate shoppers and higher income Indonesians seeking a growing range of retail food products. It is in such establishments that products prepared from fruit purees will be found.

Until recently, Indonesia was one of the world's largest importers of food products, particularly rice. However, Indonesia is now able to feed itself from locally produced rice, thereby reducing its dependency on overseas suppliers. Indonesia is theoretically able to supply all of the country's requirements for fresh and processed fruits but the selective taste preferences of the richer sector of society demands a wider range of produce. This demand is met by imports. In fact, very little of Indonesia's own home-grown fruits are processed into added-value products. Some small companies exist by producing juices and beverages based on local fruits (e.g. soursop) but large organizations almost entirely depend on imported par-processed products. Already, companies like Suba

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4 Kem Chicks
3-5 Jalan Kemang Raya, Kebayoran
Jakarta Seletan, Indonesia.
Fax: 62-221 7200 0152.

5 Susan Kismandi, Research and Development Division Manager
P.T. Subah Inda Manufacturing
Km 31, Jalan Raya Jakarta
P.O. Box 40, Cimanggis, Bogor, Indonesia.
Fax: 8711391

Indah Manufacturing[5] based in Bogor are producing a range of multi-national labelled beverages (including being franchise manufactures for Miranda, 7-up, Coca Cola, Pepsi Cola). All the company's raw materials, including pulps and concentrates, are imported.

Over the last few years, the Indonesian Government has moved toward policies of deregulation and freer trade. As a result, the proportion of citizens with significant disposable income is rising. To date, the main focus of deregulation has been directed towards reducing the barriers to foreign direct investment. This has resulted in a substantial reduction in the legal barriers to investing capital in some Indonesian industries including food processing. Currently, a duty rate of 30 per cent applies to imported fruit pulps. However, as a signatory to Uruguay Round of GATT, Indonesia is moving toward lowering tariffs and removing non-tariff barriers to imports. With respect to tariffs on agricultural products, the GATT provisions require an average overall reduction of 36 per cent, with a minimum reduction of 15 per cent for each commodity.

In August 1995, Indonesia's Seventh Economic Plan (Repelita VII) was announced with a provision for an average of 7.1 per cent growth between 1995 and 2000. According to the Plan, this growth is to be private sector driven. The Plan projects the food processing industry producing for both local and export markets (Indonesian Chamber of Commerce, *KADIN*).

In 1993, the consumption of fruits in Indonesia was approximately 71.2 grams per person per day and is expected to reach approximately 116 grams in 1997, more than 60 per cent rise in only 3 years.[6] This is supported by the Euromonitor estimate that 27.9 kg of fruits were consumed per inhabitant in 1994 (approximately 76.4 grams per day). Although these estimates include fresh fruits, the trend towards processed fruit products is clearly positive. For puree demand, the ideal situation would see the growth in the popularity of fruits extend into snack foods containing fruit flavouring. The Indonesian market for snack products is currently the fourth largest in the world at US$946.5 million, with US$143.5 million of this being extruded snack products.

Other factors demonstrate that Indonesia is moving towards greater market prospects for increasing its fruit pulp consumption via foodstuffs which utilize fruit pulps. The Tradenz Market Access publication, in assessing the Indonesian market for New Zealand food products, with similar demand characteristics to fruit purees, identified the positive market indicators:

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6 Information obtained from the Deputy Chairman for Planning Badan Koordinasi Penanaman Modal (The Investment Co-ordinating Board).

(a) Dairy product consumption is low (5 litres per capita per annum) but growing steadily (21 per cent per annum)

(b) Indonesians consume over 14 million litres of ice cream per annum (fruit pulp is a common ingredient of fruit-based ice creams) and this is expected to double over the next 3 years. Major ice cream manufacturers include PT Unilever Indonesia, PT Dairyville, PT Dolphin, PT Diamond and PT Pranoto.

(c) Very little yoghurt is manufactured locally. Imports come from Australia, France, New Zealand, etc. Local production is likely to increase in the near future.

(d) In 1994, 400 tons of fruit preparations (Tariff Item H.S.20.07) was imported into Indonesia mostly from the United States, Australia, and the Netherlands.

(e) Indonesia does not have a large local fruit preparation industry apart from jam.

(f) Retailed packed imported fruit toppings are available at most supermarkets and mini-markets in Indonesia.

(g) Distributors supply bulk-packed product to the hotel, restaurant and institutional catering sector and the airline catering trade.

(h) Critical success factors include attractive pricing, long term commitment to the Indonesian market, locating a suitable distributor, continuity of supply, strong branding and promotion (especially for the retail market), appropriate taste and packaging.

Table 4.4 presents the most recent estimates of Indonesian production of mangoes, guavas, papaya, and bananas from 1991 to 1994. It is of note that these fruits are ranked as top 4 most important fruits in Indonesia. The contrast between the figures presented in tables 4.2 and 4.3 dramatically illustrates the scale difference between the Fijian and Indonesian agricultural sectors. Despite Indonesia's huge domestic fruit production, exports of fresh fruits have been minuscule by comparison. In 1994, 429 and 422 tons of mangoes and papaya were exported respectively. This probably reflects the problems of logistics, quality, and quarantine. In contrast, Indonesia has been able to develop a substantial fruit export industry in the form of canned products. According to the Indonesian Institute for Research and

Table 4.4. Indonesian production of mangoes, guavas, papaya, and bananas, 1991-94

(tons)

	1991	*1992*	*1993*	*1994*
Bananas	2,471,925	2,650,841	2,643.812	2,614,110
Mangoes	640,457	484,782	460,357	567,333
Guava	224,067	210,791	197,243	302,097
Papaya	352,651	406,587	422,399	442,258

Source: Indonesian Institute for Research and Development of Agro-based Industry.

Development of Agro-based Industries,[7] 105,800 tons of processed fruits were exported in 1993 for a value of US$53 million. Industrial statistics show the value of canned fruits and vegetables production (ISIC 31131) to be 461 billion rupiah (about US$210 million). In contrast, the production of pulverised fruits and vegetables (ISIC 31134) which would include fruit purees was only 12.5 billion rupiah (about US$5.7 million). The value of processed fruit imports while still small (US$4.3 million in 1994) is growing rapidly (US$2.9 million in 1992).

V. FUTURE INDONESIAN DEMAND FOR QUALITY IMPORTED FRUIT PULPS

An assessment of future Indonesian demand for quality fruit pulps was provided by Mr Norman Lodge, the International Business Manager (Asia) with the Marketing and Commercial Development Division of the Horticulture and Food Research Institute of New Zealand Ltd. Mr. Lodge was formerly New Zealand's Science Liaison Officer responsible for Association of South-East Asian Nations countries. He saw the main problems associated with raw materials for processing into fruit pulps as the quality of the raw product and continuity of supply. These problems are exacerbated by a shortage of

[7] The Institute is a technical unit of the Ministry of Industry. It has the primary responsibility of conducting research and development on: products and equipment; chemical and microbiological testing; environmental management; industrial problem solving; and informational services.

domestic processors capable of producing pulps consistently to required specification.[8]

The demand for imported purees will continue to increase due the following combination of factors:

(a) a continued concentration of Indonesian agriculture on production of commodity products

(b) increasingly deregulated market environment including a lowering of import duties and restrictions

(c) increasing direct foreign investment in value-added food products

(d) little local production of par-processed products

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[8] Norman Lodge reports that a typical specification a supplier of fruit pulp would have to consistently meet include:

(a) Total plate count

This indicates the general level of hygiene under which the product has been manufactured or to which it has been exposed following manufacture.

(b) Coliform count

A measurement of E. coli indicates the level of hygiene but this time, it is an indication of cleanliness from the human handling point of view. The presence of coliform organisms is a strong indication of faecal contamination.

(c) pH

pH measures the level of acidity of the pulp and is an inherent parameter of a fruit pulp. Pulps with pH values above 4.5 require modification before processing (e.g. papaya).

(d) Degrees brix (°B)

This is an indirect measure of the soluble solids (or "sugar") content of the fruit. It is actually a measure of refractive index which is referred back to a pure sucrose solution. However, it is a simple measurement to make and extremely useful. It tends to give a measure of the sweetness of a fruit pulp and can also imply adulteration (with sugar) if the level is outside of the common range for a particular fruit.

(e) Titratable acidity

The acidity of a fruit pulp balances the sweetness and tends to be characteristic of a fruit. For example, lime is an acidic fruit which depends on a high content of citric acid for much of its character whereas mango is low in acidity.

(f) Colour (Lab or xyz indices).

Some dealers in fruit pulps use colour charts based on Munsell (or other) colour systems. This gives an indication of the colour range of the pulp which is acceptable to maintain consistent final product quality as far as colour is concerned. More professional companies resort to measurement of colour using sophisticated instrumentation which does not depend on human subjective judgement.

(e) a large and growing affluent middle class

(f) high propensity of the middle class to purchase added-value foodstuffs

(g) emergence of companies wishing to add value to par processed products for local consumption and export

(h) difficulties in sourcing quality local raw materials and continuity of supply

(i) a developing recognition and understanding of a market-led approach

(j) increasing "quality" consciousness and a desire to obtain high quality raw materials to produce high quality products for both local and export markets

These factors are seen as conducive to increasing importation of high quality par-processed products which will enable the Indonesian food processors to produce high quality added-value products referred to earlier. In the longer term, local entrepreneurs will process raw fruits and improve quality; while satisfying consumer expectations and demands. The market for such products will grow and continue to need servicing from overseas' suppliers for the foreseeable future.

VI. PROSPECTS AND REQUIREMENTS FOR FIJI TO OBTAIN A SHARE OF THE INDONESIAN FRUIT PUREE MARKET

Fiji puree processing industry would appear well placed to secure a share of the growing Indonesian par-processed fruit puree market for the following reasons:

(a) *South Pacific Foods is a proven producer of quality* bananas, mangoes, and guavas, with papaya expected to come on stream. It has established a reputation for quality in Australian, European, and the United States markets, and has the backing of SIAS-MPA reputation. This will be further enhnaced once the ISO certification is in place (it already has a HACCP control system in place).

(b) *Frequent shipping connections* through Nedloyd Lines shipping, with freezer capacity, is available on a 3 to 4 weekly basis to Jakarta and Surabaya.

However, to develop this market it will be necessary to invest in processing facilities and establish long term relationships with Indonesian processors and distributors.

A. Ultra high temperature treatment and aseptic packing facilities

Fiji's ability to expand exports to new markets such as Indonesia will depend on investment in ultra high temperature treatment and aseptic packing facilities. Currently, South Pacific Foods produces only frozen (stored at – 18°C) pulps. While this is a quality product, further market development is seriously constrained. If, during shipment, the product was allowed to be thawed, the texture of the pulps would suffer. In addition (and carrying more serious consequences), the pulps would support the growth of micro-organisms which add to the spoilage effects. The risk of the frozen chain breaking down in shipping to or in storage for developing countries such as Indonesia is greater than for Fiji's traditional developed country markets.

Keeping the product frozen at – 18°C from the time of production until point of use is costly for both the producer and the end user. Browning[9] tends to occur over time and is accelerated by increase in temperature. South Pacific Food's ability to process more pulps is primarily constrained by frozen storage capacity. In contrast, aseptic products can be stored for limited periods at temperatures above – 18°C. Modern systems are available to heat the pulps to temperatures around 145°C for 2 to 3 seconds (ultra high temperature) and

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9 Browning can occur in fruit pulps because of chemical reactions due to (i) naturally occurring enzymes in the fruit pulp reacting with a group of compounds called polyphenols and/or (ii) fruit sugars reacting with fruit proteins (Maillard reaction). In the past, the addition of sulphur dioxide to fruit pulp inhibited both of these reactions but needed a statement on the package to the effect that sulphur dioxide had been added. Sulphur dioxide has found disfavour over recent years, particularly amongst asthmatics, and it is likely that the chemical will be banned from foodstuffs within the next few years. The strong organic and health lobbies for purer, cleaner foodstuffs also work against the inclusion of extraneous compounds from foods generally regarded as "health" foods. Ascorbic acid (Vitamin C) is a water-soluble antioxidant vitamin that inhibits the enzymatic reaction by preferentially being oxidized by removing oxygen which would otherwise participate in the enzymatic reaction. However, when all of the ascorbic acid has reacted, the enzymatic action proceeds. As browning reactions are chemical in nature, their rate of reaction is increased as temperature increases. Generally speaking, the rate of reaction doubles for every 10°C increase in temperature. Conversely, the rate reduces significantly as the temperature is reduced. This is one method used for minimizing browning during the storage of fruit pulps which are susceptible to browning, particularly Maillard browning. Storage at – 18°C instead of at an ambient tropical temperature of about 30°C will extend the shelf-life of the product by approximately 30 times before equivalent changes occur.

immediately cooling to ambient or below. The short exposure to high temperature means that any flavour changes due to heat are minimized to such a degree as to make them almost non-existent. To keep the pulps free from contamination by micro-organisms, it is essential to cool the pulps immediately after the heat treatment and package it in a sterile container without any contact with the outside air. Because aseptic products do not contain viable micro-organisms, they do not suffer from microbial spoilage at the levels of ambient temperatures experienced in most warehouses.

Buyers of fruit pulps are becoming accustomed to receiving fruit pulps which have been ultra high temperature treated and aseptically packed. The pulps can be packed in volumes ranging from 5 kg to 500 kg. A common quantity is 200 kg which refers to aseptic packaging in 200 litre drum containers. As these aseptic products are now regarded as the typical "leader" pulp products available internationally, Fiji will need to offer these products if it is to develop new markets or even remain competitive in existing markets. The capital investment requirements are estimated at around US$400,000 to US$700,000. Whether this investment is made, remains a corporate decision on the part of a large company whose Fiji facility remains the smallest component of its global operations.

B. Identifying suitable and reliable distributors and processors for developing long term business relationships

This can only be done by the pulp processor/exporter. There are a number of Indonesian companies involved in fruit handling and processing. A list of such companies given in the annex may provide a useful starting point for initiating the process of buyer identification.

C. Role of the Government

Fiji's fruit puree industry has been entirely private sector driven from its inception almost 50 years ago – from raw material production through processing to marketing. This no doubt has been a major contributing factor to the industry's success and will continue to be the case as the industry enters an expansion phase. However, as pointed out earlier, the Government has a critical facilitating role to play in the development of successful horticultural export industries. In the case of Fiji, these efforts need to be focused on the fresh fruit exports industry. However, the fruit processing industry has a direct interest in the success of fresh fruit exports as it is export rejects that will provide the raw material for an expanded puree industry. The important areas of policy focus to facilitate fresh export development are listed as follows:

(a) Enhancing quality and consistency of supply

(b) Safeguarding and commercially exploiting favourable quarantine status

(c) Improving export market access

(d) Revitalization of agricultural research and access to technology

(e) Rationalizing and focusing extension efforts

(f) Improving supply and effectiveness of credit

(g) Public investment in critical infrastructure

(h) Support for industry organizations

(i) Attracting investment in agriculture

For such vertically integrated industries, one of the key role of the Government is to create a macroeconomic policy environment that leads to financial stability. This has been the case in Fiji despite the political upheavals of 1987.

D. Likely competition

A Fiji exporter of banana, mango, papaya, and guava purees would no doubt face competition from other tropical fruit producing countries such as Malaysia, Thailand, and the Philippines. Fiji's ability to compete would have to be based on superior quality and reliability of supply. It is on this basis that Fiji has been able to successfully establish market-niches for it's fruit purees in distant markets of Europe and North America.

VII. PROSPECTS FOR OTHER PACIFIC ISLAND COUNTRIES FOR DEVELOPING FRUIT PUREE EXPORTS TO ASIAN MARKETS

The Fiji fruit puree industry, albeit small, has had a long and successful tradition of exporting quality products. It now faces the prospect of developing into a major export diversification industry. There have been efforts in other Pacific island countries to develop puree-processing industries – these include passion fruit pulp in Samoa and papaya puree in the Cook Islands. These quasi government aid funded efforts were short lived. These small Pacific island countries have lacked Fiji's substantial commercial involvement and raw material base. Successful puree industries cannot be developed until these two somewhat inter-dependent ingredients are in place.

A puree processor cannot pay Pacific island farmers a sufficiently high price to grow for processing alone. The ill-fated Samoan passion fruit processing venture learnt this lesson. Farmer price expectations also lead to the eventual demise of Fiji's passion fruit industry. Thus, the raw material has to be either: (a) in abundantly available in the "wild" or as a part of traditional cropping system; or (b) the reject fruit from a substantial fresh export industry.

Fruits, outside Fiji, that might fit this category would be bananas in Samoa and papaya in the Cook Islands. Banana purees from Samoa would seem to be the most promising. Bananas grow abundantly in Samoa under optimal conditions. The once substantial export industry to New Zealand has now been lost due to quarantine restrictions and competition from Uruguay and the Philippines. With the loss of taro to a leaf blight green, bananas have replace taro as the staple starch. However, large quantities of bananas are available for processing and this could be readily expanded. Certified organic banana production presents itself as a real opportunity for Samoa. Organic certification would help find initial access to markets. There is strong domestic private sector interest in establishing an ultra high temperature treated facility for organic banana purees and a proposal is currently under consideration by the South Pacific Project Facility of the International Finance Corporation.

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Orient Business Express.

ANNEX

FRUIT HANDLING AND PROCESSING COMPANIES IN INDONESIA

P.T. Subah Inda Manufacturing
Km 31, Jalan Raya Jakarta
P.O. Box 40
Cimanggis
Bogor

Buatana Indojaya, PT
Kp. Rawa Hingkik
Desa Limus Nunggal
Cileungsi, Bogor

Agroindo Usahajaya, PT
J1. Danau Didawah-Benhil
Jakarta 10120
Phone: (62-21) 571-2282
Fax: (62-21) 571-1490
Telex: 65212 TRASDEXIA

PT Indofood Sukses Makmur
Ariobumo Central Building
Jl. HR Rauan Said X-2 Kav
5 Kuningan
Jakarta Seletan

Central Food Industry CV
Jl. Rungkut Industri Estate III/41
Surabaya
Phone: (62-31) 832 651
Fax: (62-31) 838 199

Koperasi Pemasaran Hortikultura (KPH)
Jl. M.I. Ridwan Rais 7, Jakarta 10110
Phone: (62-21) 380 3334
Fax: (62-21) 375 216

Argomega Nusa Citra, PT
Jl. Raya Subang Km. 14
Cilandak, Kec. Cempaka
Purwakarta, West Java
Phone/ Fax: (62-264) 200915

Salim Group
Central Plaza 12th Floor
Jl. Jend. Sudirman Kav. 47-48,
Jakarta 12930
Phone: (62-21) 520 7582/7632
Fax: (62-21) 570 5054/7620

Pido Trading Company
Jalan Garuda No. 36
Jakarta Pusat

Argomega Nusa Citra, PT
Jl. Raya Subang Km. 14
Cilandak, Kec. Cempaka
Purwakarta, West Java
Phone/ Fax: (62-264) 200915

Aneka Sarivita PT
Jl. Kesehatan Raya No 21
Jakarta Pusat
Phone: (62-21) 380 3809
Fax: (62-21) 380 3837

Daya Mata Agro Lestari PT
Kanindo Plaza 6th Floor
Jl. Gatot Subroto Kav. 23
Jakarta 12950
Phone: (62-21) 525 8268
Fax: (62-21) 525 8272

Great Giant Pineapple, PT
Chase Plaza 20th Floor
Jl. Jend. Sudirman Kar. 20
Jakarta 12910
Phone/ Fax: (62-21) 570-6438

PT Indofood Sukses Makmur
Ariobumo Central Building
Jl. HR Rauan Said X-2 Kav
5 Kuningan
Jakarta Seletan

Aneka Sarivita PT
Jl. Kesehatan Raya No 21
Jakarta Pusat
Phone: (62-21) 380 3809
Fax: (62-21) 380 3837

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Koperasi Pemasaran Hortikultura
Jl. M.I. Ridwan Rais 7
Jakarta 10110
Phone: (62-21) 380 3334
Fax: (62-21) 375 216

Assistance in compiling this list was provided by the Horticulture and Food Research Institute of New Zealand Ltd.

Additional food companies listed in the *Orient Business Express* include:

Ciracas Indo Perdana PT; Alpen Fruits; HNI Fruits & Vegetables; Kerna Suyur Jaya PT; Koletika; Persada PT; Melkar CV; Moenafarms PT; Sapta Jaya Toko; Sari Buah Segar Perus; Segar Kumala PT; Mahkota Generasi PT

Some additional preliminary assistance could be provided by Tradenz, Indonesia, who are willing to search for information on likely users or importers of Fiji fruit pulps and purees at a cost of NZ$150 per company.

CHAPTER V

BÊCHE-DE-MER EXPORTS FROM PACIFIC ISLAND COUNTRIES FOR MARKETS IN ASIA

*by Infofish**

INTRODUCTION

Bêche-de-mer or sea cucumber is an important marine product harvested from the inshore waters of the Pacific island countries and territories. The importance of bêche-de-mer to the Pacific island countries dates back to the early days of European contact. However, market expansion to Asia and the Orient began in the first years of the nineteenth century. Lately, Asia has become the most important outlet for bêche-de-mer from the Pacific island countries and other producing nations.

I. PRODUCT RANGE

Sea cucumber belongs to the group of sea-animals called *Holothurians*. This group consists of over 600 species with 15 species having some commercial value. These are:

Sandfish:	*Holothuria scabra*
White teatfish:	*H. fuscogilva*
Black teatfish:	*H. nobilis*
Prickly redfish:	*Thelenota ananas*
Deepwater redfish:	*Actinopyga echinites*
Stonefish:	*Actinopyga lecanora*
Surf redfish:	*A. mauritiana*
Bronen sandfish:	*Bohadsehia maimorates*
Blackfish:	*Actinopyga miliaris*
Curryfish:	*Stichopus variegatus*
Greenfish:	*Stichopus chloronotus*
Amberfish:	*Thelenota anax*
Elephant trunkfish:	*Holothuria fuseopunctata*
Pinkfish:	*Holothuria edulis*
Lollyfish:	*Holothuria atra*

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* Kuala Lumpur, Malaysia.

The opinions, figures and estimates set forth in this paper are the responsibility of the author, and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations.

In terms of market preference and commercial value, sea cucumber species could be classified into four categories:

High value:	Sandfish
	White teatfish
	Black teatfish
	Prickly redfish (coldwater)
Medium value:	Stonefish
	Surf redfish (good quality)
	Greenfish (good quality)
	Curryfish
Lower medium value:	Deep-water redfish
	Surf redfish
	Blackfish
	Greenfish
Low value:	Brown sandfish
	Lollyfish
	Pinkfish
	Elephant trunkfish
	Amberfish
	Tigerfish

The Pacific islands countries have become an important source of high and medium value species for the Asian markets. However, low value species are also harvested from these countries for export. Supplies come from most of the Pacific island countries and the countries of significant importance are Fiji, Kiribati, Papua New Guinea, Solomon Islands and Tonga.

In the international market, bêche-de-mer are mainly traded in dried form, as are the products from the Pacific island countries. However, a negligible volume of frozen products are entering the Oriental market from New Zealand and Australia.

II. INTERNATIONAL TRADE

Seven countries in Asia import almost 90 per cent of the fresh/frozen/dried bêche-de-mer traded in the international market (table 5.1). With an average annual imports of 13,000 tons, the market for bêche-de-mer in Asia is estimated to be worth US$60 million.

Almost 95 per cent of the bêche-de-mer is imported in dried form. Recently, a small volume of fresh/chilled and frozen products was imported into Hong Kong and Taiwan Province of China for the speciality restaurant trade.

Table 5.1. Imports of fresh/frozen/dried bêche-de-mer, 1992-1994

		1992		1993		1994
Hong Kong	Q	7,030	Q	7,401	Q	7,281
	V	35,136	V	29,774	V	35,136
China[b]	Q	2,423	Q	3,508	Q	3,163
	V	NA	V	9,140	V	8,260
Singapore	Q	1,435	Q	880	Q	1,242
	V	11,001	V	6,953	V	11,341
Malaysia	Q	401	Q	335	Q	400[a]
	V	1,081	V	761	V	1,000[a]
Taiwan Province of China	Q	1,191	Q	1,135	Q	1,124
	V	9,229	V	6,030	V	5,543
Republic of Korea,	Q	18	Q	21	Q	25
	V	265	V	327	V	400[a]
Japan	Q	40	Q	17	Q	17[a]
	V	1,263	V	635	V	635[a]
Total	**Q**	**12,538**	**Q**	**13,297**	**Q**	**13,252**
	V	**55,018**	**V**	**53,620**	**V**	**62,315**

Source: FAO Fishery Statistics, 1993.

Notes: Q = Metric tons.
V = US$ '000.
[a] estimate.
[b] imports from Hong Kong only.

Generally, dried bêche-de-mer from the Pacific island countries are imported by Hong Kong and Singapore. In 1994, Singapore imported 135 tons of dried products mainly from Fiji, Papua New Guinea and Solomon Islands, and Hong Kong bought about 900 tons in the same year. Some of these products imported from the Pacific island countries are re-exported worldwide after sorting, regrading and repacking at higher prices.

A. Hong Kong

The imports into Hong Kong during 1992-1993 showed a marginal increase of 3.5 per cent (table 5.2). South Pacific Island countries including Australia and New Zealand supplied 629 tons of bêche-de-mer in 1994 at a value of HK$ 48.3 million. The leading suppliers from the Pacific island countries were Solomon Islands (247 tons), Fiji (176 tons), Kiribati (130 tons), and Papua New Guinea (150 tons). Exports from the Pacific island countries to Hong Kong have declined by half in the last three years due to reduced harvests from Fiji, Papua New Guinea and Solomon Islands. On the other hand, supplies from Kiribati increased impressively from two tons in 1992 to 130 tons in 1994. Exports have also increased from Tonga, Vanuatu and Samoa during the last three years. Indonesia and the Philippines from Asia, and Madagascar and Kenya from the Indian Ocean and Africa, remained the leading exporters of sea cucumber to Hong Kong in 1994.

Table 5.2. Hong Kong: imports of bêche-de-mer (dried, salted or in brine)

Country	1992		1993		1994	
	Q	V	Q	V	Q	V
USA	31	3,404	3	316	48	4,993
Canada	34	3,431	41	4,133	2	348
Ecuador	6	1,495	15	867	5	438
Mexico	2	475	–	–	1	264
Peru	–	–		–	32	1,230
Venezuela	–	–	–	–	2	133
U A Emirates	8	587	25	1,904	11	1,088
Yemen	–	–	5	321	–	–
Taiwan Province of China	23	1 008	23	1,063	11	635
Indonesia	2,266	72,713	2,620	75,314	2,599	82,974
Philippines	1,198	21,075	1,872	28,951	1,726	28,053
Republic of Korea,	9	776	47	3,181	12	1,036
Japan	42	11,949	45	14,035	19	12,580
China	117	7,385	68	5,075	76	5,708
Viet Nam	46	1,213	43	1,075	35	1,497
Maldives	9	307	14	667	21	1,556
Sri Lanka	12	2,661	–	–	4	1,023
India	21	854	10	252	32	2,493
Malaysia	2	227	–	–	1	157
Singapore	943	27,817	756	24,625	20	38,193
Mozambique	31	218	–	–	9	647
Madagascar	312	10,074	379	10,267	318	8,948
South Africa	49	1,911	28	1,429	93	5,502
Kenya	109	2,565	60	1 ,874	49	2,527
Mauritius	–	–	–	–	1	40
United Republic of Tanzania	388	13,023	478	12,987	303	13,457
US Oceania	2	42	10	465	49	3,956
Aust and Oceania	102	8,838	85	8,335	49	5,983
Kiribati	2	150	99	3,674	130	6,059
Tonga	–	–	6	684	43	2,257
Samoa	–	–	17	687	22	672
Australia	6	360	23	1,865	41	4,860
Solomon Islands	545	23,404	319	100,076	247	11,312
Fiji	423	20,756	119	7,601	176	11,245
New Zealand	9	395	6	388	3	270
Vanuatu	–	–	6	400	40	2,353
Papua New Guinea	232	9,020	179	8,655	150	9,289
Total (incl. minor exporters)	**7,030**	**250,995**	**7,401**	**232,238**	**7,281**	**274,057**

Source: Department of Fisheries, Hong Kong

Notes: Q = Metric tons.
V = US$ '000.

Products from the Pacific island countries fetch the highest prices as high value sandfish and teatfish make up the bulk of the Pacific island countries' exports to Hong Kong. For example, the average import price for Pacific island countries' products was HK$ 76.8/kg (US$ 9.8) in 1994, compared with prices of Indonesian and Filipino products, which were HK$ 31.90/kg (US$4.08) and HK$ 16.00/kg (US$2.05) respectively.

Bêche-de-mer, together with other fish and fishery products have duty free entry into the Hong Kong market. The import market is mainly dominated by 10-12 big importers/traders. However, there is also a large number of small importers/reprocessors who import bêche-de-mer occassionally. Most of the products imported into Hong Kong are regraded by quality, size and species before being sold domestically or re-exported.

According to official records, Hong Kong re-exports nearly 4,000 tons of bêche-de-mer annually (table 5.3). Some 85 per cent of the re-exports are directed to China and 10 per cent to Taiwan Province of China. The remaining five per cent are exported to the United States, Europe, the Republic of Korea, and Singapore and other minor markets in Asia. Products re-exported to China and other markets range from high value sandfish to low value lollyfish. Domestic consumption of bêche-de-mer in Hong Kong is merely 10 per cent of the total imports ranging between 500-700 tons annually.

Table 5.3. Hong Kong: re-exports of bêche-de-mer, 1992-1994 (dried, salted or in brine)

Destinations	*1992*		*1993*		*1994*	
	Q	*V*	*Q*	*V*	*Q*	*V*
USA	21	3,047	25	3,001	25	3,894
Canada	14	1,449	13	1,672	12	2,008
France	–	–	–	–	1	78
United Kingdom	1	238	1	167	3	846
Taiwan Province of China	372	15,413	375	16,240	401	20,749
Indonesia	–	–	–	–	4	140
Republic of Korea	98	7,987	79	7,040	76	8,552
Thailand	5	331	1	245	1	99
Japan	9	1,135	60	609	12	1,111
China	2,423	–	3,508	69,461	3,163	62,775
Malaysia	2	193	2	1,500	1	183
Singapore	48	5,043	62	7,043	55	6,687
Australia	1	153	2	202	2	93
Total (incl. minor importers)	**3,003**	**85,747**	**4,162**	**106,768**	**3,755**	**107,375**

Source: Department of Fisheries, Hong Kong.

Notes: Q = Metric tons.
V = US$ '000.

The population growth in Hong Kong has remained static for the last few years. Immigrants from mainland China have not had any major impact on the total consumption of bêche-de-mer as these are considered expensive products. Therefore, day-to-day consumption of bêche-de-mer is limited to the Chinese New Year celebrations, wedding, dinners and banquets. Due to these factors, limited volumes of dried products are sold through retail outlets. The bulk of the products sold in Hong Kong for domestic consumption are channelled through the wet market and the catering sector. Here, reprocessors play an important role; they handle the bulk of the products. Speciality shops also sell dried and wet products in consumer packs for domestic households.

B. Singapore

Singapore is a major trading centre for fish and fishery products (table 5.4). A reasonable volume of high value dried fishery products are imported into Singapore and dried bêche-de-mer is one of the items. Due to preferential tariff rates between the Association of the Southeast Asian Nations countries, Malaysia, Brunei Darussalam and Thailand prefer to import bêche-de-mer and sharkfins through Singapore rather than direct purchases from producing countries. Moreover, Singapore offers duty free entry to all seafood items.

Bêche-de-mer is one of the preferred seafood delicacies of the highest order in Singapore. Annual imports of dried bêche-de-mer range between 1,200-1,400 tons. In recent years, imports have risen due to increased supplies from Madagascar, Tanzania and the South Pacific countries.

Imports from Africa mainly consist of cheaper quality sandfish and some white teatfish. Some of the best quality products are imported from Tonga, Fiji and Australia. These products are usually consumed in the domestic market. Singapore also imports a reasonable quantity of bêche-de-mer from Indonesia which is not reported in the official statistics. As such, the total import figures reported by the Primary Production Department of Singapore does not reflect the total volume imported by the Country.

The 1994 statistics show that like Hong Kong, nearly 85 per cent of the imported bêche-de-mer was regraded and then re-exported from Singapore to international markets. The bulk of these re-exports were directed to the Hong Kong market, followed by Malaysia, Taiwan Province of China, Myanmar, and Thailand (table 5.5). A small volume was also exported to the United States. High quality teatfish and sandfish are usually exported to Taiwan Province of China. Exports to Malaysia consist of medium grade sandfish of various sizes and a small quantity of teatfish. The re-exports per kg received by Singapore during 1992-1994 is provided in table 5.6.

Singapore has a 15 per cent non-Chinese population. Bêche-de-mer is not popular among this group. Local consumption of bêche-de-mer (primarily

Table 5.4. Singapore: imports of bêche-de-mer (dried, salted or in brine), 1992-1994

	1992		1993		1994	
	Qty	*Value*	*Qty*	*Value*	*Qty*	*Value*
Australia	9	240	13	308	47	1,154
New Zealand	–	–	4	159	9	182
China	2	42	–	–	1	114
Taiwan Province of China	8	195	–	–	5	128
Hong Kong	48	1,127	44	1,151	46	936
India	20	314	16	240	39	900
Sri Lanka	9	196	36	592	39	1,597
Malaysia	39	280	25	128	17	125
Philippines	68	1,065	77	1,253	66	1,727
Myanmar	–	–	5	76	6	88
Viet Nam	3	43	16	242	15	122
Fiji	29	869	3	75	8	131
Maldives	82	1,044	52	894	49	549
Papua New Guinea	378	6,380	146	1,840	80	838
Solomon Islands	28	214	3	72	4	38
Mauritius	1	30	–	–	6	96
Kenya	102	884	19	120	36	493
Madagascar	283	1,343	245	1,505	333	2,368
Mozambique	16	221	–	–	3	86
Tanzania	225	1,703	111	1,130	249	2,070
United Arab Emirates	12	237	14	380	18	704
Yemen	58	1,084	18	264	45	601
USA	1	27	3	55	–	–
Oceania	4	128	25	466	43	707
Other countries	10	266	5	175	49	1,258
Total	**1,435**	**17,932**	**880**	**11,125**	**1,242**	**17,012**

Source: Primary Production Department, Singapore.

Notes: Q = Metric tons.
V = S$ '000.

sandfish) in Singapore ranges between 150-200 tons annually. The market demands high value products. Although the retail sector takes only 10 per cent of the market share, the best products are usually sold through this sector. Restaurants, which are the main users of dried bêche-de-mer, buy their products from wholesalers and reprocess their own products.

Reprocessors, who generally use small dried sandfish (40-80/kg), play an important role in Singapore. Retail outlets which sell processed/wet bêche-de-mer through wet markets and speciality shops, get their supplies directly from reprocessors.

Table 5.5. Singapore: re-exports of bêche-de-mer (dried, salted or in brine), 1992-1994

Destinations	1992		1993		1994	
	Q	V	Q	V	Q	V
Hong Kong	781	7,450	558	6,234	734	7,835
Malaysia	153	1,128	187	1,165	184	4,545
Taiwan Province of China	169	3,749	129	2,387	65	2,188
Myanmar	58	559	51	570	44	970
Thailand	8	69	6	28	22	586
USA	3	62	2	27	2	85
Brunei Darussalam	3	93	3	93	1	51
Total (including others)	**1,191**	**13,267**	**942**	**10,634**	**1,054**	**16,311**

Source: Primary Production Department, Singapore.

Notes: Q = Metric tons.
V = S$ '000.

Table 5.6. Singapore: bêche-de-mer: re-export value per kg in S$ by major destinations, 1992-1994

Destinations	1992	1993	1994
Hong Kong	9.5	11.2	10.7
Malaysia	7.3	6.2	24.70
Taiwan Province of China	22.2	18.5	33.6
Myanmar	9.6	11.2	22.0
Thailand	8.6	4.6	26.6

Source: Primary Production Department, Singapore.

The catering sector is the main area where bêche-de-mer is consumed round the year. Consumption is high during the Chinese New Year, at mid-year and year-end festival dinners, and at almost every wedding dinner irrespective of income group.

C. Taiwan Province of China

Annual imports of bêche-de-mer averaged 1,100 tons during the last three years. In 1994, Taiwan Province of China imported 1,124 tons of sea cucumber. Of that, 36 per cent were frozen products and the rest were in dried form (table 5.7).

When it comes to reporting the origin of products, official trade statistics from Taiwan Province of China could be misleading. For example, Hong Kong supplied almost 60 per cent of the dried bêche-de-mer imported into Taiwan

Table 5.7. Taiwan Province of China: imports of bêche-de-mer, 1992-1994

			Spiked		*Others*		*Total*
1992	Frozen	Q	–	Q	386	Q	38
		V	–	V	43,492	V	43,49
	Dried	Q	39	Q	666	Q	70
		V	24,805	V	93,852	V	118,65
	Salted/in brine	Q	–	Q	100	Q	10
		V	–	V	9,472	V	9,47
	Total	Q	39	Q	1,152	Q	1,19
		V	24,805	V	146,816	V	171,62
1993	Frozen	Q		Q	327	Q	32
		V		V	38,894	V	38,89
	Dried	Q	34	Q	655	Q	68
		V	19,171	V	82,196	V	101,36
	Salted/in brine	Q	–	Q	117	Q	11
		V	–	V	10,432	V	10,43
	Total	Q		Q		Q	1,13
		V		V		V	150,75
1994	Frozen	Q	–	Q	404	Q	40
		V	–	V	38,193	V	38,19
	Dried	Q	34	Q	625	Q	65
		V	13,145	V	82,633	V	95,77
	Salted/in brine	Q	–	Q	58	Q	5
		V	–	V	4,611	V	4,61
	Total	Q	34	Q	1,087	Q	1,12
		V	13,145	V	125,437	V	138,58

Source: Taiwan Fisheries Bureau, Taiwan Province of China.

Notes: Q = Metric tons.
V = NT$ '000.

Province of China in 1994. However, official records indicated zero imports fro Hong Kong in that year. This is because Taiwan Province of China has impose a ban on imports from Hong Kong for the past 15 years because of its politic status with China. However, in practice, trading is allowed with Hong Kong i every respect although there has not been any official legislation overturning th ban.

A recent survey revealed that only one company imports more than 7 per cent of the bêche-de-mer into Taiwan Province of China. It can be safel assumed that more than half of the total imports came from Hong Kong an Singapore, mainly in dried form. Almost 90 per cent of products from the Sout Pacific area is imported through Hong Kong. The most expensive dried bêche de-mer, coldwater prickly redfish, comes from the Russian Federation (vi Japan). Some retailers also import tropical products directly from Indonesia an the Philippines. Frozen bêche-de-mer is imported directly from the United State

(Alaska), Japan, Canada and South America. Most of the imported products are usually absorbed by the market. However, as the market demands only high quality products, lower grade products are sometimes re-directed to China via Hong Kong.

Taiwan Province of China has imposed high import duties on bêche-de-mer. The following are the tariff rates:

Fresh/chilled live bêche-de-mer	=	42.5 per cent
Frozen bêche-de-mer	=	20 per cent
Spiky, bêche-de-mer, dried	=	NT$ 200/kg or 20 per cent of the cif value, whichever is higher.
Non-spiky, bêche-de-mer, dried	=	NT$ 50/kg or 20 per cent on invoiced value, whichever is higher
Other bêche-de-mer, dried/salted or in brine	=	NT$ 32/kg or 20 per cent on invoiced value, whichever is higher.

It is interesting to note that the import duty on spiky sea cucumber is higher than on the non-spiky variety or sandfish, although sandfish is more expensive than tropical teatfish. The import duties were imposed 10 years ago and have not been revised since.

The original settlers of Taiwan Province of China came from the affluent southern provinces of China where consumers traditionally eat expensive seafood, with bêche-de-mer being one of the items. This tradition, combined with the present economic power, allows Taiwan Province of China to buy the best quality dried products. Household consumption of processed bêche-de-mer is high in Taiwan Province of China, although it is not popular with highlanders.

Traditionally, the market prefers various kinds of spiky bêche-de-mer. As a result, there is greater market demand for good quality teatfish and prickly red fish. Coldwater prickly red fish are imported from the United States (Alaska) and Canada in frozen form. Frozen bêche-de-mer from Peru are processed in Taiwan Province of China into dried products for domestic consumption. Small quantities of sandfish are also gaining market acceptance and imports continue to show an increasing trend for this variety.

Bêche-de-mer products are used by reprocessors with only 10 per cent being sold through the retail chain. Dried bêche-de-mer sold at retail shops are the best quality and are highly priced. Reprocessors sell their products to retail outlets at wet markets and to the catering sector.

A substantial volume of processed (wet) bêche-de-mer is sold through wet markets. Retailers keep these products in big tanks with iced water. Some frozen coldwater species are also sold through the retail wet markets.

D. Malaysia

Malaysia imports 300-400 tons of dried bêche-de-mer annually (table 5.8). Indonesia is the main supplier of dried products followed by Singapore, the Philippines and China. In 1993, a small quantity (one ton) was imported directly from Papua New Guinea.

Malaysia also imports chilled/frozen bêche-de-mer from Indonesia. Reportedly, some frozen products (cleaned muscles of bêche-de-mer) are being imported from New Zealand via Hong Kong. Indonesian products are usually re-exported to Singapore where they fetch high prices.

Malaysia has a population of 19 million. As ethnic Chinese make up 35 per cent of the total population of the country, there is some Chinese influence on the diets of the local population. Malays, who comprise 55 per cent of the population, do not have a liking for sea cucumber. Consumption of bêche-de-mer in Malaysia is therefore comparatively lower than in Singapore and Hong Kong.

In the domestic market, some processed wet products are sold through traditional wet markets in Chinatowns. During the Chinese New Year, supermarkets also offer wet processed sea cucumber in tray-packs. Chinese wholesalers who sell herbs and dried shellfish also sell processed frozen sea cucumber on foam-trays for household cooking. Importers also operate their own wholesale-cum-retail outlets for restaurants and wet markets. These wholesalers sell processed bêche-de-mer to restaurants in fresh or chilled form. Re-exports of dried bêche-de-mer from Malaysia are negligible.

Table 5.8. Malaysia: imports of dried bêche-de-mer, 1990-1993

Countries	*1990*		*1991*		*1992*		*1993*	
	Q	*V*	*Q*	*V*	*Q*	*V*	*Q*	*V*
Australia	1.02	8.91	0.93	6.78	0.15	1.52	0.30	2.18
China	0.72	5.97	1.50	11.99	0	0	36.92	76.96
Hong Kong	1.36	5.96	0.24	2.31	1.16	12.49	0	0
India	9.01	72.55	5.86	58.09	12.35	89.35	5.23	8.72
Indonesia	386.84	2,431.11	403.02	2,879.28	325.23	2,184.74	168.70	1292.65
Japan	1.11	8.35	0.27	2.38	6.96	52.74	0.69	2.42
Papua New Guinea	3.56	40.78	1.30	16.90	4.84	68.84	1.00	10.00
Philippines	1.83	2.67	11.99	79.04	11.59	65.54	28.30	222.96
Singapore	3.17	19.75	3.83	24.45	9.21	31.53	21.18	125.45
Sri Lanka	0.50	2.50	3.31	38.25	8.64	93.09	9.20	56.27
Others	4.6	32.40	3.9	31.40	8.48	60.48	57.67	84.52
Total	**413.72**	**2,631.95**	**436.15**	**3,150.87**	**388.61**	**2,660.32**	**329.19**	**1,882.13**

Source: Department of Fisheries, Malaysia.

Notes: Q = Metric tons.
V = RM$ '000.

E. China

China is the largest market for bêche-de-mer than any other kind of products offered by the Asia/Pacific region. Traditionally, Hong Kong has been the main trade channel for imports of various fishery products into China. Although direct imports of frozen fishery products are taking place between China and other supplying countries, for dried products Hong Kong, still remains the main channel. Therefore, an analysis of Hong Kong's exports to China gives clear indications of trade with China.

Recent liberalization of the national trade policy has had a big impact on China's imports of fishery products. Imports of dried/smoked fishery products during 1989-1993 increased by 40 per cent in quantity and 174 per cent in value. Imports of high value sharkfins and bêche-de-mer have contributed to this high growth rate.

According to official statistics, imports of bêche-de-mer from Hong Kong alone totalled 3,163 tons in 1994, compared to 2,423 tons in 1992. However, real imports were probably much higher than this volume. It is very difficult to establish a value for these imports, as export prices from Hong Kong are heavily under-invoiced during shipment. However, China imports all species, sizes and shapes of dried bêche-de-mer for domestic market.

Consumers in the Southern Provinces of Guangzhou, Xiamen, Shenzhen and Shanghai demand good quality products which are highly priced, whereas medium and low quality products are imported for middle and lower income areas in the Central and Northern Provinces of China. Consumption of other high value seafood is also increasing in the southern areas due to high disposable incomes. Bêche-de-mer are sold through restaurants, retail dried fish shops, and wet markets. With a population of 1.2 billion and increasing per capita income, China should be able to absorb any volume of products offered on the international markets.

F. Other Markets

Asia is the major market area for fishery products. Importing countries from the region have fairly liberal trade policies for imports of fishery products including bêche-de-mer. In most of the importing countries in Asia, import duties on these products are either low or non-existent. This offers good opportunities to producing countries to have better access to Asian markets.

Consumption of dried seafood is also reasonably high in Indonesia, the Philippines, Thailand, and Viet Nam. However, local demand in these countries is catered to by domestic supplies.

According to FAO, the Republic of Korea imported 253 tons of dried fishery products in 1993. Imports of dried bêche-de-mer were 25 tons in that year, as compared to only 18 tons in 1992. Curryfish which are imported from Hong Kong, Singapore and Taiwan Province of China, is the most preferred

species in the Republic of Korea. However, supplies are usually procured from the South Pacific, India and Sri Lanka. The market has also started to accept sandfish which have been introduced by exporters from Hong Kong. Korean consumers accept only good quality products.

The market is highly dominated by Chinese traders from Hong Kong who place middlemen in producing countries to procure dried bêche-de-mer in joint ventures either in processing or in imports. They are basically interested in unsalted bulk imports to retain maximum profits in this business.

However, some newcomers, particularly from Singapore, have started looking into joint ventures opportunities for processing of bêche-de-mer in producing countries. Due to the opening of more markets in China, demand for bêche-de-mer has increased compared to supply. This trend is expected to remain so, as supplies in producing countries come from natural sources. The South Pacific area has continued to remain one of the main sources of dried-bêche-de-mer for the major markets. However, supply fluctuations have been noticed in the recent past due to over-fishing in some countries.

III. CONSTRAINTS IN PRODUCTION AND EXPORTS OF BÊCHE-DE-MER

Due to lack of published data and facts on producing countries, it is not possible to pin-point all the problems faced by the Pacific island countries in harvesting, processing, exports and on the socio-economic aspects of the people involved in this sector. However, the following are the main constraints faced by the Pacific island countries in supply and exports of bêche-de-mer.

1. Bêche-de-mer is an important fisheries commodity and a source of revenue for the South Pacific countries. However, driven by strong demand from the markets, overexploitation of resources occurred from time to time in the Pacific island countries due to lack of resource management.

2. Poducers in the Pacific island countries lack basic knowledge of market structure, market preference, consumption patterns and specific requirements by individual markets,

3. Although bêche-de-mer resources in the Pacific island countries consist of high and medium value species, generally producers fail to obtain a better price due to inconsistency in quality. As a result, they lose out to middlemen who buy them in bulk at lower prices. Lack of technical know-how and quality control are identified to be a major problem in the production sector.

4. Harvesting of under-sized animals is another factor that affects fishermen's or producers' overall revenue. Prices of bêche-de-mer also depend on acceptable sizes.

5. In most of the Pacific island countries there are no closed seasons or size restrictions for harvesting which results in overexploitation from time to time.

6. Exports from the Pacific island countries are seldom graded according to the market preference. Due to this process, exporters fail to obtain fair or better prices for their products.

IV. RECOMMENDATIONS

South Pacific countries offer a wide range of sea cucumber species and dried sharkfins which are usually preferred items by importers compared with products imported from African, Indian Ocean or Latin American countries.

Sea cucumber species such as sandfish and teatfish from the Pacific island countries are the most preferred varieties. Recently, due to the increase in demand and shortages in supply, certain species from Pacific countries have been re-designated from medium-value species to high value species, and low-value species to medium-value species. This will provide better opportunities for fishermen and will also put less pressure on resources. The following measures are recommended for Pacific island countries to increase their returns in terms of value and volume.

1. Quality assurance and consistency: These are the most important aspects that need immediate attention in order to obtain better prices in international markets. At present, the bulk of Pacific origin sea cucumber ends up in the market as low grade products due to quality problems.

2. Products should be graded by species, size and even by form according to market preference. For example, consumers in Singapore and Malaysia prefer calcium-free products whereas Hong Kong and mainland China consumers have a preference for calcium-coated, skin-on bêche-de-mer. The same concept also applies for species. Greenfish, for example, could be graded and packed separately for the Republic of Korea market although these are traded through Hong Kong or Singapore. Specialised medium size importers these days prefer to buy properly graded products due to increasing labour costs in Singapore, Hong Kong and Taiwan Province of China. However, large buyers from Hong Kong and those who import mixed products (sharkfin, bêche-de-mer, dried shells etc) still prefer to buy ungraded products in order to get a higher profit margin.

3. Attention should be given to value addition for high value species such as sandfish. Some importers in Singapore have developed high quality cleaned, skinless, smoked dried sea cucumber which has already received recognition at retail level. Affluent Chinese consumers nowadays want to continue with their traditional food habits but their preference is for better quality and clean products.

4. In order to improve product quality, processors/exporters should be aware of various market requirements. This will help them to have better bargaining power when dealing with either midddlemen or importers directly.

5. It is also advisable to develop joint ventures with Oriental buyers in processing and marketing. In order to produce quality products, assistance from ethnic counterparts is a prerequisite. The market for sea cucumber and sharkfins is very much controlled by traditional old fashioned importers and traders. Nevertheless, some companies in the Orient are following modern marketing techniques and channels in order to get better returns out of limited resources. They are also willing to share processing technology with counterparts in producing countries.

6. In view of increasing world demand and over-exploited resources in many Pacific island countries, a mandatory closed season and size limits for sea cucumber should be introduced. For bêche-de-mer, it is the quality and size, and not the volume, that counts in order to get better returns from limited available resources. Price-wise, one kilogramme of large or medium size sandfish fetches a much higher price in comparison with three kilograms of small size products of the same species.

V. CONCLUDING REMARKS

The market for bêche-de-mer is almost exclusively limited to the Asia-Pacific region. Nevertheless, a small volume is also entering western markets to cater to the ethnic Oriental communities in those countries.

While the existing large markets in Asia are expected to remain strong in the coming years, supply from producing countries will not grow much from its current level. This phenomena will probably lead to higher prices for bêche-de-mer in the international markets.

While basic marketing and technical information is available from INFOFISH and sub-regional organizations like the South Pacific Commission, there is a major lack of data on the sustainable resources available in Pacific island countries with regard to annual production/harvesting, cost of production, transportation etc. and socio-economic factors. Information on governments' policies on export, duty, etc. are also not available.

Taking all these factors into consideration, this study recommends a major survey on the current status of bêche-de-mer resources and exports in the Pacific island countries which will help in the preparation of any medium or long term investment and marketing strategy for bêche-de-mer in the Pacific island countries.

This publication may be obtained from:

Director
Development Research and Policy Analysis Division
Economic and Social Commission for Asia and the Pacific
Rajadamnern Avenue
Bangkok 10200, Thailand

Tel: (662) 288-1610
Fax: (662) 288-1000, 288-3007
Telex: 82392 ESCAP TH, 82315 ESCAP TH
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