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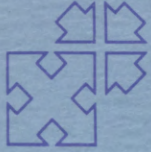
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Fruit - marketing



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THE NEW ZEALAND MARKET FOR
PASSIONFRUIT, PAWPAW AND LIMES

by

P.A. Dover

M.J. Clarke



COMMODITY REPORT NO. 5 - MAY 1974

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M.J. Clarke

Market Research Centre
Massey University,
Palmerston North.

Commodity Report No.5
May 1974

PREFACE

One of the objectives of the Market Research Centre is to publish background information concerning commodities on the New Zealand market.

This fifth Commodity Report examines the New Zealand market for passionfruit, pawpaw, and limes. Although the market for these commodities is relatively small, it has considerable importance to some of the smaller nations and territories which export fruit to New Zealand. Prominent among these is Niue, the Government of which originally commissioned the study upon which this report was based. Involvement of the Market Research Centre in the original study reflected the Centre's policy of assisting in the South Pacific. Tremendous scope exists for work of this nature and it is to be hoped that increased assistance will be offered by New Zealand institutions and organisations in the future.

In undertaking this study, Messrs Dover and Clarke encountered many inadequacies in the secondary data. This was especially true of data relating to imports, which appear in a form that aggregate over several fruit varieties. The practice of aggregating official statistics before publication sharply reduces the value of the information contained in them.

The authors concluded that some potential exists in New Zealand for expanding demand for all three fruits, particularly in processed form. However, they emphasised that successful expansion will involve a substantial amount of careful product and market research designed to guide the development of marketing strategies.

Despite the preliminary and limited nature of this study, it was a very worthwhile undertaking. I am indebted to the Government of Niue for permission to make its findings more generally available.

R.W. Cartwright

DIRECTOR.

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1. Background

As part of a combined New Zealand Government/United Nations (F.A.O.) aid programme, a new food processing factory complex has been built on the island of Niue. This resulted from the recommendations of two United Nations experts - Dr E.A. Asselbergs and Mr A.W. Martin - who visited Niue in July 1971 to assess the lime and passionfruit processing industries and to recommend a programme for future development. Both the passionfruit and lime industries were considered to have sufficient potential to warrant expansion of existing facilities. It was also felt that consideration should be given to the processing of other foods (e.g. meat, fish) with the view of not only finding other processed products for export but developing products as import substitutes.

The Asselbergs/Martin report also emphasised the need to strengthen the marketing function. Part of this requirement was to develop reliable information on potential markets. With this in mind the Government of Niue approached the Market Research Centre, Massey University in late 1972 to examine current developments in the New Zealand fresh and manufacturing market for passionfruit, lime and pawpaw products.

The Government of Niue have now kindly permitted the Market Research Centre to make the survey findings generally available.

2. Research Objective

To examine, and report on the New Zealand market for fresh and processed passionfruit, pawpaw and lime products.

3. Methodology

This report is based on published material from both New Zealand and overseas sources and correspondence with New Zealand and Australian authorities on tropical and sub-tropical fruits. A full list of data sources is contained in the Bibliography, (Appendix 6).

In addition a short questionnaire was sent to 44 New Zealand food processing companies to determine their current and future demand for fresh and processed passionfruit, pawpaw and limes. Information was also collected on their source of supply. Details of this survey can also be found in Appendices 1 and 2.

Due to the low domestic consumption of passionfruit, pawpaws and limes in this country very limited information is available from official statistics on these fruits. Because of this it has not been possible to look at the market for these products in any depth and many gaps exist in information contained in the report.

However, it is felt that the data provides a useful starting point in the examination of the potential for passionfruit, pawpaw and lime products in New Zealand.

In the main body of the report, passionfruit is treated separately from pawpaw and limes. This is because only passionfruit is grown commercially in New Zealand and

¹ More detailed information on the development of processing facilities in Niue can be found by reference to: Hubbard, R.J., 'Passionfruit Processing on Niue Island', Food Technology in New Zealand, Vol. 8, No.1 and Vol. 8, No.2 (January and February 1973)

consequently more detailed information is available on this fruit.

4. Introduction

4.1 Passionfruit

Passionfruit - also known as parchita, granadilla, and water lemon - is a native of southern Brazil.

Of the many varieties of passionfruit, most of which are edible, only two are used for processing. 'Passiflora edulis F. edulis', the purple skinned variety, is grown in temperate to warm climates and constitutes the bulk of the world output. The main producing countries are Australia (including the territory of Papua New Guinea), South Africa and some East African countries. It is this purple variety which is grown in New Zealand.

The other variety used in processing is the tropical or yellow passionfruit, 'Passiflora edulis F. Flavicarpa'. It is about 2½ times larger than the purple variety and when mature has a golden yellow smooth waxy skin. The principal producing countries of this variety are Hawaii and Fiji. It is also grown with varying degrees of success in Brazil, Cook Islands, Guan, Indonesia, Malaysia, Niue Island, Philippines, Solomon Islands, Western Samoa, Taiwan, Sri Lanka, and Colombia. ^{1/}

Although the composition of fresh passionfruit may vary considerably between and within varieties it has been estimated that average composition is as follows: ^{2/}

	%
<u>Skin</u>	52
Juice	34
Seeds	14
<u>Total Edible Pulp</u>	<u>48</u>
Total fruit	<u>100</u>

The tropical or yellow variety is higher in soluble solids and acidity than the purple variety but lacks the delicacy of flavour of the latter. However, it has been reported that some processors prefer to use the tropical variety of passionfruit as the slightly higher acidity allows the flavour to go further.

The purple variety of passionfruit require an average rainfall of 30 - 50 inches. It can be grown on a variety of soils but prefers a light, rich loam with good drainage. The vines will only withstand a few degrees of frost. In New Zealand the harvesting seasons for passionfruit are, February to May (main crop) and September to October (second crop).

Fresh passionfruit may be eaten directly from the shell or used in making fruit salad. Passionfruit can be processed into a wide range of products, the most important of which are beverages. For an extensive list of passionfruit products see Appendix 3.

^{1/} Extracted from: 'Passionfruit: Agronomy, Processing and Marketing'; D.E. Whittaker Tropical Science; Vol.14, No.1, 1972

^{2/} ibid;

4.2 Pawpaw

Pawpaws (*carica papaya*) are widely grown in all tropical and subtropical areas, notably Sri Lanka, India, Cuba, Hawaii, Puerto Rico, South Africa, Australia, East and Central Africa, Philippines and the Antilles. Pawpaw is also known as papaya and papaw.

The ripe fresh fruit are eaten throughout the tropics for breakfast and desert and in fruit salads. They are also processed into such products as soft drinks, jam, ice cream flavouring, crystallised fruit, canned pieces or cubes in syrup, fruit juice or nectar, canned baby food, pickles and dried candied pulp.

Papain is a product obtained by tapping the outer skin of the fruits and collecting the latex which drips down on a white cloth spread around the tree. The latex is dried in a kiln before being packed in tins for export. Tanzania and Sri Lanka are the main producers of papain which is used in meat tenderising preparations, manufacture of chewing gum, cosmetics, tanning, digestive tonics and to give shrink resistance to wool.

There is no commercial production of pawpaw in New Zealand because the climate is too cool for the tropical pawpaw to succeed. Some mountain pawpaw (*C. candamorcensis*) is grown in New Zealand as a novelty fruit in home gardens. The mountain pawpaw bears a small fruit which is only suitable for stewing or jam.

4.3 Limes

The two main varieties of lime (*citrus aurantifolia*) are the Mexican or West Indian lime and the Tahitian lime. The Tahitian lime has a larger fruit and is able to withstand a slightly cooler climate.

The main areas of commercial production for the former variety are Mexico, West Indies (the principal lime producing area in the world) and Egypt, although it is also grown extensively throughout the tropics.

The type of lime grown in New Zealand is the Tahitian lime. The true lime, (i.e. the Mexican lime), requires a warmer climate than we can provide. There is interest in the possibility of developing the Tahitian lime as a commercial crop in New Zealand but so far only a small number of trees have been planted in the Bay of Plenty and none of these are producing yet.

Lime is eaten as a fresh fruit or used as a flavouring for many foods. One of the principal commercial products made from limes is lime oil which is used in soft drinks, artificial syrups, flavours, and also has uses in the non food sector as a scenting agent in cosmetics, soaps etc. Other important products for which limes are processed are juice, cordial, squash, marmalade and concentrates.

Only small quantities of fresh limes are imported by temperate countries as they do not travel well and tend to be substituted by lemons.

5. Passionfruit

5.1 Production

Prior to the 1971/72 season, production of passionfruit in New Zealand had been steadily increasing over a number of years. The drop in production in 1971/72 was

probably due to the frosts and hard winter experienced in the Bay of Plenty (the major producing area) in that year. The decline in 1972/73 was probably due to the decline in vine numbers which occurred in 1971/72 and 1972/73. (Approximately 23% of all vines were removed in 1971/72).

Production of Fresh Passionfruit

Year ended Nov. 30th	1965/66	66/67	67/68	68/69	69/70	70/71	71/72	72/73
Total Prodn. (Tons)	84	65	161	222	298	318	242	222
% Change on prior years	-	- 23%	+ 148%	+ 38%	+ 34%	+7%	-24%	-8%

Source: N.Z. Horticulture Statistics

N.B. The low figures in 1965/66 and 1966/67 were due to disease.

Although passionfruit must be considered only a minor subtropical crop in New Zealand, (2219 tons of tamarillos were produced in 1973 and 3651 tons of Chinese Gooseberries in the same year), it is interesting to note that production figures for the worlds major passionfruit grown, are not very high^{1/}: viz

Kenya:	1,680 tons (1968) - estimated to have risen to 4,500 tons by 1972
Australia:	1,400 tons (1968/69)
Hawaii:	1,220 tons (1970)
Papua/New Guinea:	455 tons (1969)
Fiji:	220 tons (1969)

The most recent figures for Niue show production of 180 tons. The same output was estimated for 1971/72.^{2/} New Zealand production increases prior to 1972 may have been due to several factors. Firstly, an increased acreage has probably been in young blocks starting into production before a disease factor reduced their productivity. Secondly, until 1972 there had been a series of mild winters.

The area planted in passionfruit has fluctuated from year to year. The life of plantations has tended to be quite short, often no more than 5 or 6 years.

Acreage Under Passionfruit

Year ended Nov. 30	Net area (acres)
1965/66	80
1966/67	90
1967/68	60
1968/69	90
1969/70	100
1970/71	96
1971/72	93
1972/73	74

Source: N.Z. Horticulture Statistics

^{1/} 'Processed Tropical Fruit' F.A.O. Commodity Bulletin, Series No.51, Rome 1972

^{2/} 'Summary of Economic Development Projects', Niue Development Board, Niue 1972

New Zealand growers regard passionfruit as an extremely risky crop to grow. One of the major problems facing the grower is the vines high susceptibility to disease:

The most serious is a soil borne fungus disease known as crown canker, which can wipe out whole blocks in a season. In addition, there are several diseases which affect the fruit and other above ground parts of the vines which require a stringent spray programme. The D.S.I.R. has carried out a certain amount of research into these disease problems but has yet to find the complete solution.

A further risk factor is that passionfruit vines are truly subtropical, being frost tender and easily damaged by wind.

The Bay of Plenty is the main region for growing passionfruit. In recent years it has experienced a tremendous orchard expansion. Many new growers, whilst trying to establish a citrus and/or subtropical fruit orchard, have planted passionfruit with the hope of comparatively quick returns from their properties. Estimated production of subtropical fruits and number of plants in commercial orchards by region for 1973 were:

	Chinese Gooseberry	Passionfruit	Tamarillo
Kerikeri			
Plants	9,330	190	167,100
Production (tons)	75	-	1,200
Auckland			
Plants	7,580	750	36,290
Production (tons)	70	2	400
Bay of Plenty			
Plants	249,580	12,260	110,270
Production (tons)	3,500	140	610
Gisborne			
Plants	12,850	8,100	6,100
Production (tons)	6	80	9
TOTAL			
Plants	279,340	21,300	319,760
Production (tons)	3,651	222	2,219
Acreage	2,000	74	613

Source: Ministry of Agriculture and Fisheries

The Bay of Plenty is generally considered the most suitable area in New Zealand for the passionfruit crop largely due to the deep free-draining soil. In Poverty Bay (Gisborne) the soil is more likely to have drainage problems and the possibility of heavy frosts are greater than in the Bay of Plenty.

It would seem that, unlike chinese gooseberries and tamarillos, there will be little or no growth in passionfruit production over the next few seasons. In fact, there was a

net reduction of 4510 plants in orchards in 1973 compared with the previous year.

Subtropical Fruits Planted and Removed During 1972

	Chinese Gooseberries		Passionfruit		Tamarillos	
	Planted	Removed	Planted	Removed	Planted	Removed
Kerikeri	2,200	-	-	-	15,780	1,000
Auckland	1,450	-	-	-	2,540	-
Bay of Plenty	42,230	160	1,400	6,460	9,300	2,830
Gisborne	1,310	-	2,700	-	-	-
TOTAL	47,190	160	4,100	6,460	27,620	3,830

Source: N.Z. Horticulture Statistics

An industry expert^{1/} summarises the situation well. He feels that 'there is a lack of interest in growing passionfruit due to the risks involved and in recent seasons, reduced returns from the markets and processors'^{2/} He does, however, expect the acreage under passionfruit to react fairly sensitively to price fluctuations caused by changing market supply and demand conditions.

5.2 Imports

Because of the small quantities of passionfruit, pawpaws and limes imported, Government statistics do not itemise these fruits separately.

Imports of fresh passionfruit are shown with imports of medlars, a rather obscure fruit that the Oxford dictionary describes as "like a small brown apple, eaten when decayed". Because medlars are not well known in New Zealand it can be assumed that only a very small proportion, if any, of the figures below include this fruit.

Imports of Fresh Passionfruit and Medlars (lb)

Year ended 30. June	1966/69	1967/68	1968/69	1969/70	1970/71	1971/72
Fiji	26,470	210,279	71,114	43,714	26,179	-
Western Samoa	1,316	2,280	-	20	-	1,168
Tonga	-	14,921	250	1,976	30	-
Norfolk Island	1,863	-	-	-	-	-
TOTAL (lb)	29,649	227,480	71,364	45,710	26,209	1,168
TOTAL (Tons)	13.2	101.6	31.9	20.4	11.7	.5

Source: New Zealand Imports; Department of Statistics

In addition, small shipments of fresh passionfruit, packed in 6lb trays, have been shipped to New Zealand from Niue. These figures have not appeared in the official statistics.

It is not known to what extent fresh imported passionfruit is used by processors but

^{1/} Mr P.A. Sale, Horticultural Advisory Officer, Department of Agriculture, Tauranga.

^{2/} See also pages 7 and 11.

of those manufacturers who returned our questionnaire all those importing passionfruit did so in processed form. This would suggest that most of the above imports were eventually sold for use as fresh fruit. It should, of course, be noted that this fruit is the tropical or yellow variety and not the purple variety as grown in New Zealand.

Processed passionfruit is imported from a number of countries including the Cook Islands, Fiji, Niue, the U.S.A. Unfortunately the total amount of processed passionfruit imported into New Zealand cannot be determined from Government statistics.

The quantities received from Niue, since imports from this source commenced in 1968, are shown below. All of this was in the form of passionfruit pulp.

	1966	1967	1968	1969	1970	1971	1972
Passionfruit (lbs)	-	-	293	27,228	107,408	154,703	108,008

Source: 'Reports on Niue and the Tokelau Islands', Maori and Island Affairs Department, March 1973

The decline of imports from Niue observed in 1972 is expected to be very temporary. Niue authorities report buoyant demand for passionfruit pulp in New Zealand and a programme of increased passionfruit planting on the island.

The results of the industry survey (see Appendix 2) indicate that Niue is an important source of passionfruit supply for major New Zealand manufacturers. Of the ten food processing firms using imported passionfruit, six obtained at least part of their supplies from Niue. Of the six companies using more than 10,000 lbs of passionfruit pulp per year three imported some, or all of their supplies from Niue.

It should be noted that there was some disagreement between manufacturers as to the relative value of the tropical (yellow) New Zealand (purple) passionfruit for processing. Two of the survey respondents claimed the tropical product was an unacceptable substitute for the New Zealand variety.

Niue, with its unrestricted access to the New Zealand market, does allow processors in this country the importation of cheap pulp. Before Niue pulp became available on the New Zealand market, some New Zealand pulp was fetching up to 80c per lb. Niue has held its own price at 39c per lb (ex freezer Auckland). This factor has tended to depress the price of passionfruit offered by processors to domestic growers. It can be considered another deterrent to the expansion of passionfruit production in New Zealand.

The survey revealed that New Zealand manufacturers received their imported passionfruit in either pulp or juice form, pulp clearly accounting for most of the imported product.

Turning briefly to the world scene, trade in processed passionfruit products is poorly documented. Of the wide range of passionfruit products (viz. juices, nectars, jams, squash, puop, concentrates, fruit in syrup) only juice is of any significance in international trade. Of the estimated total juice production, nearly 50% is exported (viz. 1500 tons).

The main market for passionfruit juice is Western Europe. Imports into the major consuming countries in 1971 were estimated as follows:

Imports of Passionfruit Juice in SelectedWestern European Countries

1971.

<u>Country</u>	<u>Volume (tons)</u>
Federal Republic of Germany	500
Netherlands	300
Scandinavia	100
Switzerland	100
TOTAL	1,000

Source: 'Processed Tropical Fruit' F.A.O. 1972

5.3 Exports

Exports of New Zealand passionfruit have been negligible to date. Small amounts of pulp have been exported. Fruit salad, cake mixes and ice cream containing passionfruit are also exported. However, the quantity of passionfruit in these products is very small. Again exact figures cannot be determined from official statistics.

To date only small export consignments of fresh passionfruit have been made.

Exports of Fresh Passionfruit (lbs)

Year ended 30th June	1969/70	1970/71	1971/72
Belgium and Luxembourg	-	224	-
U.K.	107	-	7
Norfolk Island	-	-	80
British Solomon Is.	70	-	-
Papua/New Guinea	34	-	-
Gilbert Islands	-	18	10
TOTAL lbs	211	242	109

Source: N.Z. Exports; Department of Statistics

Fresh passionfruit does not travel very well and develops a rather unsightly appearance if not eaten soon after they are picked. They will probably have to be airfreighted to distant overseas markets. This suggests that exports of passionfruit in any quantity will need to be in the form of processed products.

Australia constitutes an important market for passionfruit. The bulk of its crop is processed into juice and consumed locally as carbonated beverages, mixed fruit drinks, ice cream, confectionery flavourings. A small quantity is also used in fruit salad. In fact Australia comprises the largest single market for passionfruit juice in the world,

accounting for more than one third of world consumption. Local juice production has to be supplemented by small imports which currently come from New Guinea and, to a lesser extent, Fiji. The growth potential of this juice market, for use particularly in soft drink lines, is felt to be still considerable.

New Zealand processed passionfruit would have no access difficulties in entering the Australian market as under the NAFTA free trade agreement, New Zealand passionfruit pulp would invoke a duty of only 4c per litre. Countries not covered by a special agreement with Australia are faced with a duty rate of 18c per litre.

There may also be export opportunities for passionfruit sales in the growing Western European markets. It is felt^{1/} that the product would have to be in the form of concentrate to reduce transport cost. Further details about market prospects for selected exotic fruit products, including passionfruit and pawpaw, in certain Western European countries are contained in a recent UNCTAD/GATT publication.^{2/}

As a basic requisite to any export development considerable product and market research needs to be undertaken to develop products suitable for particular export markets. To effectively achieve this, there would have to be significantly closer intra-industry liaison than exists at present.

It should be noted that in developing overseas markets for passionfruit, New Zealand will face stiff competition from the major producing countries. They have the advantage not only of better growing conditions but are also invariably closer to the world's markets. Moreover, production quantities in New Zealand would have to rise greatly to justify the considerable expense, particularly in promotion and distribution, required to develop and maintain a sizeable export market. These considerations imply that New Zealand growers and processors, at least initially, would be best advised to thoroughly examine the full potential of the domestic market before seriously studying exports prospects.

5.4 Consumption and Utilisation

(a) Consumption Trends

At present a large proportion of the New Zealand crop is sold for consumption as fresh fruit. That proportion of the crop directed towards processing is grown under contract for the processors or, in one case, by the processor himself. It should be noted that the volume utilised by processors has grown each season except in 1969-70 and 1971-72 and the industry survey results indicate that this trend is likely to continue.

Year ended 30th Nov.	1955/66		1966/67		1967/68		1968/69		1969/70		1970.71		1971/72	
	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%
Fresh	69	82	44	68	103	64	134	60	233	78	223	70	150	62
Processing	15	18	21	32	58	36	88	40	65	22	95	30	92	48
TOTAL	84	100	65	100	161	100	222	100	298	100	318	100	242	100

Source: N.Z. Horticulture Statistics

^{1/} Personal correspondence with Mr G. Strachan, D.S.I.R., Auckland

^{2/} 'The Markets for Selected Exotic Fruit Products', International Trade Centre, UNCTAD/GATT: Geneva 1971

Almost all the fresh passionfruit consumed in New Zealand is grown in New Zealand. (Only and estimated 5% of passionfruit consumed in 1970-71 was imported.) It was noted previously that passionfruit does not travel well and is consequently a high risk import product. Although precise information is not available on the importation of processed passionfruit products into New Zealand it would seem that domestic producers (on 1972 figures) provide about 50% of manufacturers' requirements (assuming a conversion of fruit to pulp of 40%). Most of the remainder is supplied from Niue.

Consumption of fresh passionfruit is low compared with other subtropical fruits as can be seen in the following table

Approximate N.Z. per capita consumption of Fresh Subtropical Fruit

	<u>1971/72</u> (lbs)
Passionfruit	0.2
Chinese Gooseberries	1.4
Tamarillos	1.7

It is interesting to note that even in Australia, a major passionfruit producer, consumption of fresh passionfruit is extremely low, (estimated at 0.6lb per head in 1970/71). The bulk of the passionfruit crop is directed to processing.

The results of the industry survey and the general trend towards passionfruit grown under contract to manufacturers suggest that demand for passionfruit for processing is likely to continue moving upwards. Eleven of the twenty one processors using passionfruit indicated that their demand for passionfruit was likely to increase. Of those processors using more than 10,000 lb per annum five felt that their demand would rise whilst one said that there would be no change in his passionfruit requirements. One leading manufacturer, in order to ensure a regular supply of passionfruit have planted their own orchard in Poverty Bay. Of those companies not using passionfruit at present four recorded that they had plans to manufacture products containing passionfruit within the next 12-24 months.

1/

(b) Prices

A number of factors make processed passionfruit prices unattractive when compared to those of processed products from such fruits as orange, lemon, grapefruit and apple. This price disparity stems from the following:

1. Both the fresh and processing industries are not developed to the same extent with the result that on-orchard and in-factory costs tend to be higher.
2. Juice yields from fresh fruit are lower than from the other, better known fruits,

1/ For results of industry survey see Appendix 2

resulting in higher costs per gallon.

However, passionfruit does have some advantages over rival fruits. Its flavour is unique and it is a natural concentrate. In most applications a concentration of 9 to 10 percent is used, which is considerably less than citrus fruit for example, which must be concentrated before being used as a flavouring. This means that less passionfruit is needed than other fruits to obtain an acceptable flavour. It is also extremely versatile and is capable of being blended with a wider range of other beverages and is an excellent base for cocktails.^{1/}

Most of the fresh fruit sold to processors realises an average price of about 10c/lb. Fruit sold at auction for fresh consumption tends to receive a higher price but prices vary widely according to market conditions (retail prices of 5c - 7c per fruit were being paid in April 1974 in Auckland). Passionfruit pulp imported from Niue has been selling at 39c/lb (1974).

(c) Distribution

Individual growers deal directly with processors or fruit merchants for the sale of their passionfruit. The fruit merchant holds fresh fruit on behalf of the grower and sells it at auction to the retailer, charging the grower a percentage of the price realised for the fruit. In the case of imported fresh passionfruit the fruit is imported by an island shipper and sold through the auction system in the same way as locally grown fruit.

(d) Promotion

Fresh passionfruit has received little or no promotion or publicity to date. It has tended to be rather overshadowed by the attention given to the other major subtropical fruits, tamarillos and chinese gooseberries. However, products containing passionfruit (e.g. ice cream, baby food, fruit salad, yoghurt) are fairly widely advertised although the emphasis is centred on the product itself rather than the passionfruit content.

(e) Available Processed Products

The following is a list of some retail products containing passionfruit that are available in New Zealand. Brand names and recommended retail prices of some of these products are shown in Appendix 4

Baby food fruit gel
Sandwich spread
Fruit salad
Passionfruit pulp
Juice
Essence
Cordials
Ice cream topping
Cake mix
Desserts
Yoghurt

^{1/} D.E. Whittaker, 'Passionfruit Agronomy, Processing and Marketing', Tropical Science, Vol. 14, No.1, 1972

Ice cream
Confectionary

The industry survey indicated that the major retail uses of passionfruit were passionfruit pulp, baby food fruit gel, fruit salad and as a flavouring in yoghurt and ice cream. Little use was made of the fruit for juicing. This contrasts with the products use in the world market, where juice was the dominant outlet for passionfruit.

Two major product areas that did not include passionfruit among their range of flavours were the jam and carbonated beverage markets.

A number of manufacturers, when answering the questionnaire, made the comment that the comparatively high price of passionfruit, in pulp or juice form was a deterrent to more extensive usage of the fruit.

6. Pawpaw and Limes

6.1 Production

There is no commercial production of pawpaw or limes in New Zealand. An experimental plot of Tahitian limes has been established in the Bay of Plenty to examine the fruits commercial potential. None of the trees are producing yet.

For climatic reasons it is not possible to grow tropical pawpaw commercially in New Zealand. However, some interest is being shown in the possibilities of canning domestic grown mountain pawpaw by a New Zealand firm.

6.2 Imports

(a) Pawpaw

Small quantities of fresh pawpaw are imported from Western Samoa and other Island groups. Fresh pawpaw from the Pacific Islands is usually air freighted to New Zealand. No information is available as to exact quantities of this imported fresh fruit.

Imported canned papaya (pawpaw) pieces and papaya juice have been available on the New Zealand retail market from time to time, but without conspicuous success. Low product quality has been the main reason attributed to their failure. It need not be stressed that excellent product quality is vital if a product as strange to the palate of New Zealanders as pawpaw is to stand any chance of market penetration.

In 1970/71 83,558lbs of canned pawpaw was imported from Western Samoa and Malaysia. A further 10,575lb of canned pawpaw was imported from Western Samoa and 360lb was imported from South Africa in the 1971/72 trade year.

Pawpaw is used extensively round the world as a base ingredient for fruit salad. It is essentially a cheap bland filler that picks up the other flavours of the fruit salad in the syrup. As such it is not recognisable as pawpaw in the final product. Most countries have regulations governing the maximum pawpaw content of fruit salad.

A tropical fruit salad containing pawpaw, is imported from the Cook Islands and available throughout New Zealand.

(b) Limes

The New Zealand demand for this fruit is small and imports have been restricted to purchases of fruit available from Niue. However, the supply over the years has been most inconsistent.

Imports of Fresh Limes From Niue

Year ending 31st March	1966	46,035 lb
	1967	26,895 lb
	1968	25,971 lb
	1969	6,661 lb
	1970	24,288 lb
	1971	17,853 lb
	1972	15,378 lb

Source: Fruit Distributors Ltd

Fruit Distributors Ltd have an agreement with the New Zealand Government whereby they are the sole importers of fresh citrus fruit into the country. Fruit Distributors deal directly with the administration of Niue, accepting all the limes that the island has to offer.

All lime juices, lime oil, and spray dried lime must be imported but unfortunately no figures are available as to the quantities entering the country.

Of the companies who returned the questionnaire (36), six were using imported processed lime products. The most common source of supply was the West Indies although two companies purchased processed lime from Niue and Western Samoa.

6.3 Marketing

The small quantities of fresh pawpaw that are imported follow similar channels of distribution to those for fresh imported passionfruit (see page 11).

As previously noted, Fruit Distributors are the sole importers of limes into New Zealand. The fruit is sold through the auction system to New Zealand retailers. The fruit merchant who auctions the fruit holds the fruit on consignment for Fruit Distributors and collects a commission based on the price realised at auction.

In a recent survey^{1/} carried out by the Market Research Centre in the Palmerston North area about 8% of the sample (239) had used fresh limes at some time but only 1% had used them in the 12 months prior to interview (year ended May 1973).

The following is a list of products that have a lime flavouring, and are on the New Zealand retail market. For brand names and recommended retail prices of lime juice cordials see Appendix 4.

^{1/} A Consumer Study of the New Zealand Market for Fresh and Processed Citrus Fruit'.
Consumer Research Report No.5. Massey University, 1974

Cordials
 Cordial extracts
 Juice (combined with apple juice)
 Jellies
 Instant puddings
 Other desserts
 Confectionary
 Frozen Confectionary
 Ice Cream
 Milk shake flavour

7. Future Market Potential

7.1 Passionfruit

Passionfruit is not currently an important fruit in New Zealand to either growers, processors or consumers. It is likely that lack of grower interest in the fruit has led to a low level of consumer product awareness and subsequent demand. Current market problems are illustrated in Figure 1.

In order to determine the potential for supplying increased quantities of fresh and processed passionfruit products to the New Zealand market, substantial product and market research should be undertaken. It is fair to ask who will carry out this essential work. Growers are traditionally an extremely fragmented group and such action demands considerable co-ordination of effort and resources. The author is not very hopeful that such a spirit of co-operation (at least, without strong Government intervention) can be easily engendered. It seems probable that fresh passionfruit will remain a very minor fruit on the New Zealand market for some time to come.

The picture appears somewhat brighter in relation to processed passionfruit. Processor companies hampered by unreliable supplies of domestic fresh fruit or unable or unwilling to pay high prices for much of the processed products available for import, have taken steps to ease these problems. In many cases domestic supplies of fresh passionfruit are being provided from either their own orchards or by contracted growers. This accounts for the rapidly increasing importance of processing in the utilization of passionfruit (see page 9). It would seem that this is a trend that can be expected to continue. It would also seem that substantially more, reasonably priced processed passionfruit may soon come available from overseas sources. For example, Niue Islanders recently undertook a considerable expansion of their passionfruit planting programme with a view to markedly increasing their pulp production.

Knowledgeable sources close to the passionfruit industry feel confident that there is good potential for processed passionfruit in New Zealand. Greatest demand is likely to be for pulp and juice products. It is worth noting that passionfruit is one of the few

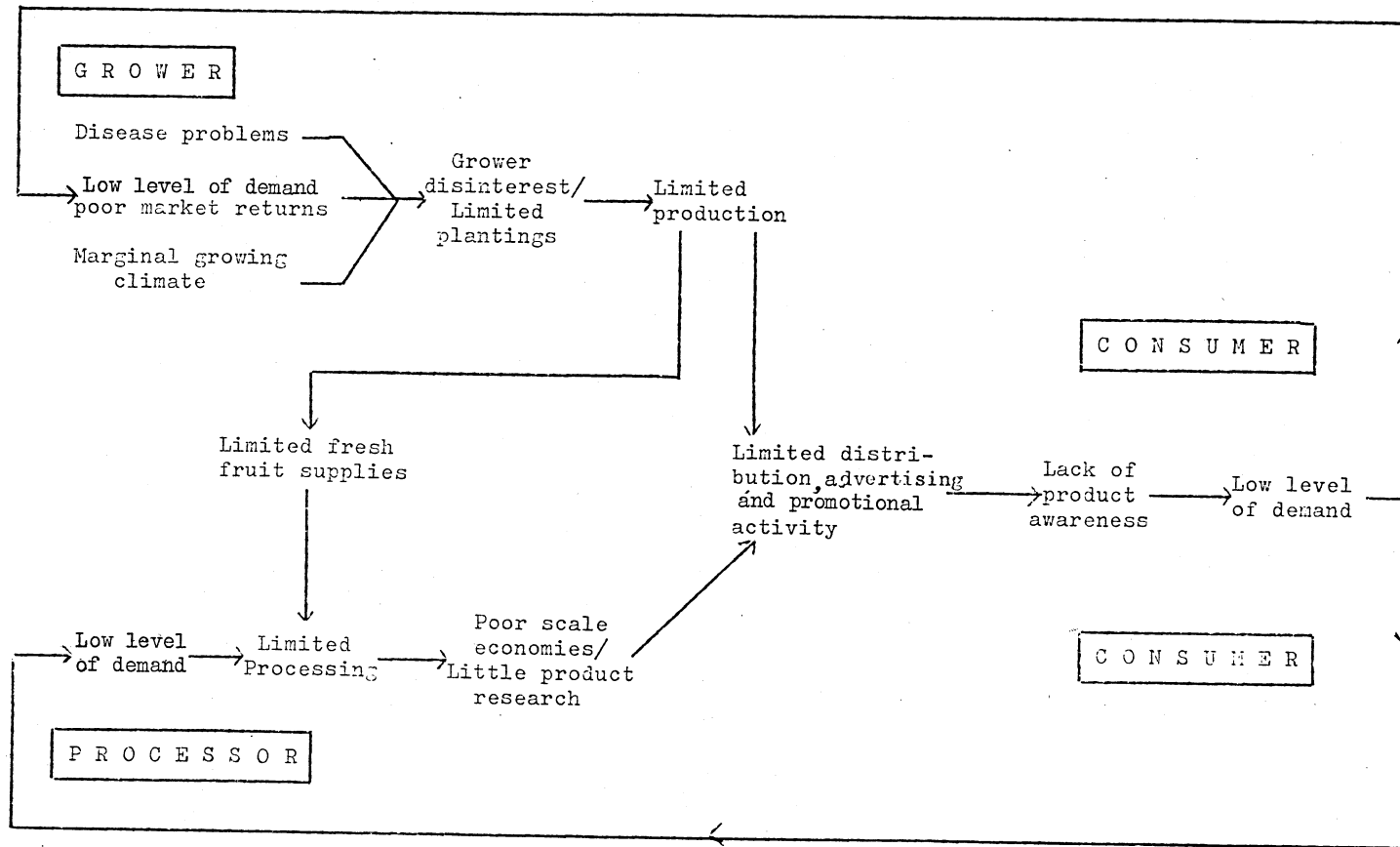


Figure 1: Current Demand/Supply Situation for Passionfruit Products.

fruits unlikely to be greatly influenced by the advent of artificial flavours. This is felt to be due, in part, to the natural viscosity of the product which would be hard to duplicate. For example, soft drink manufacturers, who rely almost exclusively on compounded flavours and flavour extracts to produce other fruit flavours, use only passionfruit juice as a flavouring in passionfruit soft drinks.

As previously noted the industry survey showed that five of the six major processors of passionfruit indicated that their demand for the fruit would increase. Product areas where passionfruit is not well established at present (jam, fruit juice, ice cream topping, tropical fruit salads etc.^{1/}) warrant product and market research attention.

The industry experts also foresaw good market potential for fresh passionfruit. Exploitation of this potential poses the problem.

7.2 Pawpaw and Lime

Pawpaw is not a well known fruit in New Zealand, except possibly amongst the various Island communities, and in the urban Auckland area where fresh pawpaw and pawpaw products are available. Until research is carried out to determine whether pawpaw is found acceptable by New Zealanders it is difficult to determine what potential there is for pawpaw products in this country. Even if consumers reacted favourably to the taste of pawpaw considerable promotional activity would be required to establish the product(s). The industry survey showed that one N.Z. company is using pawpaw; however two more companies indicated that they planned to introduce pawpaw in the future and a further two companies said they were interested in using pawpaw. No indication was given in what way pawpaw would be employed. It may prove advantageous to conduct future test marketing exercises for new pawpaw products in the Auckland area. This region provides not only the largest population concentration in New Zealand but also an above average existing awareness of pawpaw.

Lime is a well established flavour in New Zealand, being generally associated with cordial extracts, jellies, instant puddings and carbonated beverages. However, many lime products, such as cordial extracts and jellies, contain artificial colourants. Only lime juice cordial and an apple and lime fruit juice are made with 'unadulterated' limes. It should be determined whether this will act to the detriment of the introduction of further 'true' lime products.

It is very difficult to predict just what the potential for lime products is likely to be because information on past and present consumption is almost non-existent. Of the six companies who answered the questionnaire and are at present using lime in their products, three thought their demand for lime would increase and three felt their demand would remain at its current level. Of those companies who at present are not using lime two indicated that they planned to use it in the future and two said they were investigating the possibilities of introducing it. This evidence would suggest that manufacturers in general contemplate a steadily growing market for lime products in New Zealand.

The opportunities for fresh limes would appear less bright. Although experimental

^{1/} For information on production and consumption of jam, fruit juice and ice cream see Appendix 5

work is under way to establish commercial plots, the fresh lime will face formidable competition from the familiar, readily available, lower priced lemon.

8. Conclusion

In spite of shortage of factual data, this report has endeavoured to present the current situation in regard to fresh and processed passionfruit, limes and pawpaw products in New Zealand. It is felt that expansion potential exists for all fruits, especially in the form of processed products. In order to carefully examine this potential it is essential that careful product and market research is undertaken to identify market sizes and needs. This is especially true of passionfruit and pawpaw products, currently little used fruits in New Zealand. The initial product image created will do much to determine future market penetration for the fruits.

APPENDICES

1. Results of Industry Survey
2. Questionnaire and Covering Letter.
3. Processed Passionfruit Products.
4. Some Processed Fruit Products Available in Auckland and their Recommended Retail Prices.
5. Production and Consumption of Selected Fruit Products.
6. Bibliography.

SURVEY OF THE NEW ZEALAND MARKET FOR PASSIONFRUIT, PAWPAWS AND LIMES.

(a) Date Survey Conducted: October/November 1972

(b) <u>Response:</u>	<u>No.</u>	<u>%</u>
Questionnaires sent	44	100
Replies	36	82

Type of Company Returning Questionnaire:

Ice Cream Manufacturers	5 ^(a)
Milk treatment stations	9
Fruit Juice and cordial manufacturers/marketers	6
Fruit processors	9
Biscuit and confectionary manufacturers	2
Other food processors	5
TOTAL	<u>36</u>

(a) One company has four different factories and each factory returned a separate questionnaire. Only two ice cream companies are therefore represented.(c) Fruit Usage:

Number of Firms Using - Passionfruit	21
- Pawpaw	1
- Lime	6
- No Answer	1
- None	7

Number of Firms Intending to use Passionfruit in the Next 12 - 24 months:

definitely will use	22
interested/maybe will use	4

Number of Firms Intending to use Pawpaw in the Next 12 - 24 Months:

definitely will use	3
interested/maybe will use	2

Number of Firms Intending to use Lime in the Next 12 - 24 Months

definitely will use	8
interested/maybe will use	2

Responses from Companies at Present Using Passionfruit.Quantity: Of those companies at present using passionfruit only 6 companies were using more than 10,000 lb of passionfruit pulp per year,

Annual Consumption Passionfruit Pulp	No. of Cos.
0 - 1,000 lbs	5
1,001 - 5,000 lbs	6
5,001 - 10,000 lbs	2
More than 10,000 lbs	6
No Quantity given	2

Source: Ten of the twenty one companies using passionfruit, imported some or all of their supplies.

Source of Imports	No. of Cos.
Niue	6
Cook Islands	2
East Africa	1
U.S.A.	1
Fiji	1

N.B. One company imported from two different sources.

Of the six companies using more than 10,000 lb, three import some or all of their supplies from Niue, one receives supplies from the Cook Islands, one relies solely on New Zealand grown passionfruit, and one did not know where their passionfruit came from.

Only one company grows its own passionfruit and apart from this company none indicated that they would grow their own passionfruit in the future.

Future needs:

Annual Consumption	No. of Cos. indicating their demand for passionfruit would:		
	Increase	Decrease	Not change
0 - 1,000 lb	1	1	3
1,000 - 5,000 lb	3	-	3
5,000 - 10,000 lb	1	-	1
More than 10,000 lb	5	-	1
No Answer	1	-	1
TOTAL	11	1	9

N.B. Four other companies said they intended to use passionfruit in the future or at least were interested in using passionfruit in the future although they were not using it at the present time.

Other Comments:

"Generally we cannot satisfy the New Zealand market for New Zealand grown passionfruit" (a fruit processor).

"The cost of passionfruit is of concern. It is more expensive than other flavours and therefore a passionfruit product would have to be more expensive than our other products. Because of this it is particularly difficult to consider in our marketing range" (a soft drink manufacturer)

"Passionfruit is the dearest fruit to buy for our products and we will be glad when greater amounts are grown in N.Z. so as production costs and unit price can be cut down" (a yoghurt manufacturer).

Two of the processors mentioned that imported passionfruit had not proved an acceptable substitute to New Zealand passionfruit. However, these were the only complaints made with regard to the quality of the imported product.

Responses from Companies at Present Using Limes

Of the six companies who said they were using limes only two were using more than 1,000 gals. of lime juice.

Most of the processed lime was imported from the West Indies, but two companies purchased lime from Niue and Western Samoa.

Of the six companies at present using a lime ingredient in their products, 3 thought their demand for lime would increase and 3 thought their demand for lime would remain at its present level over the next 12 - 24 months.

Other Comments

"We have been unable to process the latter (limes) either by themselves or incorporated in other products due to import licences not being available. If we were able to import we would be interested in reviewing the position" (a fruit processor).

"Most N.Z. manufacturers would be unfamiliar with pawpaws and limes and due to the supply position, would not be in a position to experiment with manufacturing procedures which would enable them to develop products from these fruits which could be most acceptable to the consumer. Growers and governmental advisers should therefore either arrange for product development or liaise with manufacturers who would be prepared to offer facilities and staff for product development" (a food processing company).

"The price of the pure lime juice is an important factor and to be of any use the juice must be refined" (a cordial manufacturer).

"Would estimate most lime flavour is derived by artificial means. Education required here" (an ice cream manufacturer).

2. QUESTIONNAIRE AND COVERING LETTERS

MARKET RESEARCH CENTRE

Massey University, Palmerston North

SURVEY OF THE NEW ZEALAND MARKET FOR PASSIONFRUIT, PAWPAWS AND LIMES

NAME OF COMPANY

Should you not wish to answer any particular question, please leave and continue the questionnaire.

1) Is your company currently manufacturing products containing the following fruits?

	YES	NO	COMMENTS
Passionfruit	<input type="checkbox"/>	<input type="checkbox"/>
Pawpaw	<input type="checkbox"/>	<input type="checkbox"/>
Limes	<input type="checkbox"/>	<input type="checkbox"/>
		

2) Does your company have plans to manufacture products containing these fruits (in the next 12 - 24 months)?

	YES	NO	COMMENTS
Passionfruit	<input type="checkbox"/>	<input type="checkbox"/>
Pawpaw	<input type="checkbox"/>	<input type="checkbox"/>
Limes	<input type="checkbox"/>	<input type="checkbox"/>

3) Approximately what quantities of these fruits do you use annually (i.e. as a raw material)?

	Passionfruit	Pawpaw	Limes
Fresh	lb	lb	lb
Processed - Pulp	lb	lb	lb
Juice	gals	gals	gals
Other			

4)(a) What proportion of your requirements (processed or fresh) is imported?

	% Imported
Passionfruit	
Pawpaws	
Limes	

(b) What are your main sources of imported fruit?

	Country
Passionfruit	1. _____
	2. _____
	3. _____
Pawpaws	1. _____
	2. _____
	3. _____
Limes	1. _____
	2. _____
	3. _____

5) Do you grow any of your own requirements of these fruits?

	YES	NO
Passionfruit		
Pawpaws		
Limes		

IF YES:

(a) What proportion of your requirements is currently met by fruit grown by your company?

(b) What proportion do you anticipate this will be in five years' time?

	% Current	% 5 years
Passionfruit		
Pawpaws		
Limes		

- 6) Do you feel your demand for passionfruit, pawpaws and limes will increase; decrease; or remain about the same; over the next two to three years?

	Increase	Decrease	About thme
Passionfruit			
Pawpaws			
Limes			

- 7) We would be grateful for any further comments you have on the New Zealand market for these fruits which you feel may be of use to us in our study.

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THANK YOU FOR YOUR COOPERATION.

M A S S E Y U N I V E R S I T Y - M A R K E T R E S E A R C H C E N T R E
P A L M E R S T O N N O R T H , N E W Z E A L A N D .

October 1972.

Dear Sir,

I am undertaking a study of the market for passionfruit, pawpaws and limes in New Zealand. We have been asked to do this research by the Government of Niue, but the final report will be available to all those who are interested.

... Attached to this letter you will find a short questionnaire. I would be very grateful if you would complete this and return it to the Market Research Centre. I would like to stress that even if you have no current or anticipated use for passionfruit, pawpaws and limes, it is important that you return a completed questionnaire.

All information given will be regarded as strictly confidential and the final report will only contain information for the total food processing industry.

A copy of the final report will be forwarded in due course to your company.

I look forward to your reply.

Yours faithfully,

M.J. Clarke
JUNIOR MARKET RESEARCH OFFICER.

ENCL.

M A S S E Y U N I V E R S I T Y - M A R K E T R E S E A R C H C E N T R E
P A L M E R S T O N N O R T H , N E W Z E A L A N D .

21 November 1972.

Dear Sir,

I would be very grateful if you could complete and return, as quickly as possible, the questionnaire about your company's use of passionfruit, pawpaws and limes, which was sent to you recently.

It is hoped that the final report will be available to your company early in the New Year, but to be able to do this we must have all the questionnaires returned by the end of November so that we can analyse the results before Christmas.

If you have already returned your questionnaire, please disregard this letter and I thank you for your assistance.

Yours faithfully,

M.J. Clarke
JUNIOR MARKET RESEARCH OFFICER.

3. PROCESSED PASSIONFRUIT PRODUCTS

Some of the products that can be made by incorporating passionfruit are shown below. It should be noted that not all are available in New Zealand.

- (a) Pulp for reprocessing
 - (b) Carbonated and uncarbonated beverages
 - Nectar
 - Fruit juice beverage
 - Soft drinks
 - (c) Mixed drinks, carbonated and uncarbonated
 - Passionfruit juice mixed with other fruit juices
(orange, grapefruit, apple etc.)
 - (d) Syrups (squashes)
 - As a base for home drinks
 - As addition to sweet dishes (e.g. dessert toppings).
 - (e) Jams, Jellies
 - Passionfruit jelly
 - Mixed fruit jams and jellies
 - Aroma amplifications of other fruit jams by addition of
passionfruit juice.
 - (f) Fillings for sweets, chocolates, confectionery
 - Passionfruit fillings for chocolates
 - Passionfruit jelly with liqueur filling
 - Cakes and confectionery.
 - (g) Milk products
 - Passionfruit yoghurt
 - Passionfruit yoghurt mixed with other fruit
 - Milk mixes.
 - (h) Ice Creams
 - Ice cream
 - Soft ice
 - Sherbert.
 - (i) Canned foods
 - Fruit salads with passionfruit juice.
 - (j) Pulp for retail outlets
 - Baby food
 - Flavouring
-

4. SOME PROCESSED FRUIT PRODUCTS AVAILABLE
IN PALMERSTON NORTH AND THEIR RECOMMENDED
RETAIL PRICES (APRIL 1974)

FRUIT JUICES

	<u>Brand</u>	<u>Size</u>	<u>Price</u>	<u>Price/oz</u>
Grapefruit	Citralis	16 oz	28c	1.75c
	Goldfrute (Unsw't)	12½oz	24c	1.92c
	St George (Unsw't)	13 oz	31c	2.39c
	Suka	15 oz	26c	1.73c
	Watties	15 oz	33c	2.20c
Orange	Citralis	16 oz	28c	1.75c
	Goldfrute	12½oz	24c	1.92c
	Raro	12½oz	30c	2.40c
	Suka	15 oz	26c	1.73c
Apple	Fresh Up (Apple)	12 oz	26c	2.17c
	Fresh Up (Apple/Orange)	12 oz	26c	2.17
	Fresh Up (Apple/Lime)	20 oz	28c	1.40c
Tomato	Watties	15½oz	28c	1.81c
Pineapple	Raro	12½oz	26c	2.08c
Passionfruit	Citralis	16 oz	30c	1.88c
	Goldfrute	12½oz	24c	1.92c
Grape	Glenvale (still)	Quart	68c	3.40c

FRUIT PIECES

	<u>Brand</u>	<u>Size</u>	<u>Price</u>	<u>Price/oz</u>
Apricots	'K'	16 oz	35c	2.19c
Fruit Salad	Watties	15½oz	35c	2.26c
	Raro (Tropical)	16 oz	33c	2.06c
Pineapple	Aust. Pieces	16 oz	30c	1.88c
	Aust. Slices	16 oz	31c	1.94c
	Malayan Pieces	16 oz	30c	1.88c

FRUIT PIECES Cont'd.

	<u>Brand</u>	<u>Size</u>	<u>Price</u>	<u>Price/oz</u>
Pineapple	Malayan Slices	16 oz	32c	2.00c
	Malayan Crushed	16 oz	26c	1.63c
	Raro Pieces	16 oz	33c	2.06c
	Raro Slices	16 oz	33c	2.06c
	Raro Crushed	16 oz	33c	2.06c
Peaches	Watties	15½oz	31c	2.00c
Pears	Watties	15½oz	31c	2.00c

PASSIONFRUIT PULP

	<u>Brand</u>	<u>Size</u>	<u>Price</u>	<u>Price/oz</u>
	Sunripe	150ml	49c	9.28c
	Watties	3¾oz	25c	6.67c
	Watties Fruit Gel (baby food)	5oz	15c	3.00c

LIME CORDIALS

<u>Brand</u>	<u>Description</u>	<u>Size</u>	<u>Price</u>	<u>Price/oz</u>
Robinsons	Lime and Barley	26 oz	59c	2.27c
Roses	Lime Juice	26 oz	67c	2.56c
Schweppes	Lime Flavour	26 oz	52c	2.00c
Sykes	Lime	26 oz	55c	2.12c
	Ships Lime	26 oz	57c	2.19c
Tiptop	Lime	26 oz	40c	1.54c

5. PRODUCTION AND CONSUMPTION OF SELECTED FRUIT PRODUCTSProduction and Consumption of Fruit and Vegetable Juice in New Zealand

	GALLONS					
	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71
Production	701,000	728,000	654,000	399,000	703,000	928,982
Exports	8,413	16,129	15,322	65,523	163,122	156,642
	<u>692,587</u>	<u>712,871</u>	<u>638,678</u>	<u>333,477</u>	<u>539,878</u>	<u>772,340</u>
Imports-Cook Is.	627,514	731,315	861,382	935,002	792,042	848,143
Other	136,722	109,250	58,508	76,477	71,368	99,621
Available for local consumption	<u>1,456,823</u>	<u>1,553,436</u>	<u>1,558,568</u>	<u>1,344,156</u>	<u>1,404,288</u>	<u>1,720,104</u>
% changed on previous year		+7%	N/C	14%	+4%	+23%
Est. per capita consumption	4.4 pts	4.6 pts	4.5 pts	3.9 pts	4.0 pts	4.8 pts

Source: New Zealand Year Book, Dept. of Statistics, Import Export Statistics, Monthly Abstract of Statistics.

The main reasons for the fluctuations in per capita consumption have been due to local processors not being able to supply enough product to meet demand, through crop failures and shortages.

By international comparison New Zealand has a very low per capita consumption. The following shows consumption of fruit juices only.

U.S.A.	(1970)	17.8 pts
Canada	(1970)	17.0 pts
Australia	(1970)	12.1 pts
France	(1970)	4.8 pts
U.K.	(1970)	3.3 pts

Source: Commonwealth Secretariat

The New Zealand fruit juice market can be divided up into four main product groups.

Citrus
Apple
Tomato
Pineapple

Unfortunately no complete figures are available to indicate the size of these groups, although undoubtedly the citrus segment would be the largest.

Production and Consumption of Jams, Jellies and Conserve in New Zealand

	TONS					
	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71
Production	4,521	4,786	4,014	4,106	4,769	4,401
Exports	3	4	22	757	1,149	1,083
	<u>4,518</u>	<u>4,790</u>	<u>3,992</u>	<u>3,349</u>	<u>3,620</u>	<u>3,318</u>
Imports	48	51	49	45	53	57
Available for local consumption	<u>4,566</u>	<u>4,739</u>	<u>4,041</u>	<u>3,394</u>	<u>3,673</u>	<u>3,375</u>
Est. per capita consumption	3.81b	3.91b	3.31b	2.71b	2.91b	2.61b

Source: New Zealand Year Book; Dept. of Statistics; Import and Export Statistics; Monthly Abstract of Statistics.

The jam market can be divided into two product groups—jam and marmalade—and each of these groups can be divided into ready to eat and mixes (a jam or marmalade concentrate which allow the consumer to make up their own spread).

Production and Consumption of Ice Cream in New Zealand

	(000 Gallons)				
	1966/67	1967/68	1968/69	1969/70	1970/71
Production - Bulk	2,809	3,079	3,011	5,574	3,176
- other	4,406	5,198	5,550	5,893	6,230
TOTAL	<u>7,215</u>	<u>8,277</u>	<u>8,561</u>	<u>11,467</u>	<u>9,406</u>
Exports	-	-	-	2,243	539
Available for local consumption	<u>7,215</u>	<u>8,277</u>	<u>8,561</u>	<u>9,224</u>	<u>8,867</u>
Per capita consumption	21 pts	24 pts	25 pts	33 pts	25 pts

Source: New Zealand Year Book; Monthly Abstract of Statistics

Government statistics make no reference to imports of ice cream over this period. Exports refer only to what the Department of Statistics regards as mixed ice cream and does not include ice cream powders.

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Personal communication with:

- W.A. Fletcher, Horticultural Advisory Officer (Citriculture),
Department of Agriculture, Auckland.
- G. Strachan, Food Technology Department, Plant Diseases Division,
D.S.I.R., Auckland.
- K.C. Richardson, Food Technology Liaison Officer, Division of Food
Research, C.S.I.R.O., Sydney.
- C.R. Walker, Managing Director, Fruit Distributors Ltd.
- J.P. Turner, Managing Director, Turners and Growers Ltd.
- R. Bailey, Department of Trade and Industry, Wellington.
- Miss G.V. Halliday, Department of Statistics, Wellington.
- P.R. Sale, Horticultural Advisory Officer, Department of
Agriculture, Tauranga.
- R. Hubbard, Food Technologist, Government of Niue.
-