



## POSSIBILITIES IN PROCESSED PEAS AND BEANS

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The recent drop in prices received for wool and meat has resulted in greater interest in diversification of our farming in New Zealand. One suggestion is to expand cropping in New Zealand and, in particular, to introduce new crops. If an increase in cropping is to occur then from a national point of view it should be in those crops which have an export potential. Unfortunately many of our major crops—wheat, barley and oats for example, are grown for local consumption and have little or no export future. However, processed vegetables are one group of crops which are likely to have a considerable future. New Zealand has a combination of climate and soil which is ideally suited to the efficient production of a wide range of vegetable crops. By far the most important crop in the processed vegetable industry at present is green peas, with green beans increasing rapidly.

### Production and Consumption

There has been a spectacular increase in the pea and bean industry in recent years, particularly in frozen products. In the early 1950's only a token amount of frozen vegetables was produced, but to-day it is the major part of the processing industry. Table I lists the present areas and production of green peas in New Zealand:

TABLE I

### PEAS FOR PROCESSING

Area (average 1962-66), 11,600 acres  
Main Districts, 1965-66:

Hawke's Bay	.....	59.5%
Canterbury	.....	15.1
Nelson	.....	8.2
Marlborough	.....	7.3
East Coast	.....	7.0
Wellington	.....	2.7

Production (average 1962-66)

(canned and frozen), 16,300 tons		
Canned	.....	30%
Frozen	.....	70%

In the period 1962-66 the area of peas has remained fairly constant at between eleven and twelve thousand acres. Hawke's Bay is the main producer although the acreage in Canterbury is increasing. The majority of the peas are frozen although dried green pea production is increasing. Canned pea production is tending to decline. Green bean production has increased rapidly from just over 3,000 tons in 1962 to nearly 6,000 tons in 1967. Export markets in Australia, England and South-east Asia have been developed over the last decade but over 75% of our pea and bean production is still used locally.

Frozen vegetables have been accepted rapidly by the New Zealand consumer. The consumption during the 1962-1965 period averaged nearly 11 pounds per head annually, with frozen peas and beans predominating. In fact, New Zealand is almost certainly the world's leading consumer of frozen peas and beans per person and probably also of total frozen vegetables per person. Table II lists the consumption of frozen peas and beans in New Zealand, Australia, United States and Great Britain.

**TABLE II**

**ANNUAL CONSUMPTION OF FROZEN PEAS AND BEANS (pounds/person)**

	Peas	Beans
New Zealand (average 1962-66)	7.9	1.3
Australia (1965)	5.0	0.8
United States (1965)	1.9	0.8
Great Britain (1964)	2.4	0.6

Annual consumption of frozen peas in New Zealand, although much higher than the other countries listed, seems to have levelled off at about 8lb. per person, although frozen bean consumption is still tending to rise.

Processed peas have become a popular crop with farmers and contracts are eagerly sought. The monetary return is high and can be

added to by sale of pea hay. Peas do not impoverish the soil and improve soil structure. They are in the ground for only 3½-4 months and are harvested in early summer, thus giving the farmer an excellent opportunity to grow an autumn crop, establish new grass or cultivate for twitch control in the dry summer weather. For example, the inclusion of freezing peas in the cropping rotation on the Lincoln College mixed cropping farm has enabled the growing of two cash crops and a forage crop in 18 months. Freezing peas are sown in September and harvested in early January. This is followed by greenfeed or soft turnips sown in late January and utilised in April, May and early June. Wheat is sown in June and harvested in the following summer.

**Potential in Canterbury**

The area of processed peas and beans will need to be expanded if export markets are developed. Additional areas suited to processed legume crops are limited in Hawke's Bay, Gisborne, Blenheim and Nelson. Potential exists in the Auckland province, particularly for green bean production, but Canterbury undoubtedly has the greatest potential for expansion of pea growing. The climate is favourable and there is a large area of suitable soils. (See Table III.)

**TABLE III**

**CANTERBURY SOILS SUITED TO PROCESSED PEA GROWING**

	Acres
1. Variable moisture, droughty in some seasons:	
Templeton	151,000
Waimakariri	111,000
Barrhill	24,000
Highbank, Lyndhurst	48,000
	<hr/> 334,000
2. Moist soils, well drained:	
Wakanui	92,000
Mayfield	72,000
Kowai	21,000
Kaiapoi	28,000
Willowbridge	16,000
	<hr/> 229,000
3. Moist soils, gleyed, relatively poorly drained:	
Temuka	96,000
Tai Tapu	38,000
	<hr/> 134,000
4. Rolling downlands:	
Timaru	74,000
Claremont	117,000
	<hr/> 191,000
<b>Total:</b>	<hr/> <hr/> <b>888,000 acres</b>

The Wakanui-Mayfield group of soils is the most suited to processed pea growing. They are deep, fertile, well drained and with a fairly reliable moisture supply during the growing season. The Templeton Waimakariri group show greater moisture fluctuations and yields of peas may be low in dry seasons. Irrigation is likely to be extremely valuable on these soils. Temuka and Tai Tapu soils, although very fertile and well supplied with moisture, are heavy and relatively poorly drained. Consequently peas cannot be sown early in the spring and yields may be reduced by excessively wet conditions if heavy rains fall during the growing season. Peas may also be grown successfully on Timaru and Claremont soils of the rolling downlands where topography permits. If irrigation were available pea growing could be extended to the lighter Eyre-Paparua, Chertsey and Hatfield soils.

In 1967, the area of processed peas in Canterbury was just over 3,000 acres. If peas were included in cropping rotations only once in eight years sufficient suitable soils are available to grow over 100,000 acres in the future.

### Export Markets

#### **Further expansion of the processed pea and bean industry in New Zealand depends primarily on the development of overseas markets.**

First, let us look at Australia. Until recently, a **tariff** of 10c a pound greatly restricted the quantity of peas and beans entering from New Zealand. Under the Free Trade Agreement, however, this tariff is being progressively reduced and will disappear completely in 1973. In addition, **devaluation** has placed New Zealand in a much more competitive position than it was previously.

Against this must be balanced the spectacular increase of the frozen vegetable industry in Australia itself. Production is geared primarily to supplying the expanding domestic market and in 1966 67,000 acres of peas and 17,000 acres of beans were grown. Imports into Australia as a percentage of apparent frozen vege-

table consumption have declined steadily from 30% in 1961 to less than 5% in 1967. The available evidence suggests that, at present, frozen vegetables are imported by Australia mainly because of seasonal drops in local production and not because of price or quality advantage of the overseas product. As the growing season for peas in New Zealand coincides with that for Australia, it is impractical for New Zealand processors to arrange for additional acreages to be grown when it becomes known that Australian production will be light and imports required.

Therefore, if New Zealand is to expand its market in Australia, it is likely to be in direct competition with the Australian product. Both **price** and **quality** advantage must therefore be obtained. Devaluation and tariff removal may assist considerably in creating a price advantage but other comparative advantages will need to be exploited. For example, the pea processing season in Australia is considerably shorter in all states except Tasmania than it is in New Zealand and yields are more variable from year to year. New Zealand processing factories should therefore have an advantage in lower overheads and more efficient planning. In addition, long distances between field and factory, coupled with high temperatures at harvesting, cause considerable problems in maintaining pea quality in Australia. This problem is much less in New Zealand.

The average Australian eats only 5lb. of frozen peas each year as compared with the average New Zealander's 8lb. This would suggest that there is still a large potential market in Australia which could be developed by well-planned advertising and selling.

**South-east Asia** is another potential market for New Zealand peas and beans. Already a small but increasing export trade is developing to Singapore and Malaya. In Japan, frozen vegetables are little used at present but a very large market may eventually develop as industry expands, the standard of living rises

and more families own refrigerators and buy their vegetables instead of growing them.

New Zealand exports frozen peas to Great Britain in some years but export possibilities seem to be less there than in Australia or South-east Asia. Supplies from New Zealand are sought only when the British crop is unsatisfactory and imports are required to meet the demand. Cost of transport to Britain is also higher than to Pacific markets.

If New Zealand is to compete effectively in overseas markets our growing, harvesting, processing and marketing techniques will need to improve and become more efficient. This means a considerable increase in research and development. **New markets will not develop without a considerable effort on our own part.** We have only five years to prepare for the tariff-free Australian market and certainly no longer for the South-east Asian markets.

The final part of this bulletin discusses some points where research and development, mainly in agronomy, may improve the efficiency of the processed pea and bean industry.

### Improvement in Efficiency

The average yield of frozen peas in the Christchurch area is about 1.6 tons per acre, although in favourable seasons (e.g. 1966-67) over two tons have been obtained. In Australia the average yield is 1.5 tons per acre, ranging from three tons in Tasmania to one ton in Victoria (1965-66). In Britain the average yield is approaching two tons per acre. The relatively low yields in Canterbury as compared with Tasmania and Britain suggest that there is considerable scope for improvement. Even with present yields, however, the gross margin received from frozen peas compared favourably with that received from wheat in the Christchurch area in the 1967-68 season. (See Table IV.)

The term "gross margin" refers to the margin which an acre of any enterprise is expected to produce in excess of the direct costs. Calculation of gross margins is therefore a convenient means of comparing the returns from alternative enterprises, e.g. frozen peas, wheat, in circumstances where indirect costs, e.g. permanent labour, depreciation, rent, etc., are similar for each enterprise.

**TABLE IV**  
GROSS MARGINS, FROZEN PEAS AND WHEAT,  
CHRISTCHURCH AREA, 1967-68

Gross Revenue:			
1.6 tons at \$56 per ton (Tenderometer reading 101-105) .....			\$89.60
30 bales pea hay at 45c per bale .....			13.50
			\$103.10
Direct Costs:			
Cultivation—5 hours at \$0.30 .....			1.50
Seed—4 bushels at \$4.00 .....			16.00
Fertiliser—1 cwt. at \$1.12 .....			1.12
Cartage—Seed and fertiliser .....			0.20
Spraying .....			3.50
Raking and Baling—			
Raking .....		\$0.10	
Twine .....		0.75	
Baling .....		0.10	0.95
			\$23.27
		Total	\$79.83
Gross Margin for Frozen Peas .....			
Gross Margin for Wheat			
(Aotea wheat ex-Peas) .....		50 bu.	\$62
		60	76
		70	90
		80	103

In Table V are listed the effects of variation in yield and price on the gross margin from frozen peas.

TABLE V

GROSS MARGINS (\$) FROZEN PEAS, CHRISTCHURCH AREA  
EFFECTS OF VARIATION IN YIELD AND PRICE

Price \$/ton	Yields—tons/acre				
	1.0	1.6†	2.0	2.5	3.0
30	16	38	54	72	89
40	26	54	74	97	119
50	36	70	94	122	149
56*	42	80	106	137	167
60	46	86	114	147	179

\* 1967-68 price.

† 1967-68 average yield.

It can be seen that if yield could be raised to 2.0 tons per acre a price of between \$40 and \$50 per ton would return farmers the same gross margin as at present. If yields were 2.5 tons per acre the same gross margin would be received at a price of between \$30 and \$40 per ton. An increase in yield, therefore, could enable New Zealand processors to create a price advantage overseas.

The main factor limiting yield of frozen peas in Canterbury is water shortage at critical periods of crop development. Work by Salter (1963) in England showed that so long as the soil is moist at drilling, dry conditions up to flowering had little or no effect on the ultimate yield of peas, although haulm growth was reduced. On the other hand, irrigation at the start of flowering increased yields by over 30% and further irrigation at pod swelling increased yields by 20%. Irrigation offers great scope in raising yields of frozen peas on most soils in Canterbury although it is also obvious that research is required on times, rates and methods of water application under our local conditions. Water is freely available and easily tapped in Canterbury and the time is long overdue for farmers to change from irrigation of pasture to the irrigation of peas, potatoes and other vegetable crops. These crops will produce a much higher return per unit of capital invested on irrigation than will fat lambs and wool.

Diseases such as **Fusarium wilt**, and the aphid-transmitted viruses, **mosaic** and **top yellows** can seriously reduce yields in peas and beans in

New Zealand. Crop Research Division at Lincoln has been actively engaged for a number of years in the production of resistant lines of the more popular pea varieties, Victory Freezer, Greenfeast and William Massey, and has already released several resistant selections for commercial use.

In Canterbury, freezing peas are normally sown in 7-inch rows at four bushels per acre. Although it is well established that 7-inch rows will give a higher yield than wider spacings, there is some evidence from overseas work that rows narrower than 7 inches may increase yields still further. It is also known that spacings closer than 2 inches down the row may reduce the yield of later maturing branching varieties, but may have little effect on, or even increase the yield of, quick maturing varieties which show little basal branching. Research on optimum spacing for peas and beans may give the farmer worthwhile yield increases for little or no extra cost. Fertiliser requirements, particularly under irrigation, and weed control, are other agronomic factors requiring further investigation.

Although processing companies in New Zealand are already very efficient there is little doubt that new technical developments could improve their efficiency still further. For example, the factory season for frozen peas in Christchurch is about 60-70 days, commencing in the first week of December. If the season could be extended by commencing operations earlier, then factory overheads could be reduced. Earlier

commencement may be possible if sowings of cold-resistant pea varieties could be made in July or even in the first week of May, when field peas are often sown. May-sown peas would be ready for processing in mid-November. A problem with early sowings is the risk of bacterial blight disease, but this should not deter research in this field.

If processed pea sales are to be expanded overseas, the peas themselves must be of high quality and of good flavour. Breeding and selection for quality in peas is already being undertaken at the Crop Research Division.

A new mechanical pea harvester is being developed in U.S.A. which removes the intact pods from the vine. In Australia, C.S.I.R.O. have developed a machine which will squeeze peas out of the pod. A combination of these two machines would result in less damage than at present and therefore a higher yield of marketable peas.

Although I have been mainly discussing peas in this bulletin, most of my remarks apply equally well to beans. Green beans have a very great potential in New Zealand, particularly in areas such as Waikato and the Bay of Plenty. Relatively cool temperatures and high wind incidence may restrict the expansion of bean growing in Canterbury although 100 acres were successfully grown in the 1967-68 season.

In conclusion, I would again point out that New Zealand has a combination of soil and climate which makes it ideally suited to the efficient production of processed peas and beans. If overseas markets are developed these crops could contribute increasingly to our exports. To do so, however, means expanded research into growing, harvesting and processing of these crops, and into their marketing overseas.

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