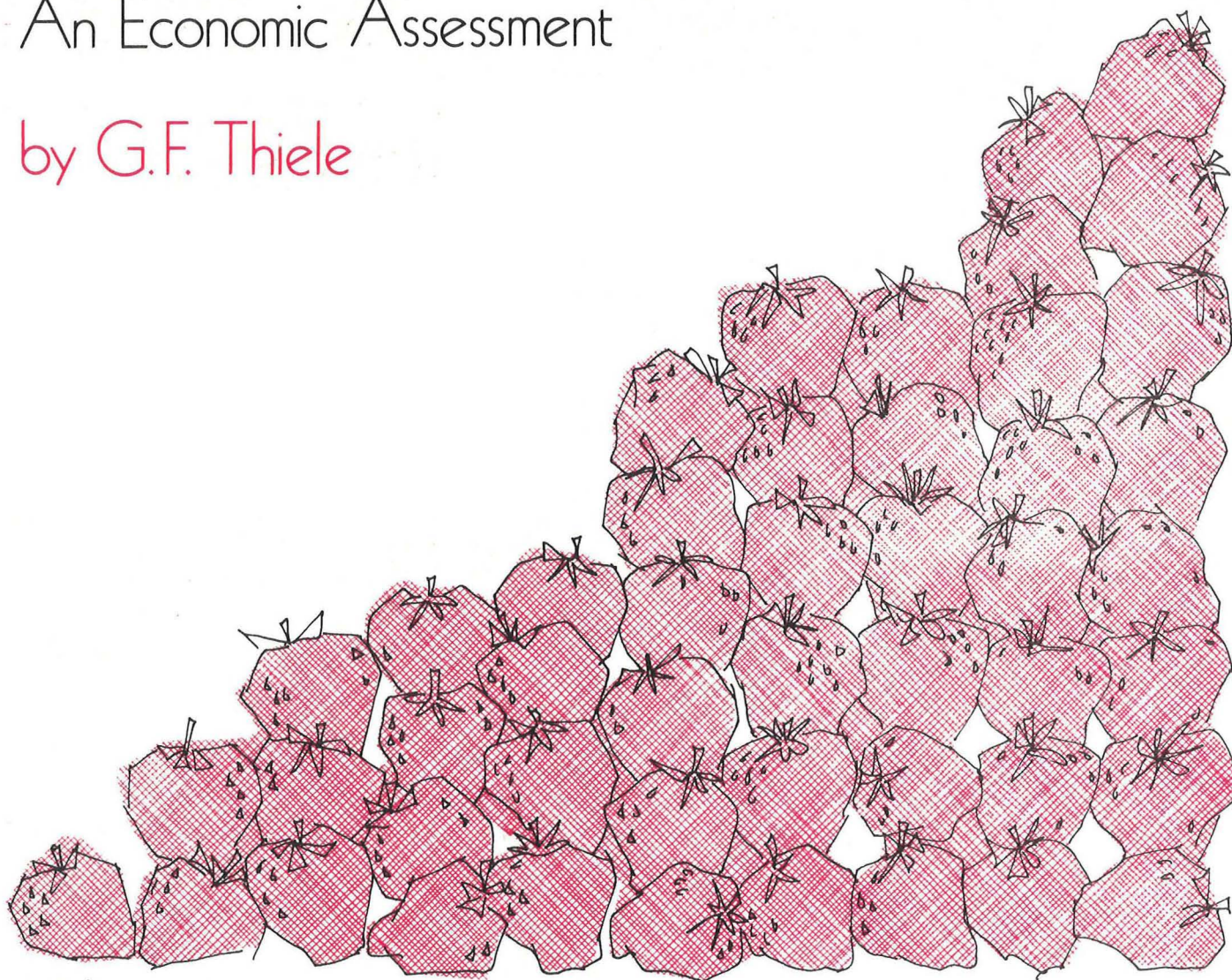

A Decade of Strawberry Production An Economic Assessment

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Production

An Economic Assessment

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Introduction

The method of growing and marketing strawberries varies throughout the world and even within countries. Traditionally New Zealand produces strawberries on a short term cropping system where the plants may be cropped for only one or two seasons, as is the case in the Auckland province, or they may be held for three or four years as is common in the South Island.

Sale is still based firmly on the local market both in fresh form and as block frozen for processing. Northern areas of New Zealand have developed a sound fresh export trade in punnets particularly to Australian markets and some strawberries are also exported fresh from the South Island later in the season. Strawberries are also exported in block frozen form and in the I.Q.F. (independently quick frozen) form.

Latest statistics available¹ are for the 1976 year. (Table 1). Figures for the 1970 year are presented for comparison. The 37.6% reduction in production in 6 years corresponds to the 38.7% reduction in area. The traditional Australian market for fresh strawberries has reduced by 79% in 6 years and represents only 40% of all fresh strawberries exported compared with 77% in 1970. Fresh fruit export to the U.S.A., U.K. and Hong Kong has increased and represents now 18, 10 and 10% respectively of fresh strawberry exports.

Unfortunately separate statistics are not available for export of frozen strawberries but it is estimated that it is approximately 150-200 tonnes per annum.

Commercial Production

In order to examine the economics of production of strawberries for export in the frozen form a 1 hectare area of Red Gauntlet was established in 1968 (Illustrations 1 and 2). It was intended to keep the area for 3 years as is traditional in the South Island but because of the health and continued productivity of the plants it was decided to hold the area for as long as it remained economical. Accordingly it was cropped for 10 years.

1. New Zealand Horticultural Statistics 1977 Economics Division Ministry of Agriculture & Fisheries, Wellington.



Illustration 1. A 1 ha block of Red Gauntlet strawberries in the 8th harvesting year till cropping economically. Hand harvesting is still the most economical inspite of range of methods tried to mechanise the operation.

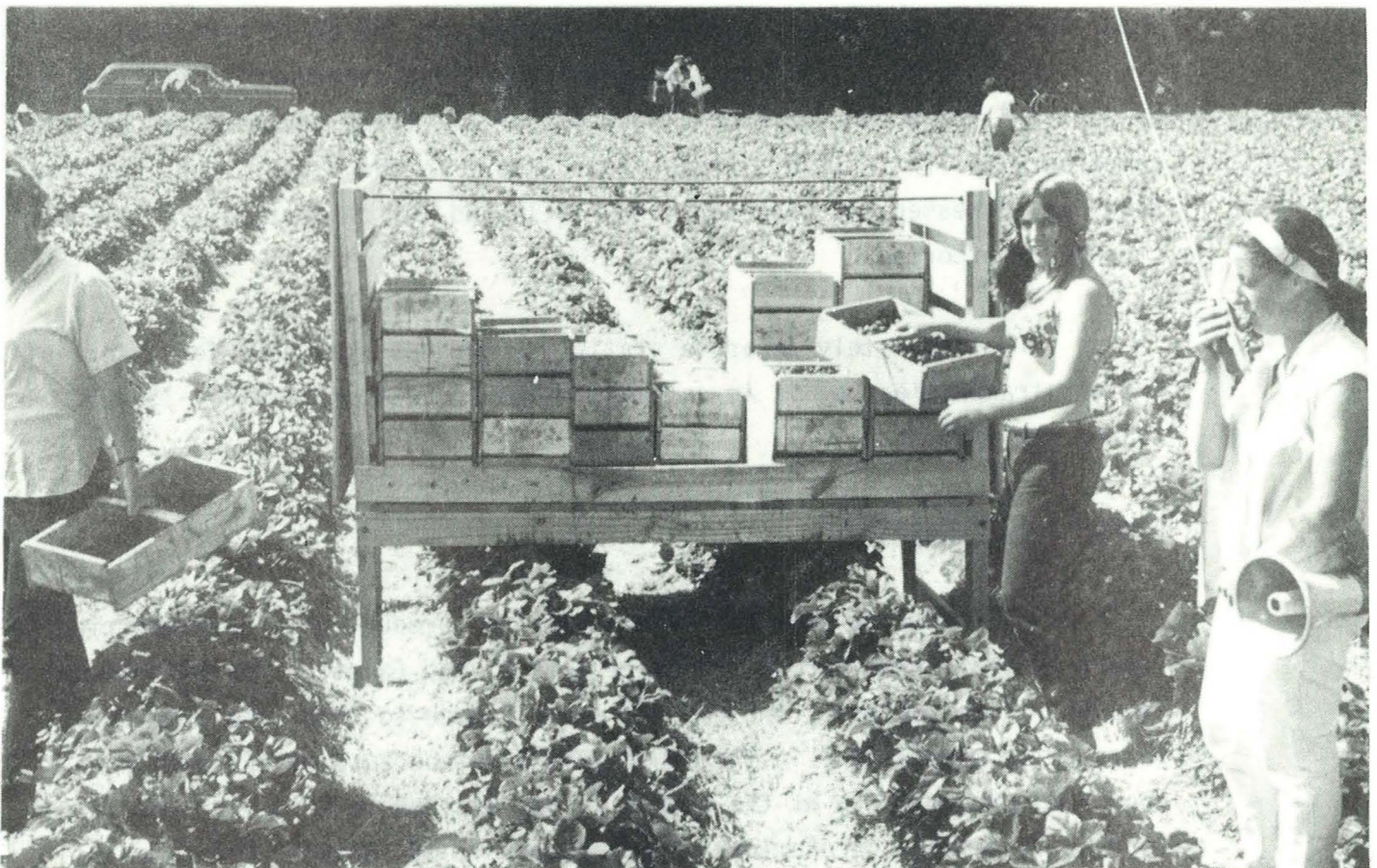


Illustration 2. Strict but helpful supervision of labour is essential to maintain quality control. Regular contact between the field and the packing shed ensures that individual pickers are kept informed of the standard of their fruit.

Table 1

NEW ZEALAND STRAWBERRY STATISTICS 1976

	1976	1970	% alteration in 6 years
Production (tonnes)			
Fresh	2552	3048	- 16.3
Processed	305	1531	- 80.0
Total	<u>2857</u>	<u>4579</u>	- 37.6
Export (tonnes)			
Fresh	155	380	- 59.2
Processed	Not Available		
Area (hectares)	152	248	- 38.7

As the pattern of production emerged a further hectare of Red Gauntlet was planted in 1973 in an attempt to repeat the results. The second hectare received identical treatment on a similar soil type but was less sheltered from the prevailing cool easterly wind. Total yields from the two blocks are given in Table 2, with figure 1 demonstrating the pattern of yield for the 10 year block. Block 1 has averaged 20.73 t/ha/annum over the 10 year period compared with the block 2 average of 14.24 t/ha/annum for 5 years. For the first five years for each block the average production was 29.60 and 14.24 t/ha/annum respectively, a reduction of 51.3% without shelter.¹

Table 2

<u>Red Gauntlet Strawberry Yields From</u>				
<u>Two 1 Hectare Commercial Blocks</u>				
	(tonnes)			
	Block 1		Block 2	
1968-69	5.08			
1969-70	33.45			
1970-71	34.67			
1971-72	47.65			
1972-73	27.14	147.99		
1973-74	<u>16.35</u>		5.62	
1974-75	13.61		29.50	
1975-76	16.24		12.80	
1976-77	3.42		13.22	
1977-78	<u>9.72</u>	59.34	<u>10.07</u>	71.21
Totals		<u>207.33</u>		<u>71.21</u>

1. It should be noted, that with seasonal variations, a comparison of yields in different years is not strictly valid.

Fig.1

STRAWBERRY YIELDS: RED GAUNTLET
10 YR LIFE OF CROP

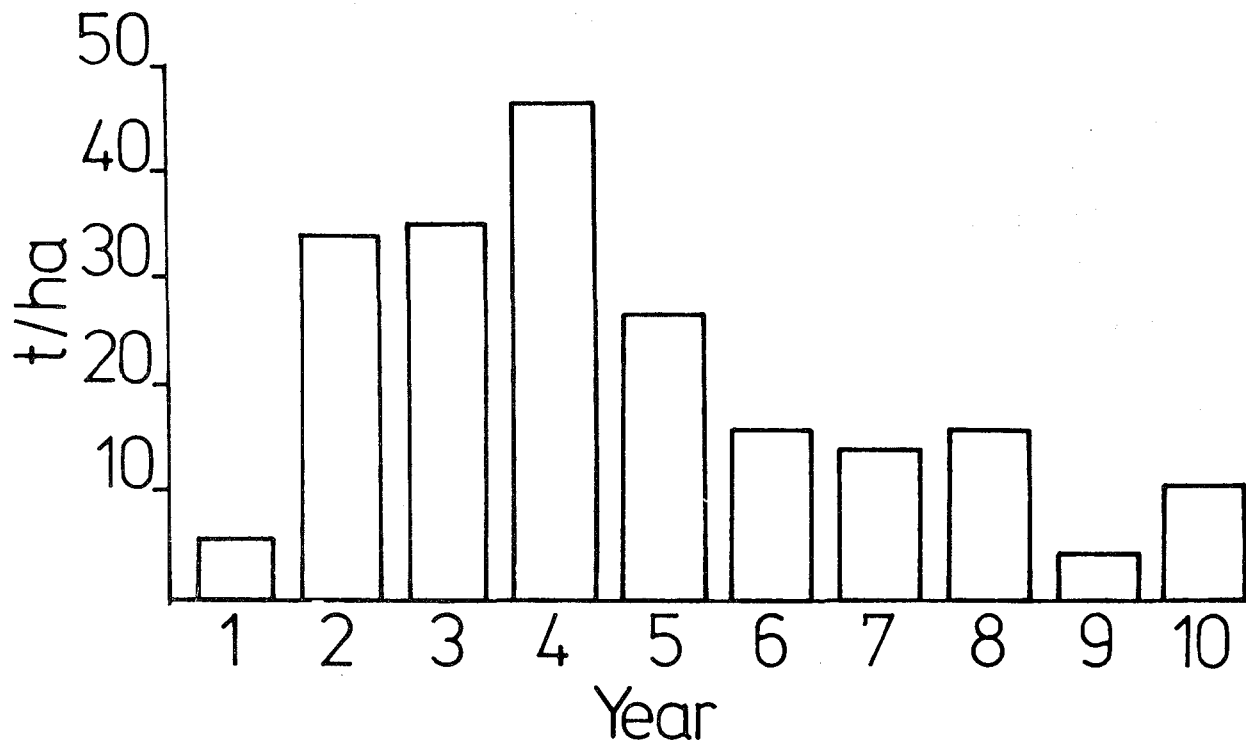


Table 3

Monthly Yields: Block 1 Strawberries: Red Gauntlet

(tonnes/hectare)

Period No.	1968/69	1969-70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78
1 (Nov)	1483	4521	2655	11900	14767	2527	70	2556		328
2 (Dec)	1821	10442	16346	12631	7035	8334	12329	8442	1547	9072
3 (Jan)	-	6946	2643	7835	40	213	218	258	1870	316
4 (Feb)	558	3460	6228	8460	1318	606	953	1827		
5 (Mar)	1010	3722	5110	5478	3180	2620	-	2287		
6 (April)	218	3147	1528	1350	799	2048	38	865		
7 (May)		1220	163							
<hr/>										
Nov-Dec	3304	14963	19001	24531	21802	10861	12399	10999	1547	9400
Jan-May	1786	18495	15672	23123	5337	5487	1209	5237	1870	316
Total	5090	33458	34673	47654	27139	16348	13608	16236	3417	9716

Fig. 2

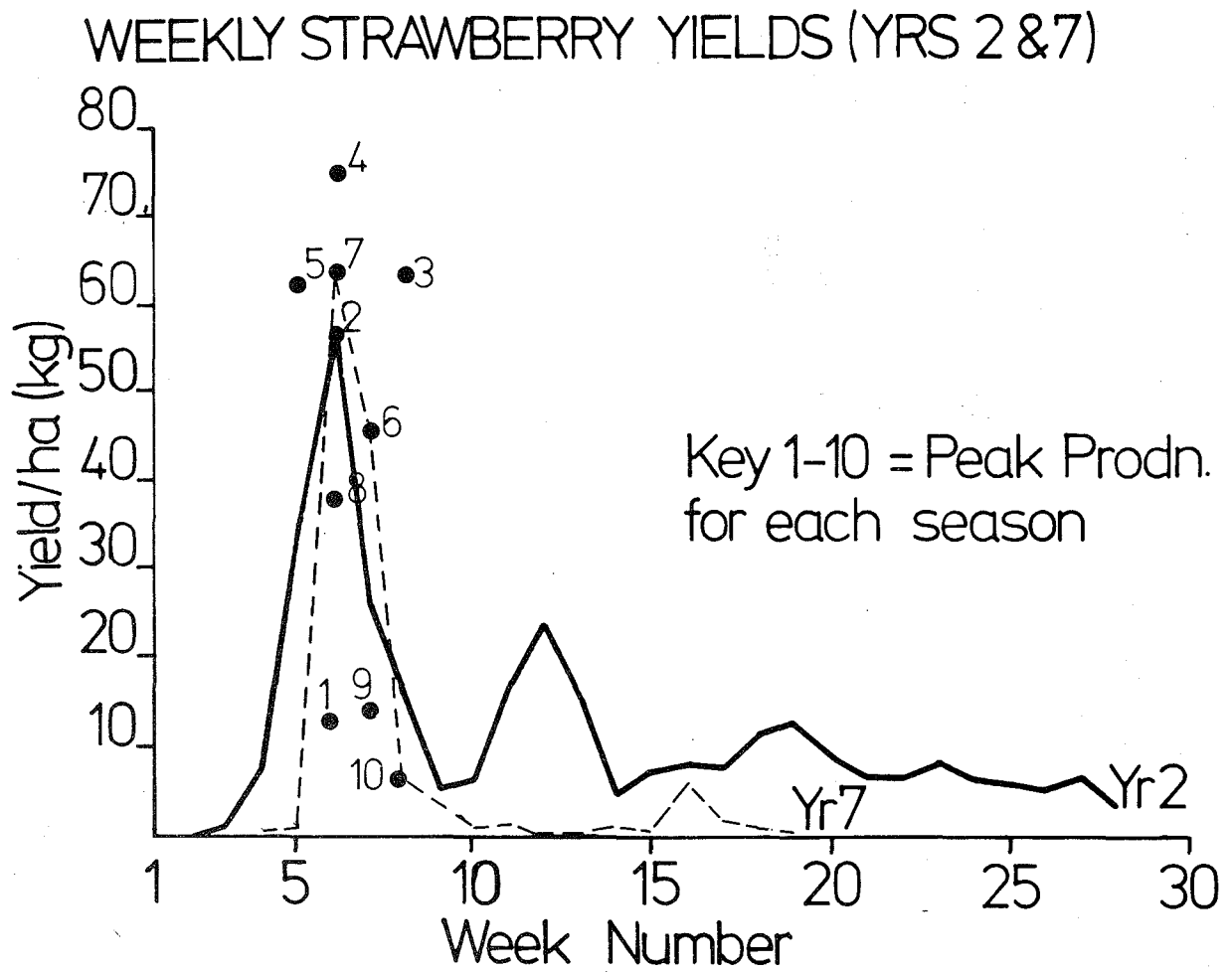




Illustration 3. Fruit in the primary position on the flower truss is consistently larger and ripens first. Fruit in the secondary and tertiary positions on the truss ripens later and is progressively smaller.



Illustration 4. A high ridge covered in plastic ensures good drainage and clean fruit. Before straw is laid between the rows a Simazine/Paraquat mixture is applied for weed control

Monthly patterns of production are detailed in Table 3. Red Gauntlet traditionally produces two crops per year with the first crop harvested in the November-December period and the 2nd crop spread more evenly from January-May. There is usually a marked reduction in harvesting in January but at times when there is some damage from spring frosts the plants may produce an extra crop, harvesting heavily in January (1969/70 and 1971/72).

Table 4 summarises these yields into 5 year periods. Figure 1 shows how the bulk of the crop is harvested in the December period and as the plants age they tend to produce an increasing percentage of the annual yield in the November-December-January period. Two years which demonstrate this pattern clearly are years 2 and 7 where weekly yields are plotted for each season in Figure 2. The peak production period is quite marked in each year and creates management problems in hiring staff for such a short period. A high proportion of the crop is harvested each season in a two week period at the end of November and the beginning of December. (Table 5).

Table 4

Summarised Yields Strawberries

tonnes/hectare

	1st 5 years	% per month	2nd 5 years	% per month	10 years total	% per month
Nov	35.32	23.87	5.48	9.23	40.80	19.68
Dec	48.27	32.62	39.73	66.95	88.00	42.44
Jan	17.46	11.80	2.88	4.85	20.34	9.81
Feb	20.02	13.53	3.39	5.71	23.41	11.29
March	18.50	12.50	4.91	8.27	23.41	11.29
April	7.04	4.76	2.95	4.97	9.99	4.82
May	1.38	0.93			1.38	0.67
Total	147.99		59.34		207.33	

Fig. 3

Percentage of fruit harvested/month

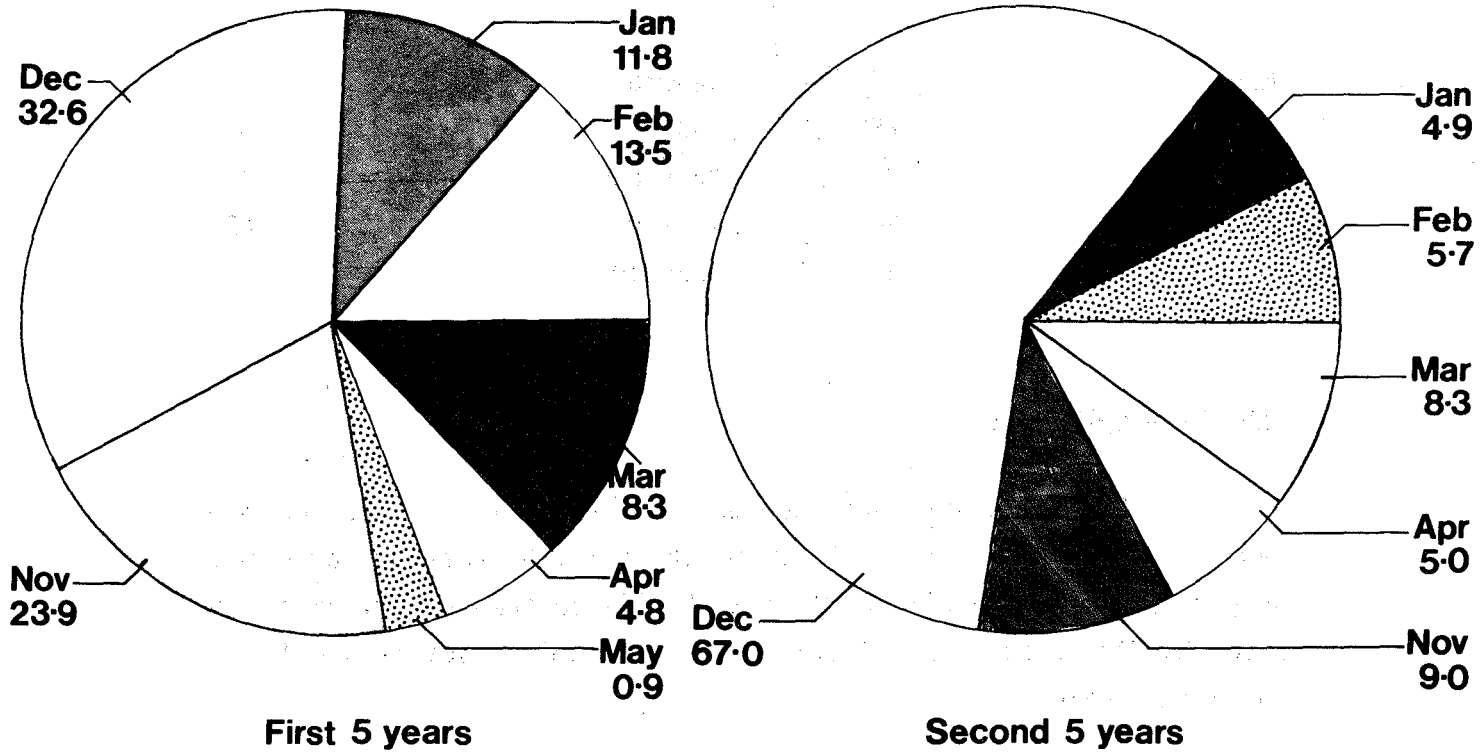


Table 5

<u>Percentage of Crop Harvested</u> <u>in 2 Week Peak</u>			
	%		%
Year 1	42	Year 6	24
Year 2	25	Year 7	80
Year 3	35	Year 8	42
Year 4	26	Year 9	45
Year 5	44	Year 10	12

Fruit Size and Weight

Extensive work has been carried out on fruit size and weight regarding proportion of I.Q.F. to Block fruit, harvesting rates and weight loss. The details of this work will be the subject of another paper but the results pertinent to this economic assessment will be summarised here.

Table 6 sets out six years of recordings on average weights of Red Gauntlet fruits. The figures cover the main harvesting period for each year (November-December) and represent samples taken at random each time the crop was harvested. There are two significant features about the fruit size recordings.

1. The reduction in size over a 5-6 week period is consistent over the years although occasionally the first berries harvested may be smaller than the second harvest often due to a seasonal effect of frosts or strong winds. Fruit size is a function of the position of the berry on the flower truss (Illustration 3). The primary flower on the truss is invariably a large berry and ripens first. Flowers in the secondary position in the flower truss ripen next and the smaller berries are in the tertiary positions. The strength and size of the flower truss determines ultimate yield and although soil water levels, nutrients and leaf health (particularly occurrence of 2 - spotted mite Tetranychus urticae) have a bearing on yield, the relative size of the berries between

harvests is unlikely to be affected markedly.

2. Where fruit is being harvested on a piece rate the size of berries is extremely important to hourly earnings. Those harvesting the crop must pick approximately twice as many berries towards the end of the first main crop compared with the early part of the harvest to record a similar weight. Figure 4 demonstrates this point clearly. Size is compensated to some extent by yield but rates of harvest generally decline in the latter half of December.

Table 6

<u>Average Weight/Fruit</u>							
<u>Red Gauntlet (g)</u>							
(Calyx removed).							
Harvest	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	Average for 6 years
1	11.6	13.0	15.2	13.1	13.8	9.5	12.7
2	12.9	10.2	13.9	10.4	11.1	10.1	11.4
3	9.0	8.5	12.7	9.8	10.3	8.3	9.8
4.	6.6	7.9	8.6	8.4	10.1	7.0	8.1
5	6.3	6.5	6.1	5.6	6.3	5.0	6.0

Removal of Calyx

For both I.Q.F. and block frozen fruit the fruit must be picked without the calyx. With Red Gauntlet this usually involves the removal of the central core or receptacle as well and as a result some weight loss occurs compared with fruit harvested for fresh consumption. The average weight loss over several seasons was 2.8%.

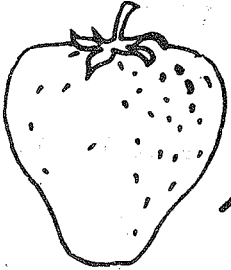
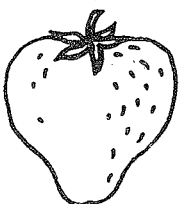
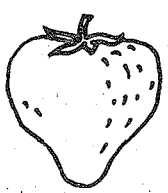


Weight Loss in Freezing

Block frozen fruit is packed before freezing. No significant loss results in this case as the fruit is sealed within polythene bags.

Independently Quick Frozen fruit (I.Q.F.) is frozen on open metal trays stacked so as to allow the movement of air between trays. In a normal air blast freezer over a 12 hour period, weight loss has varied between 2.5 and 3.3% of fresh weight. If the fruit is left exposed in the freezer

Fig.4

AVERAGE WEIGHT OF FRUIT
RED GAUNTLET 1st Crop
(6 Seasons Recordings)

Harvest		
1		12.7 gms
2		11.4 "
3		9.8 "
4		8.1 "
5		6.0 "

for 2 days (over a weekend) the loss increases to 5%.

Use of liquid nitrogen for freezing was tested in two seasons. The weight loss during the 10-15 minutes required to freeze the fruit in this way averaged 1% but the additional cost of liquid nitrogen compared with electricity made this method uneconomical.

I.Q.F. versus Block Frozen Fruit

Details are presented later comparing prices for I.Q.F. versus block frozen fruit. The differential price in favour of I.Q.F. fruit has been in the vicinity of 20c/kg. The fruit is graded in the field as it is harvested and supervisors instruct the pickers on the relative grades. The main criteria for I.Q.F. fruit are size and a sound whole sample. The minimum size of fruit demanded by the buyers has varied from season to season but has normally been not less than 1.75-2cm. Although measurements reveal that up to 80% of fruit produced in any one season could qualify for the I.Q.F. grade the subjective judgement of pickers, even with constant supervision, does not allow more than 50% to be packed I.Q.F. Detailed measurements have been made between pickers in this regard. Inexperienced pickers consistently grade to a higher size standard apparently through lack of confidence.

A further factor in maintaining a high I.Q.F. grade is the ability of the grower's freezer to cope with the peak production in early December (Figure 2).

Cultural Details

Establishment

Longevity of a strawberry block is determined by four key factors

1. It is essential to use virus free plants and maintain them virus free. A successful strawberry industry depends on continual injection of "mother" plants raised at a research station using virus indexing procedures. Although the Levin Research Centre in New Zealand cannot certify plants as guaranteed virus free it does nevertheless maintain a very high level of disease free "mother" plant production.

There is no regulation forcing strawberry plant producers to use certified "mother" stock but there should be a scheme to protect strawberry fruit producers from unscrupulous plant producers who fail to use disease free stock.

It is extremely bad practice to establish a fruiting bed from plants taken from an existing fruiting bed. Strawberry plant producers who fail to use strawberry mother stock, who fail to rotate or sterilise their nursery areas and who fail to maintain an aphid free environment should be boycotted by fruit producers.

2. It must be standard practice in both plant beds and fruiting areas to spray for aphid control on a regular basis. Regular use of a systemic insecticide such as Metasystox in strawberry plant areas should be mandatory and fruit producers should use Metasystox or Rogor early in the season or Phosdrin during fruiting according to waiting period regulations. The principle should be prevention of aphid rather than elimination once it appears.

3. Good drainage is essential to prevent root problems such as Phytophthora sp. A higher ridge than normal was used in the Lincoln College strawberry block (approximately 15cm) to facilitate good drainage. (Illustration 4). Where rotation cannot be practised it is essential to sterilise the soil with chloropicrin prior to setting out the plants.

4. Selective weed control is difficult in strawberries. Although late dormant applications of 2,4 D or 2,4 5T have been used for perennial flat weeds and clovers it is impossible to maintain a weed free environment without a considerable degree of hard work, if plants are set out in a poorly prepared block. Perennial grasses are extremely difficult to control, particularly twitch (Agropyrens repens). Weedazol T.L. (amitrol and Dalapon) can be used for "spot" application but this is non selective against strawberries and will cause gaps in the block (Illustration 5). Perennial grasses should be eliminated before planting.

During the 10th (final) year of harvesting randomly selected 1m lengths of row were harvested to determine the variation in yield and fruit size as a result of some deterioration in plant vigour with yellow edge virus.

Yields varied from 3.58 t/ha to 16.73 t/ha with an average of 8.77 t/ha. Fruit size varied from an average of 8.32 g. from apparently healthy metre sections to 6.08 g from the lowest yielding plot.



Illustration 5. Perennial weeds and grasses are difficult to control selectively. Spot treatment with Weedazol is effective but also kills the strawberry plants. Note the irrigation standard right background. This semi-permanent system is used for frost control in the spring.

Detailed assessment of the distribution of virus infection in the block is to be made before it is removed.

Cost of Establishment

Estimated costs of establishment are given in Table 7 (1977-78 prices).

Table 7

<u>Estimated Cost Of Establishment</u>	
<u>Strawberries (\$/ha)</u>	
<u>Materials</u>	\$
Plants 45,000 @ \$40/1000 (including transport)	1,800
Plastic 11,000 m @ \$60/1000	600
Fertiliser 1.5 t/ha Nitrophoska Yellow \$270/t	405
Spray Materials	435
Straw 500 bales at 30c	150
	<u>\$3,390</u>
<u>Machinery (at \$3/hr)</u>	
Cultivation and Ridging 40 hours	120
Fertilizer application 10 hours	30
Plastic laying 25 hours	75
Spraying 35 hours	105
Straw Mulching 40 hours	120
Mowing verges 4 hours	12
Irrigation	42
Planting 3 hours	9
	<u>513</u>
<u>Labour (at \$3/hr)</u>	
Planting 200 hours	600
Cultivation and Ridging 40 hours	120
Fertiliser application 10 hours	30
Plastic laying 50 hours	150
Spraying 35 hours	105
Hand weeding and sundry 200 hours	600
Straw spreading 120 hours	360
Irrigation 8 hours	24
	<u>\$1,989</u>

Total establishment costs for the 1st year excluding harvesting and marketing

Materials	3,390
Machinery	513
Labour	1,989
	<u>\$ 5,892</u>

Table 7 includes all costs except harvesting and marketing costs for the first season. To establish a 1 ha area up to completion of planting the summarised costs are:-

Materials \$2,925, Machinery \$244, and Labour \$909 = \$4,078

Because of the expense of subsequent injection of Aldrex or Dieldrex for control of strawberry root weevil it is advisable to apply this to the soil before the plastic is laid.

Spray Materials

Herbicides - Simazine and Preglone is applied between the rows prior to the first spring growth. If runners are a problem Preglone is used with shields in calm conditions as required.

Foliar Nutrients - Urea is applied at 0.5 kg/100 l as required (2-3 times/season).

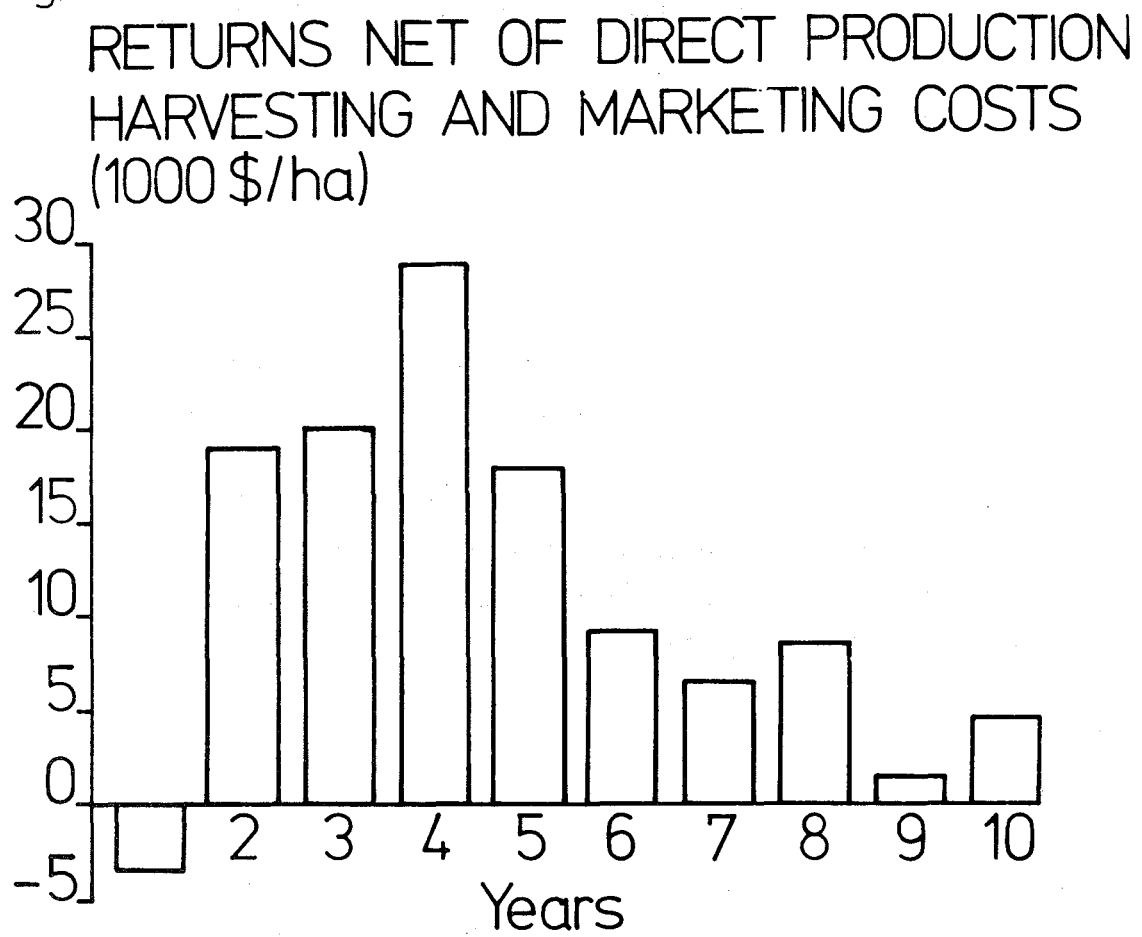
Fungicides and Insecticides -

Dormant:	Cuprox and Universal Oil
Pre-flowering:	Metasystox, Plictran, Benlate
Flowering:	Euparen
Post Flowering:	Vapona, Phosdrin, Benlate, Septan.
(as required).	

Harvesting and Marketing

Because of the marked variation in harvesting and marketing costs between fruit exported in I.Q.F. or Block Frozen form, local market sales and Pick-Your-Own (P.Y.O.) fruit, it is necessary to make some assumptions on the percentage distribution through each channel.

Fig.5



In the economic assessment (Table 10) it is assumed 50% of the crop is to be sold in Block Frozen form, 40% as I.Q.F. and 10% P.Y.O.

1977-78 prices were

I.Q.F. \$1.32/kg packaged, frozen and delivered to store.

Block \$1.01/kg packaged and delivered to store.

P.Y.O. \$1.20/kg containers supplied by purchaser.

Estimates of harvesting and marketing costs for each form of distribution are given in Table 8. It is recognised that harvesting and marketing costs may vary according to the yield and quality of the crop. An extra 5c/kg (\$50/t) is allowed for years 1, 9 and 10 when yields were less than 10 t/ha. (for other than P.Y.O.).

Returns net of direct production, harvesting and marketing costs are given for each year in Table 10 and graphically presented in Figure 5 based on yields for block 1 as given in Table 2 and annual production costs as given in Table 9.

Table 8

Harvesting and Marketing Costs

(\$/tonne)

	I.Q.F.	Block	P.Y.O.
Harvesting 35c/kg	350	350	-
Supervision 5c/kg	50	50	50
Cartage from field 3c/kg	30	30	-
Packing Shed Labour	80	50	-
Freezing charge 2c/kg	20	-	-
Cartons (materials and labour)	50	38	-
Cartage to store	25	18	-
Total	<u>605</u>	<u>536</u>	<u>50</u>

Table 9Direct Production Costs/hectare/annum (\$)

<u>Materials</u>	\$	
Fertiliser 0.625t	168	
Spray Materials	375	
Straw	150	
Sundries	25	
	<hr/>	718
<u>Machinery (\$3/hr)</u>		
Fertiliser application 10 hours	30	
Spraying 35	105	
Straw mulching 40	120	
Irrigation	42	
Mowing and sundry 4	12	
	<hr/>	309
<u>Labour (\$3/hr)</u>		
Fertiliser application 10 hours	30	
Spraying 35	105	
Straw mulching 120	360	
Irrigation 8	24	
Hand weeding and sundry 100	300	
	<hr/>	819
Total Annual Production Costs/hectare		<hr/> 1,846

Table 10

Returns Net of Direct Production Harvesting and Marketing Costs (\$/ha)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	(5.08t)	(33.45t)	(34.67t)	(47.65t)	(27.14t)	(16.35t)	(13.61t)	(16.24t)	(3.42t)	(9.72t)
<u>Returns</u>										
I.Q.F. \$1320/t	2682	17662	18306	25159	14330	8633	7186	8574	1806	5132
Block \$1010/t	2565	16892	17508	24063	13706	8257	6873	8201	1727	4909
P.Y.O. \$1200/t	610	4014	4160	5718	3257	1962	1633	1949	410	1166
	5857	38568	39974	54940	31293	18852	15692	18724	3943	11207
<u>Less</u>										
Harvesting and Marketing	2845	17227	17855	24540	13977	8420	7009	8364	1915	5443
Returns net of Harvesting and Marketing	3012	21341	22119	30400	17318	10432	8683	10360	2028	5764
Less Direct Production Costs	5892	1846	1846	1846	1846	1846	1846	1846	1846	1846
Returns net of direct Production Harvesting and Marketing Costs	-2880	19495	20273	28554	15472	8586	6837	8514	182	3918

Replacement Strategy

As long as reduction in yield does not reduce total cash flow it is feasible to hold a strawberry block in the ground indefinitely without replanting. Cash flows for replanting at the second up to the tenth year are set out in Table 11. An allowance has been made for removal of plants and plastic of \$200/ha. This is an arbitrary figure based on insufficient research. It is recognised that the use of a rotovator will reduce this considerably but is not to be recommended as regular practice from the ecological point of view. The cost of replacement will vary also with the need for sterilization. Accordingly an amount of \$900 has been allowed in each replacement year assuming that rotation is not feasible.

To complete the true picture the calculation should be taken through to the 2520th year when each cycle will be complete at the same time.

In Table 12 a 10% discount rate has been applied to calculate a net present value for each strategy. This calculation does not alter the conclusion that the block should have been replaced after the 5th year. Had block 2 been the replacement block the total cash flow of \$32,146 for 5 years would have exceeded the \$28,037 for years 6-10 of Block 1, but the difference here is not substantial.

Importance of Price and Yield

With a 4 : 5 : 1 ratio of I.Q.F. : Block : P.Y.O. this gives a harvesting and marketing cost of \$515/tonne. Assuming a gross price of \$1153/tonne with this combination the margin of returns over marketing costs is \$638. If direct annual costs are \$1846 this requires an annual yield of 2.89 tonnes to breakeven with direct costs. There may of course, be considerable variation in the cost and return data depending on the terms of the bulk fruit contract. Notable variations may occur in packaging, freezing and transport costs.

Table 11

Cash Flows Of 1 Ha Strawberry Enterprise

When Replanted At Varying Intervals (\$)

Year	R E P L A N T E D E V E R Y								
	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year
1	-2880	-2880	-2880	-2880	-2880	-2880	-2880	-2880	-2880
2	19495	19495	19495	19495	19495	19495	19495	19495	19495
3	-3980	20273	20273	20273	20273	20273	20273	20273	20273
4	19495	-3980	28554	28554	28554	28554	28554	28554	28554
5	-3980	19495	-3980	15472	15472	15472	15472	15472	15472
6	19495	20273	19495	-3980	8586	8586	8586	8586	8586
7	-3980	-3980	20273	19495	-3980	6837	6837	6837	6837
8	19495	19495	28554	20273	19495	-3980	8514	8514	8514
9	-3980	20273	-2980	28554	20273	19495	-3980	182	182
10	19495	-3980	19495	15472	28554	20273	19495	-3980	3718
Total	78675	104484	145299	160728	153842	132125	120366	101053	108751
Average/yr	7868	10448	14530	16073	15384	13213	12037	10105	10875

Table 12

Cash Flow 1 Ha Strawberries: Net Present Value 10%

Year	R E P L A N T E D E V E R Y								
	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year
1	-2618	-2618	-2618	-2618	-2618	-2618	-2618	-2618	-2618
2	16110	16110	16110	16110	16110	16110	16110	16110	16110
3	-2990	15231	15231	15231	15231	15231	15231	15231	15231
4	13315	-2718	19502	19502	19502	19502	19502	19502	19502
5	-2471	12104	-2471	9607	9607	9607	9607	9607	9607
6	11005	11444	11005	-2247	4847	4847	4847	4847	4847
7	-2043	-2043	10404	10005	-2043	3509	3509	3509	3509
8	9094	9094	13320	9457	9094	-1857	3972	3972	3972
9	-1688	8598	-1688	12110	8598	8268	-1688	77	77
10	7515	-1534	7515	5964	11007	7815	7515	-1534	1433
Total	45229	64664	86310	93121	89335	80414	75987	68703	71620
N.P.V.									

The price received is quite critical to the economics of production. For instance in year 2, had prices been \$582/tonne less than the weighted average price of \$1153, returns would have broken even with direct costs. This would be approximately 50% reduction in price. The possibility of this occurring seems quite inconceivable but when one considers that a price of less than \$500/tonne is being considered for the remainder of the 1977/78 crop left unsold, the matter is quite serious. Lack of co-ordinated export marketing and severe competition by subsidised production from Mexico are the two main causes.

Had the Year 2 crop been sold in block form only (assuming the same harvesting cost/kg) the return net of production harvesting and marketing costs would have been \$14,010 (a reduction of 28%).

The importance of yield is emphasised by reference to table 13 where the average margin/ha over production, harvesting and marketing costs is 2½ times higher for the more sheltered block for the first five years in each case.

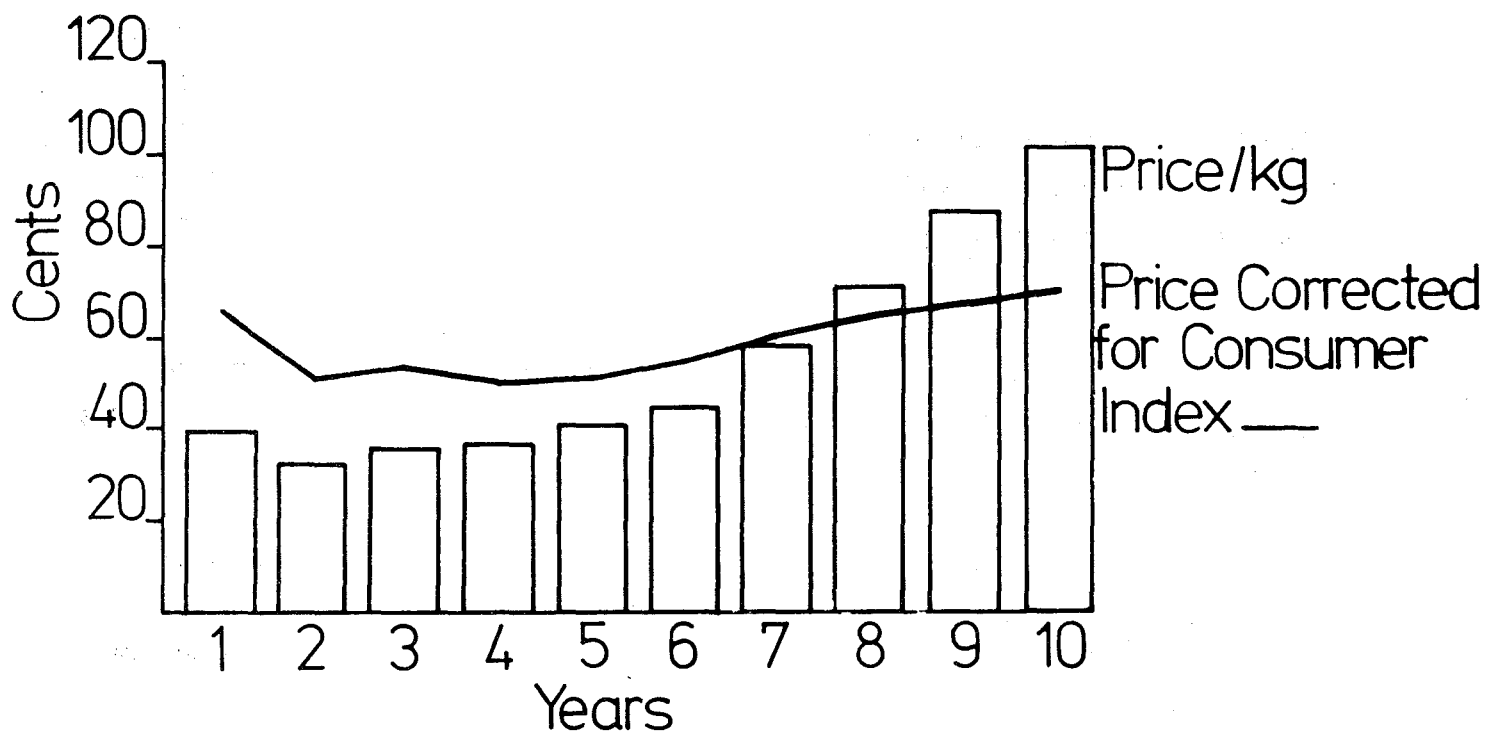
Table 13

	<u>Returns Net Of Direct</u>	
	<u>Production, Harvesting And Marketing Costs (\$)</u>	
	Block 1	Block 2
Year 1	-2880	-2306
Year 2	19495	16975
Year 3	20273	6320
Year 4	28554	6578
Year 5	15472	4579
Total for 5		
years	\$80914	\$32146
Average/year	\$16183	\$ 6429

No attempt has been made to fit the data into a whole farm situation but taxation and overheads would need to be taken into account in determining final replacement policy. These are unlikely to affect the decision.

Fig. 6

PRICES RECEIVED FOR BULK FRUIT



Strawberry Prices

Taking block frozen fruit as an example and applying the movement in the consumer price index (Base 1000 December 1974) as a correction factor the movement in the price paid for the fruit over the 10 year period can be determined (Table 14).

This shows that the price remained relatively steady over the first 6 year period (apart from the 1st year) but has climbed steadily to the advantage of the grower since year 7, the 1974-75 season (figure 6).

The cost of piece rate harvesting remained steady over the first 6 years but has risen sharply since then in line with the relative rise in prices (Table 15). If the corrected increase in piece rates during the period 1973-74 to 1977-78 (7.7c/kg) is deducted from the corrected 1977-78 selling price (69.3 - 7.7c) the real price for 1977-78 is 61.6c/kg block. This is still substantially above the 1973-74 price by 14.5% reflecting a price advantage to the grower during this period over harvesting costs. To complete the comparison it would be necessary to compare the movement in prices of other inputs.

Table 14

	<u>Prices c/kg Received For Block Fruit</u>		
	<u>Packaged And Delivered To Store</u>		
	Price c/kg "block"	Consumer Price index	Price c/kg corrected for consumer index
1968-69	39.6	601	65.9
1969-70	33.0	631	52.3
1970-71	36.3	672	54.0
1971-72	37.4	742	50.4
1972-73	40.7	793	51.3
1973-74	46.2	858	53.8
1974-75	57.2	953	60.0
1975-76	70.4	1093	64.4
1976-77	85.8	1278	67.1
1977-78	101.0	1458	69.3

Table 15Piece Rate / kg

	Rate/kg	Adult Wage Rates Index	Rate corrected for wage rate index
1968-69	7.7	459	16.8
1969-70	8.8	485	18.1
1970-71	9.9	548	18.0
1971-72	11.0	672	16.4
1972-73	12.1	734	16.5
1973-74	15.4	819	18.8
1974-75	20.8	932	19.4
1975-76	24.0	1059	25.4
1976-77	30.0	1183	25.4
1977-78	35.0	1321	26.5

The price received for fruit in the first season of operation (1968-69) was a particularly good one. Taking into account the difference in corrected wage rates the 1977/78 price is still slightly below that of 1968-69 for returns after harvesting costs.

Comparative prices for block and I.Q.F. fruit are compared (Table 16) using 1971-72 and 1977-78 figures corrected for the consumer price index.

Table 16Bulk v I.Q.F. Prices (\$/kg)

	1971-72	1977-78
Block price	37.4	101
Block price corrected	50.4	69.3
I.Q.F. price	47.3	132
I.Q.F. price corrected	63.7	90.5
Price differential I.Q.F: Block	13.3	21.2
% difference in price I.Q.F: Block	26.5	30.7

The inference here is that there has been a slight increase in the advantage of producing I.Q.F. fruit compared with block fruit over the period from the point of view of price only.

Harvesting Costs

Because of the importance of harvesting cost to the economics of production, recordings on harvesting rates and work study research have been conducted over the years to determine the reasons for variation in harvesting rates and to research the methods by which harvesting costs might be reduced both by harvesting aids and mechanization and by method study and job instruction. This work will be the subject of a separate paper. Illustrations 6,7,8 and 9 indicate the type of work conducted in improving the handling of the fruit.



Illustration 6. Small metal sledges slide easily on the straw and effectively help pickers to move the fruit along the row. The fruit is picked without the calyx for export to Australia in block frozen form.

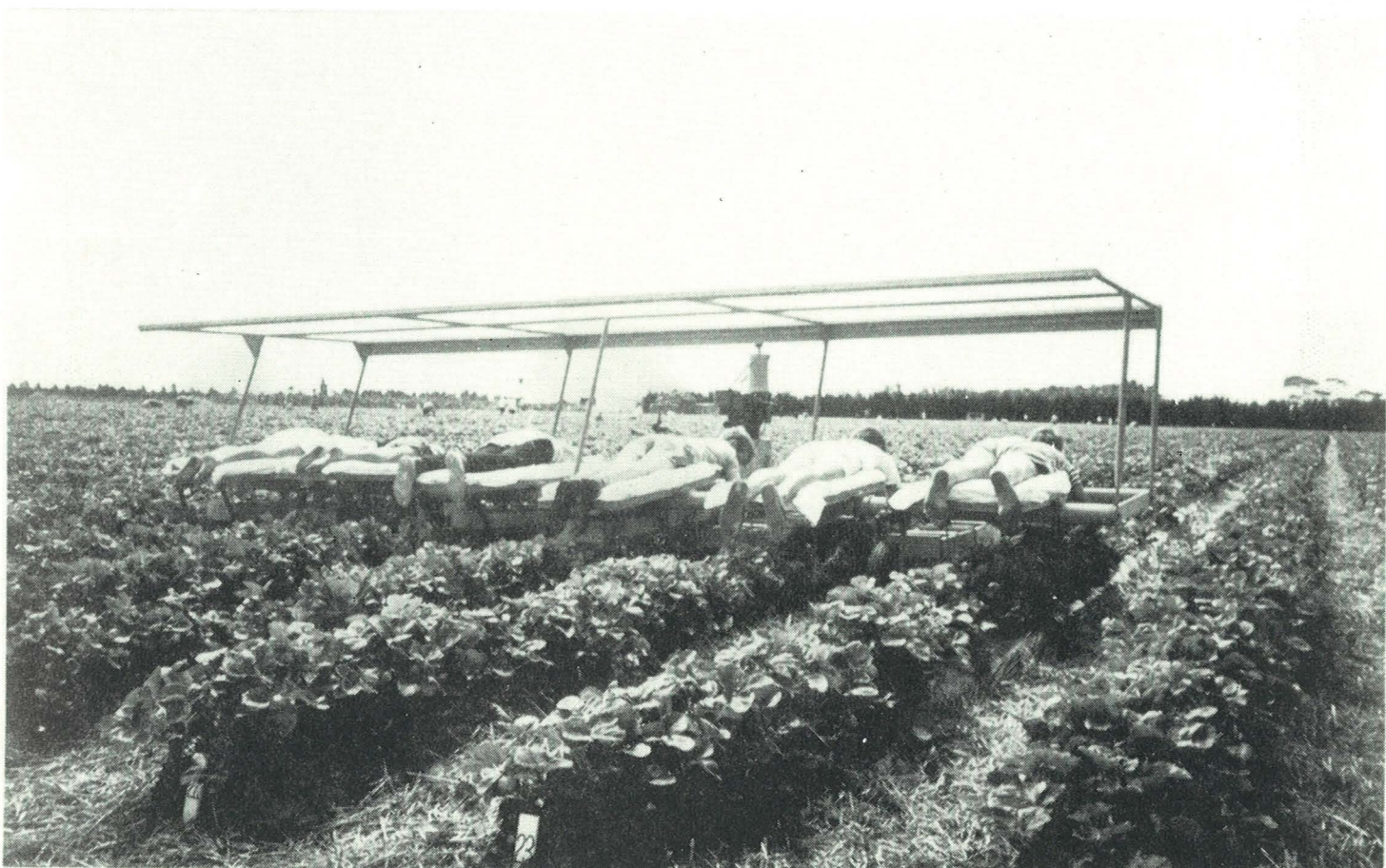


Illustration 7. A 6 bed labour carrier built by the N.Z.A.E.I. proved popular with pickers but did not improve the harvesting rate sufficiently to justify continual usage. Head rests proved essential for comfort and allowed the prostrate position to be maintained comfortably for 30 minutes.

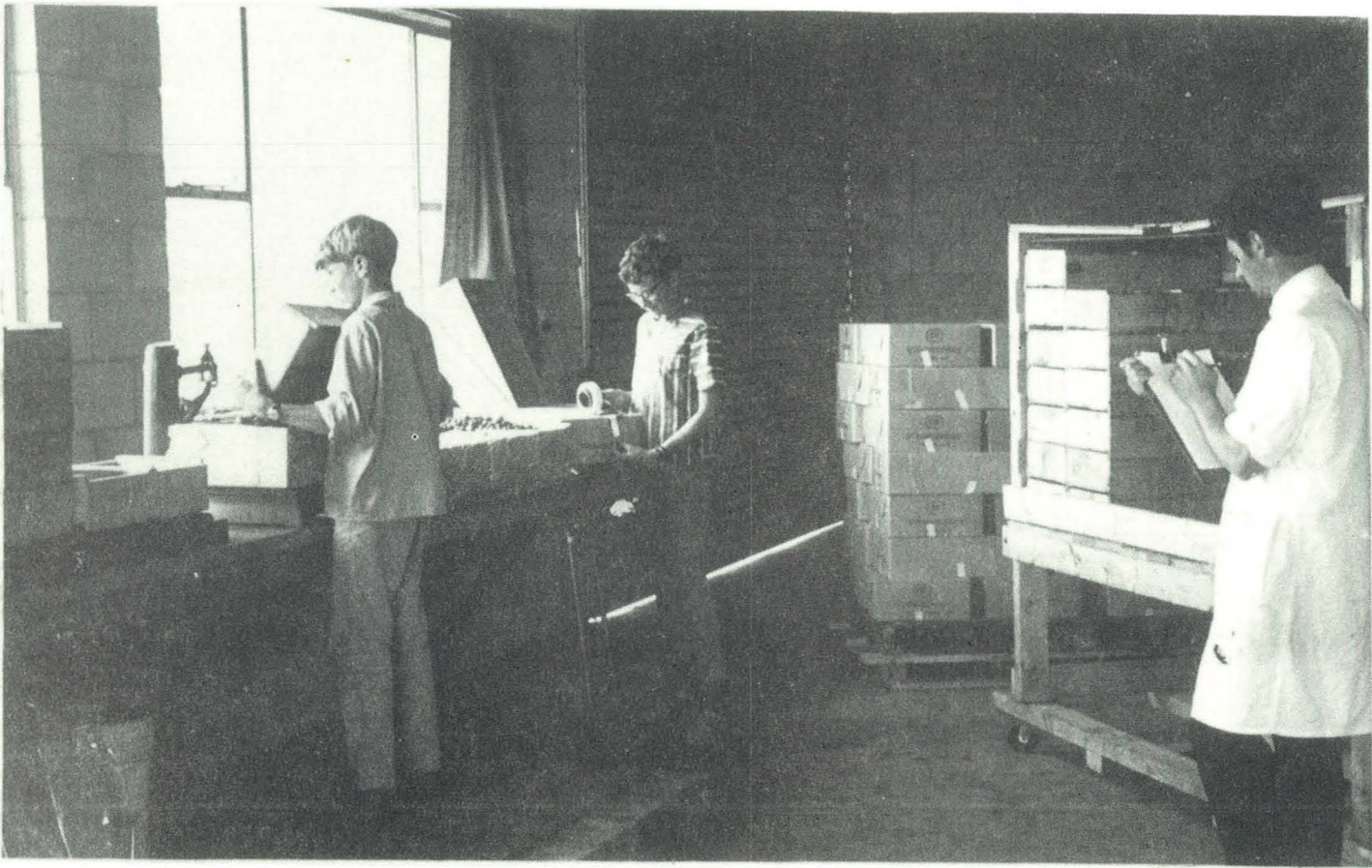


Illustration 8. Work study was conducted both in the field and the packing shed to improve efficiency and work conditions. Note that full field pallets can be moved easily about the shed on a castor wheel platform.

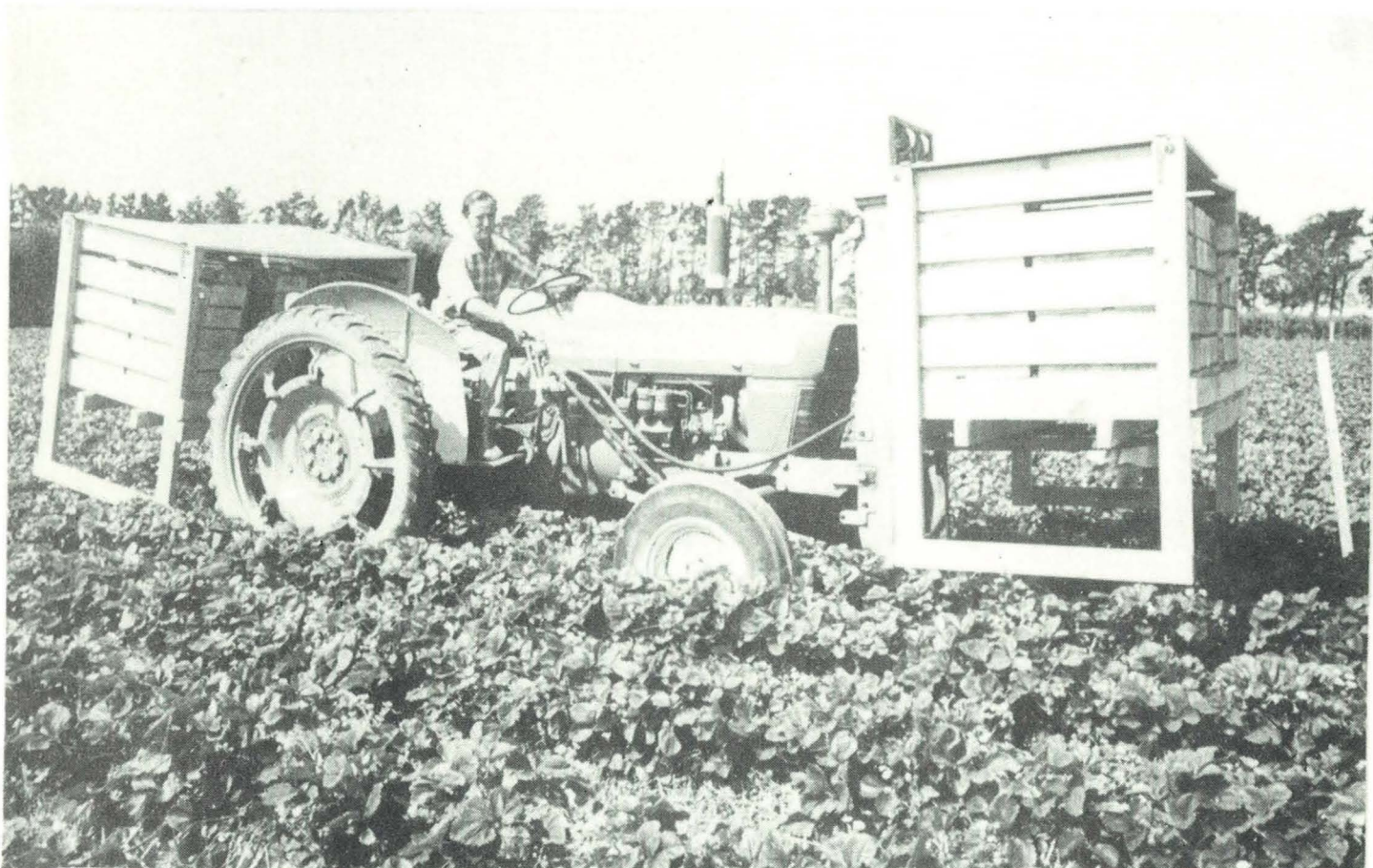


Illustration 9. Front and back forks on a narrow wheeled tractor facilitate efficient handling of the fruit on specially constructed pallets. The full pallet is transported on the front to allow the empty pallet at the rear to be taken further up the row as the pickers progress.