

**NEW ZEALAND AGRICULTURAL POLICY CHANGE:
SOME EFFECTS**

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PREFACE

The New Zealand agricultural sector has over most of its history been seen as the "backbone" of the New Zealand economy and has also been the subject of a varying range of influences caused by the implementation of various Government policies. This Discussion Paper reviews some of the progress of the agricultural sector and its reaction to the Government policies which have affected it. In particular, the effects of changes in the last decade with respect to the place of agriculture within the total New Zealand economy have been examined.

It is important that analysts, policy makers, and people both within and outside the agricultural sector have an appreciation of the role of the sector, the fluctuations in the state of the sector caused by market forces and government policies and a view of the future for the sector. This Discussion Paper provides some analysis and views on these matters and it is hoped that the material presented will assist in providing a perspective for future development.

A C Zwart
DIRECTOR

1. Introduction

For many years, agriculture has been seen as the major sector of the New Zealand economy upon which all other sectors depended and upon which New Zealand was dependent for economic growth. During the last decade, particularly the mid 1980s, this proposition has been questioned by various commentators and policy makers. It is therefore useful to review the situation for New Zealand agriculture, to assess the trends in the importance of the sector for New Zealand and to look forward to what the future might hold for the sector and for the New Zealand economy in relation to the role of agriculture within that economy.

This paper provides an historical perspective of the development of the NZ agricultural sector, particularly with respect to the focus of various institutions (including Government) upon it and the trade factors that have affected the development of the agricultural sector. This is followed by more recent information on the current position of agriculture within the New Zealand economy. Also included is some speculation on where New Zealand agriculture might move in the future.

2. New Zealand Agricultural Development - 1800s to 1960s

In order to understand the New Zealand economy and the role of agriculture within that economy, some appreciation of the historical development of the country is required.

From the beginning of European settlement international trade has been an important part of economic activity in New Zealand, and since the importance of gold production declined, in the early 1870s, the agricultural sector has been the main contributor to the export income of New Zealand. Wool was the first significant agricultural export, and after the introduction of refrigerated shipping, in the early 1880s, meat and dairy products were added to the list.

The technological revolution in transport which enabled New Zealand's meat and dairy products to be sold on the other side of the world was followed by major technological advances in agricultural production within New Zealand. The first of these improvements was the replacement of native vegetation by exotic grasses in the 40 year period leading up to the start of World War I (Gould, 1982). The second step in the technological revolution was the intensification of land use on the flat, or on low hill country, between the First World War and the depression of the 1930s. This intensification of land use was based upon the use of superphosphate fertiliser, lime and trace elements. The years following the Second World War saw another major spurt in agricultural production with the advent of aerial topdressing and the application of superphosphate to hill country areas. This began in 1949, and by 1958 approximately half the fertiliser that was used was applied from the air (Gould, 1982).

These technological advances in New Zealand agriculture led to considerable increases in production. The early development with the use of exotic grasses constituted an increase in the available pastoral land area, and the subsequent technological changes led to an improvement in the efficiency of production from those areas. There has been no single comparable technological change since the advent of aerial topdressing in the 1950s, but numerous smaller advances in technology have maintained a generally rising trend of efficiency.

The external account has always played a dominant role in the New Zealand economy, with strong growth and high levels of activity being experienced during periods when receipts are high, and recession or stagnation being the response to low levels of receipts. There have been periods when private or public capital inflows have played a significant part in overall foreign exchange receipts, but sustainable receipts are based on exports, and since the 1870s these have been dominated by payments for agricultural commodities. The agricultural industry has therefore played a key role in the overall development of the New Zealand economy.

Concern over the unequal bargaining power of farmers and the overseas owned companies which handled their export products led to the establishment of Producer Boards in the early 1920s. These Boards, established by statute, and with control in the hands of farmers, were set up to supervise the conditions of trade between farmers and exporters. Wide-ranging powers were granted, which have been used to varying degrees by different Boards. The Dairy Board eventually took full control of the export of dairy products, whilst the Wool Board has generally adopted a supervisory role. The perceived success of the Dairy Board in particular eventually led to the establishment of a range of bodies, such as the Kiwifruit Marketing Authority (since replaced by the New Zealand Kiwifruit Marketing Board), and the Horticultural Export Authority, but this has come at a time when the whole role of the Boards is being questioned.

The instability inherent in an economy so dependent on fluctuations in commodity prices led to attempts to develop a more self-sufficient economy, and the Labour Government elected in 1935 took steps to encourage the development of a larger manufacturing sector within New Zealand. In 1938, with economic recovery being threatened by a growing balance of payments deficit, wide-ranging import licensing restrictions were introduced, which were designed to stimulate local manufacturing in import replacement industries. This situation was enhanced by the Second World War during which many goods formerly imported were unobtainable. Under this dual stimulus there was considerable development of the manufacturing sector. Up to this time there had been only minor policies designed to provide support for the agricultural sector. The comparative advantage of agriculture in New Zealand was so strong that development proceeded with little Government support, based on the technological achievements of the past and the strong demand for agricultural exports during the Second World War and the Korean War in the early 1950s which led to very high commodity prices.

As a result of the favourable external balance in the early 1950s the Government relaxed the import restrictions somewhat. The resultant boom in imports, fuelled by the backlog of demand which had built up during the years of restrictions, and by the economic boom which followed the surge in export receipts in 1951, led to some restraints again being applied as the commodity prices fell away and large current account deficits appeared. The situation worsened further in 1957, largely as a result of the British market being over-supplied with dairy products (Gould, 1982). A newly-elected Labour Government therefore re-imposed strict quantitative controls on imports in January 1958.

Recovery from the 1957/58 recession came as external conditions improved, and the agricultural sector resumed its growth. The current account of the balance of payments remained a problem, however, with total payments continually in excess of receipts. There was therefore general political acceptance of the idea that it was impossible to relax to any great extent the restrictions on imports. A Government sponsored Industrial Development

Conference was held in 1960, with the aim of stimulating a further round of import substitution, and it was also considered that a significant increase in the manufacturing sector would be required to employ the labour force which was set to grow rapidly following the baby-boom after the Second World War.

It was widely recognised, however, that an import substitution policy alone could not provide a long-term solution to the balance of payments problems, especially when the manufacturing sector was heavily dependent upon the importation of components for much of its production. This latter fact meant that as the manufacturing sector grew, more and more employment became dependent upon a continued flow of imports, and in many ways the economy became more vulnerable to a down-turn in commodity prices. It was therefore accepted that major efforts were required to stimulate overseas earnings of all kinds, and the agricultural sector's dominance of exports made it natural that attention should turn to ways to increase agricultural exports. It was also recognised that the protection of the manufacturing sector was imposing high costs upon the farming sector, both in the direct costs of farm inputs, and in the prices of factors of production, such as labour, for which the two sectors were competing. As a result an Agricultural Development Conference was called, which first met in 1963, with the major reports and recommendations being formulated during 1964.

The acceptance at the Agricultural Development Conference of the idea that the agricultural industry could be given special assistance led to the introduction of a series of policies designed to maintain or increase the level of production through periods of low farm incomes. These policies culminated in a period of high levels of support in the early 1980s, but the increasing fiscal cost of the policies, and the growing realisation that their distorting impact was imposing a very high additional cost has led to a reversal of policy, and a move towards greater liberalisation of the whole economy. Policies could be seen to have come full circle when, in December 1985, a much heralded farm support policy announcement consisted mainly of reductions in the tariffs on imported manufactured goods.

3. Agriculture from the 1970s to the Present

3.1 Agricultural Support Schemes

At the height of the commodity price boom in the early to mid 1970s many input subsidies were reduced or abolished, but with the failure of output to grow as quickly as was desired, and the collapse of commodity prices, it was decided that further assistance was required for the farming industry. Because the level of farm incomes was not seen as a social problem, and because of a desire to ensure that government assistance provided to encourage increased output was in fact used efficiently for that purpose, the new forms of assistance were targeted specifically at increased output. In 1976 a livestock incentive scheme was introduced which provided a suspensory loan of \$12, or a tax deduction from assessable income of \$24, per qualifying stock unit, as an incentive to increase production. The payouts were made to farmers whose increase in stock numbers was greater than two percent, with the increase being sustained for at least the following two years, in which case the suspensory loan was to be written off. The payment was made for each additional stock unit carried on the farm. A total loan value of \$91.53 million was paid between 1976 and 1980 under this scheme.

In 1978 a further scheme was introduced to encourage increased production. This was the Land Development Encouragement Loan Scheme. The purpose was to assist with the

development of unimproved reverted land or low producing hill country, which had the potential to carry more livestock. This was to be achieved by providing concessional loans covering the initial costs incurred in developing this land into permanent sown pastures, including expenditure on fertilisers, lime, and drainage. Loans [for a 15 year term] to a maximum of \$250 per hectare were available, and provided the improvements were maintained to the satisfaction of the Rural Bank, which was the source of the money, the accumulated interest was written off and only half the principal sum was repayable. Over the programme period a total of approximately \$100 million was made available as loans.

From an analysis carried out by the Ministry of Agriculture and Fisheries in 1980 it was assessed that of the total development expenditure of the 1980 financial year, 41 percent was sourced from the LDEL scheme and an additional 17 percent from the Livestock Incentive Scheme. This amounted to 58 percent of total development expenditure. From 1976 to 1981 total stock units increased by more than 9.1 million, and gross capital investment on land doubled from 1978 to 1981 to an estimated \$176 million.

The other significant subsidy factor was the Supplementary Minimum Price (SMP) scheme. [For an analysis of the SMP scheme and the other support mechanisms, see Sheppard and Biggs, 1982; Laing and Zwart, 1983(a) and 1983(b); Chudleigh, Greer and Sheppard, 1983; and Griffith and Grundy, 1988.]

The Producer Boards already operated minimum price schemes, but since their schemes were designed to be self-financing, they could only smooth out fluctuations in prices; they could not raise their overall average levels. The Government's new scheme was therefore designed to supplement minimum prices offered by the Producer Boards, thus raising the minimum prices paid to farmers. The new scheme was also justified by the arguments that export subsidies were available to the earners of foreign exchange in other sectors of the economy, and that in the interests of fighting inflation it was desirable to hold the exchange rate at something above its equilibrium level, and the resultant reduction in the New Zealand dollar receipts of farmers required some compensation.

3.2 "Deregulation"

In the early 1980s the fiscal costs of assistance to agriculture rose very sharply as a result of a widening gap between market prices for some agricultural commodities and the prices guaranteed to farmers under the Supplementary Minimum Price Scheme. The combined effects of the Livestock Investment Scheme, the Land Development Encouragement Loans and the high prices for products guaranteed by the SMPs all combined to push land prices up further, and, since in a period of relatively high inflation investment in land was seen as a hedge against inflation, the acceleration in the increase in land prices was considerable. In an attempt to contain the inflation the Government maintained an exchange rate which was considered by most observers to be above the equilibrium level. This artificially high level of the New Zealand dollar was given as a further justification for Government support for the prices paid to farmers for their commodities. The Government deficit rose steeply at this time to a peak of 9.1% of GDP in the 1983/84 year and it became obvious that fundamental changes were required in total Government policy. The Government gave indications that there were to be reductions in the level of agricultural assistance, and fore-shadowed the end of the Supplementary Minimum Price Schemes, but this process was hastened by the coming to power of a new Government in the middle of 1984, which quickly set about making changes in economic policy. These changes included a very sharp reduction in the level of

assistance to agriculture, and promise of equally sharp reductions in assistance to other sectors, although these changes have been somewhat slower in their implementation. The impact of the change in assistance measures is illustrated in Table 1 which shows the levels of the various types of agricultural assistance. Total net assistance had reached a peak in 1984 and had fallen dramatically to a negative value in 1987.

Table 1
Pastoral Sector Gross Assistance (at 20% cost excess)
Year Ended March 31

<u>Measure</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Contribution to GDP at World Prices (\$M)	1026	1060	963	749	49	1319	1044	1574
Total Net Assistance (\$M)	14	101	369	768	1278	424	432	-14
<u>Assistance (\$M) from</u>								
SMP	17	1	244	438	346	215	65	0
Stabilisation	-44	26	50	250	891	274	346	2
Research & Extension	34	42	49	56	60	61	66	74
Interest Concessions	88	124	131	161	160	152	242	219
Tax Concessions	59	65	68	67	70	72	24	27
Town Milk Subsidy	13	10	13	14	15	19	19	23
Fertiliser Subsidy	62	52	48	44	41	35	13	6
Inspection & Grading	33	37	50	58	57	59	63	49
Other subsidies & Services	45	56	69	70	76	62	55	55
Cost Excess on Inputs	-299	-312	-354	-392	-440	-527	-466	-467

Note: Data for 1980 to 1984 has been revised

Source: Sanderson, 1990

At the time of the change of Government the New Zealand dollar was devalued by 20 percent, and this was seen by the Government as compensation to farmers for the reductions in direct fiscal aid. In March 1985, however, the New Zealand dollar was floated, and contrary to most expectations it increased in value against most currencies. Against many currencies the New Zealand dollar in fact regained its pre-devaluation value and by October 1987 the Reserve Bank trade weighted index of the exchange rate stood at 74.0 compared with 62.7 at the time of the float. This put considerable pressure on prices received by farmers. One of the reasons ascribed to the dollar's performance has been the decision of the Government to ensure that its deficit is fully funded from the New Zealand market. This resulted in a sharp increase in interest rates, which were formerly controlled at very low levels. Although the high value of the dollar reduced farm product prices, weak markets were also to blame. Since 1980/81 agricultural export prices declined relative to the prices of other exports (Reserve Bank Bulletin, 1986). Taking these factors together farmers were hit by lower prices for their products, together with higher costs of servicing their debt, over

a period in which the Government's measures to reduce inflation were seen to have been taking a long time to act. The net result is that farm incomes were reduced to their lowest level in real terms for many years.

3.3 From 1987 to 1992

The impact of restructuring has been addressed in other publications, particularly Sandrey & Reynolds, 1990, Fairweather, 1992, Sanderson, 1990 & Sheppard, 1993(a) & 1993(b). This paper highlights some specific examples at a more "macro" level.

The major impacts of the restructuring in the agricultural sector have been in three areas. One is the decline in the "value" of farmland, which was a direct result of the removal of subsidies. The second has been the decline in the total number of stock units carried on New Zealand farms as a result of the retirement of land brought into use under the influence of subsidies (and the decline in the number of stock on farms as a result of a lower level of farming inputs (capital and labour)). The third is the redistribution of stock numbers with sheep numbers declining and cattle (including dairy), deer and goat numbers growing.

The most dramatic change was in the number of sheep with a peak in 1981 of 69.884 million being reduced to 53.013 million in 1992 (provisional), a fall of 16.9 million or 24 per cent (Table 2).

Table 2
Livestock Numbers : 1972 to 1992

	Dairy	Sheep	Beef	Deer	Goats
1972	3.289	60.883	5.344	-	-
1975	2.998	55.320	6.294	-	-
1978	2.991	62.163	5.507	-	-
1981	3.134	69.884	5.113	0.109	0.068
1984	3.246	69.739	4.531	0.258	0.230
1987	3.195	64.244	4.804	0.500	1.054
1990	3.464	57.852	4.601	0.976	1.062
1991	3.429	55.162	4.671	1.129	0.792
1992 _p	3.484	53.013	4.745	1.152	0.571

_p Provisional

Source: Fairweather, 1992

At the same time as the change in stock numbers has been occurring, there has been a decline in the number of sheep and beef farms and cropping farms and an increase in the number of dairy farms, horticultural farms and "other animal" farms (mostly deer) (Fairweather, 1992).

Employment numbers have also shown significant movements as a result of the agricultural restructuring. MAF (1993) analyzed the change in employment numbers for a range of industry sectors and the relevant statistics are given in Table 3. These statistics indicate that there has been a major decline in full time (F/T) employment in farming with most of the decline occurring in sheep farming (down by 43 per cent from 1981) and some decline in dairy farming F/T employment. This has been partially offset by an increase in F/T employment in beef farming and fruit growing. Also of significance is the increase in part time (P/T) employment on farms apart from sheep farms.

In the off-farm sector, the impact of restructuring can also be seen in the employment numbers for the sectors which depend on agriculture for their raw material inputs. The slaughtering and meat processing sector F/T employment fell by 39 per cent from 1981 to 1991 and P/T employment in this sector also fell between 1986 and 1991. The fall in employment levels in this sector was such that major gains in labour efficiency were achieved with a much higher level of output being achieved per employee. [See Appendix One for an analysis of the improvement in labour productivity in the New Zealand meat processing industry.]

Dairy product manufacturing also exhibited considerable gains in labour efficiency as a higher level of throughput was handled by fewer employees. This was a result of the closure of some smaller dairy manufacturing companies and the handling of the milk through larger more capital intensive plants.

The "food, beverage and tobacco" and "textiles, clothing and leather" sectors also exhibited declines in the number of employees. This was particularly marked in the latter sector where the decline from 1981 to 1991 in F/T employees was 45 per cent. This was a result of the removal of protection for the local textile industry as part of the liberalisation / restructuring process.

At the same time as the level of F/T employment was declining, there was a significant increase in the number of people employed on a P/T basis with approximately twice as many people employed part time in 1991 as in 1981. In the farming sector, the growth in part time employment numbers was by a factor of three.

Table 3
Employment Statistics

		1981	1986	1991
Dairy Farming	F/T	32,709	31,120	26,865
	P/T	na	4,218	4,752
Sheep Farming	F/T	43,773	36,387	24,612
	P/T	na	4,812	3,876
Beef Farming	F/T	3,690	5,898	5,451
	P/T	na	1,128	1,437
Fruit Growing	F/T	10,431	13,764	12,096
	P/T	na	3,606	2,958
All Farming¹	F/T	130,212	123,783	108,771
	P/T	8,247	21,813	23,265
Slaughtering & Meat Processing	F/T	38,853	29,739	23,628
	P/T	na	7,857	3,333
Dairy Product Manufacturing	F/T	9,966	8,385	6,945
	P/T	na	282	291
Food Beverage & Tobacco ¹	F/T	76,779	63,543	53,235
	P/T	1,791	11,148	6,882
Textiles, Clothing & Leather	F/T	45,546	40,068	25,269
	P/T	1,782	4,794	3,525
Total NZ Workforce¹	F/T	1,332,342	1,278,204	1,151,196
	P/T	115,137	221,217	249,204
Total		1,447,479	1,499,421	1,400,400

¹ Includes other categories not listed

Source: New Zealand Population Census, Department of Statistics (1991)

Other major changes that took place between the mid 1980s and the early 1990s were the decline in capital expenditure on farms and the changes in fertiliser application that took place as a result of the decline in farm sector incomes.

Farm building permits issued declined from a value in excess of \$7 million in 1984 to less than \$3 million in 1991 (MAF, 1993). Annual investment in farm plant and machinery fell from over \$200 million in the mid 1980s to less than \$100 million in 1988. Some recovery has occurred since then.

Total manufactured fertiliser sales peaked in 1984-85 at slightly over two million tonnes (MAF, 1993) and then fell to only slightly over one million tonnes in 1986-87 before recovering to 1.3 million tonnes in 1989-90 and fluctuating since then but with expected growth to around 1.6 million tonnes in 1992-93. However, sales of "Other Fertiliser Materials" have been growing steadily since 1987-88 and are expected to have reached 0.4 million tonnes in 1992-93.

The cause of the above fluctuations in input levels has been the variation in "farm profit before tax". For sheep and beef farms, a low point was reached in 1985-86 with farm profit before tax declining by 50 per cent from the 1984-85 level (MAF, 1993). Some recovery was recorded in 1986-87 with stability over the next three years and some improvement in the 1989-90 year. In real terms (base 1976 = 1000) the index of real farm profit before tax (sheep and beef farms) from 1989-90 through 1992-93 (estimated) has moved from 552 to 409, 430 and 451 respectively for the four years. This represents a level 50 per cent lower than the starting point for the index in 1976 and clearly demonstrates the shift that has occurred in sheep and beef farm profitability.

4. Relationship to the New Zealand Economy

There are a number of ways in which the relationship between the agricultural sector and the rest of the economy can be measured. There is no doubt that agriculture remains an important part of the economy and there is equally no doubt that it will remain as a major contributor to the economic well-being of New Zealand.

4.1 Assistance to Agriculture

In order to examine the contribution of the general economy to agriculture, it is useful to look at the level of assistance which agriculture "receives from the economy". MAF provides estimates of the level of assistance (MAF, 1993) and this indicates that from a high of approximately \$1,192 million in 1983 (Sanderson, 1990) the level of assistance has declined to \$116 million in 1993.

In international terms, the amount of assistance available to agriculture is often expressed as the "Producer Subsidy Equivalent" (PSE). The calculation of this converts the financial (and other assistance) available into monetary terms and expresses it as the equivalent of a percentage subsidy for pastoral agriculture. The average level of PSE for New Zealand pastoral agriculture from 1979 to 1986 was 25 per cent (MAF, 1993). This had declined to three per cent by 1992. Table 4 provides details of the PSE's for New Zealand and some other countries for the most recent period.

Table 4
Producer Subsidy Equivalents
 (%) (year ended December) (all products)

	Average 1979-86	1988	1989	1990	1991	1992 _p
Australia	12	9	9	13	14	12
Canada	32	43	40	49	48	44
European Community	37	46	41	46	49	47
Japan	66	74	70	66	67	71
New Zealand	25	7	5	5	4	3
United States	28	32	26	27	27	28

_p provisional

Source: MAF, 1993

The actual level of assistance must be considered in the light of the cost penalty facing pastoral agriculture as a consequence of assistance to other sectors of the economy. When this is taken into account the "Effective Rate of Assistance" can be calculated. In the year ended March 1983, the effective rate of assistance was 123 per cent. However, by the year ended June 1990, it is estimated that the effective rate of assistance to the pastoral agricultural sector was minus three per cent and it has remained at that level through to the year ended June 1993 (MAF, 1993). This means that the extra costs imposed by assistance to the non pastoral agricultural sector represent three per cent of the value of the unassisted output from the sector.

4.2 Contribution to Exports

The agricultural sector is often seen as the basis of New Zealand's export trade. Examination of the trade statistics tends to confirm this impression (Table 5). Although agricultural based exports are declining as a proportion of the total exports of New Zealand goods, the proportion is still over 50 per cent. Within the agricultural sector, the contribution from "other" exports has been growing reflecting increased diversification of export forms.

Table 5
New Zealand's Agricultural Exports
(\\$million FOB)

	1988	1989	1990	1991	1992
Meat and meat products	2217.2	2424.9	2335.1	2612.1	3031.9
Dairy Products	1776.4	2234.1	2534.2	2485.0	2897.1
Wool	1727.9	1909.0	1424.1	1043.7	1172.7
Fruit and Vegetables	834.2	824.2	998.6	1069.4	1166.6
Hides, skins, leather	714.6	747.1	675.9	583.0	581.9
Other	343.7	864.0	816.2	958.3	1142.7
Total Agricultural Based Exports	7614.0	9003.3	8784.1	8751.5	9992.9
Total NZ Exports of Goods	12104.1	14905.4	15163.5	15768.4	17890.6
Agricultural Based as % of Total Exports of Goods	62.9	60.4	57.9	55.5	55.9

Source: MAF, 1993

4.3 Contribution to Gross Domestic Product (GDP)

The agricultural sector contribution to GDP was a little over 12 per cent of GDP in 1992 (Table 6). This contribution has declined over the last ten years from nearly 17 per cent of the total in 1982 as the absolute level of New Zealand GDP has grown more rapidly than has the agricultural sector, i.e. New Zealand GDP has grown by 154 per cent (in money terms) over the ten year period while agricultural sector GDP has grown by only 93 per cent. The main "contributor" to the decline has been the fall in proportionate GDP contribution from the farming part of the sector which has declined from 7.5 per cent of GDP in 1982 to 4.7 per cent of GDP in 1992. This fall has been matched by the decline in importance of the input supply sector which has fallen from 2.6 per cent of GDP to 1.6 per cent. The processing and wholesale/retail sectors have maintained their relative positions while the transport sector shows a decline.

The growth in the agriculturally based processing sector by 160 per cent over the ten year period while the farming sector has only grown by 59 per cent indicates the growth in importance of agricultural sector processing as products have become more market

orientated. Another way of looking at this is to observe that for every dollar of farming output in 1982, another \$0.64 was produced in the processing sector. By 1992, for every dollar of farming output another \$1.05 was produced in the processing sector. The contribution of the processing sector was in fact larger than the contribution from farming in both 1991 and 1992.

Table 6
Agricultural Sector Contribution to GDP

	Year ended March							
	1982		1987		1991 _p		1992 _e	
	\$b	% of GDP	\$b	% of GDP	\$b	% of GDP	\$b	% of GDP
Farming	2.2	7.5	3.0	5.5	2.9	4.0	3.5	4.7
Processing	1.4	4.8	2.4	4.4	3.7	5.0	3.7	4.9
Input Supply	0.7	2.6	1.0	1.9	1.1	1.6	1.2	1.6
Wholesale/retail	0.4	1.4	0.7	1.3	1.0	1.4	1.0	1.3
Transport	0.2	0.7	0.2	0.4	0.3	0.4	0.3	0.4
Total Agriculture	5.0	16.9	7.4	13.5	9.0	12.2	9.6	12.9
Total New Zealand	29.3		54.5		73.7		74.3	

_p Provisional _e Estimate

Source: MAF, 1993

4.4 Contribution to Employment

Table 7 provides information on the contribution of the agricultural sector to employment in New Zealand. The data has been presented in full time equivalents and therefore cannot be directly compared with the data presented in Table 3. Of particular interest from Table 7 is the decline in the proportion of the total workforce involved in the agricultural sector from 20.3 per cent in 1982 to 17.6 per cent in 1992, the decline in the processing sector from 7.1 per cent to 5.2 per cent and the relative stability of the proportion in farming at around nine per cent. The decline in the proportion involved in processing is particularly significant given the growth in the contribution to GDP from that sector (see Table 6) implying that there has been a major labour productivity growth in the processing sector. This is clearly a reflection of the improvement in labour productivity achieved by the meat processing sector over the period. While the proportions have moved as described above, the total labour force has declined reflecting the growth in unemployment which has occurred in New Zealand.

Table 7
Agricultural Sector Contribution to Employment

	Year ended March							
	1982		1987		1998		1992 _e	
	(000)	% Work Force	(000)	% Work Force	(000)	% Work Force	(000)	% Work Force
Farming	118.9	9.2	109.6	8.2	110.5	8.5	116.4	9.1
Processing	91.9	7.1	79.9	6.0	73.3	5.6	66.3	5.2
Input Supply	31.1	2.4	27.1	2.0	26.1	2.0	26.4	2.0
Wholesale/retail	12.4	1.0	10.8	0.8	10.8	0.8	10.6	0.8
Transport	9.7	0.7	5.5	0.4	6.4	0.5	5.9	0.4
Total Agriculture	262.5	20.3	232.9	17.4	227.0	17.5	225.6	17.6
Total NZ	1,290.9		1,388.8		1,300.7		1,280.1	

_e Estimate

Source: MAF, 1992 and 1993

From Tables 6 and 7 an estimate can be made of the contribution to GDP by each of the agricultural sub sectors on a per full time equivalent person basis. This analysis can contribute to an understanding of the relative importance of each sub sector and the changes that have been occurring within the agricultural sector. Table 8 provides information on the level of GDP contribution per person employed in the various agricultural sub sectors.

Table 8
GDP Contribution per Full Time Equivalent Person
(\$'000)/person)

	Year ended March							
	1982		1987		1998		1992	
	\$(000)/ Person	% of Ag	\$(000)/ Person	% of Ag	\$(000)/ Person	% of Ag	\$(000)/ Person	% of Ag
Farming	18.5	97.9	27.5	86.8	26.3	66.2	30.0	70.6
Processing	15.3	81.0	29.9	94.3	50.2	126.4	55.1	129.6
Input Supply	23.9	126.5	38.5	121.5	44.1	111.1	44.2	104.0
Wholesale/retail	37.7	199.5	63.5	200.3	93.0	234.3	93.4	219.8
Transport	21.0	111.1	44.3	139.7	41.6	104.8	46.0	108.2
Total Agriculture	18.9		31.7		39.7		42.5	
Total NZ	22.7		40.7		56.7		58.0	
Agriculture as % of Total		88.3		77.9		70.0		73.3

From Table 8 it can be observed that the amount of GDP supplied per person working in the off-farm sectors is significantly greater than that supplied by the people working on the farm (\$42,500 cf. \$58,000 in 1992). Also, the proportion of the GDP per person involved in farming has been declining in comparison to the GDP supplied per person off-farm (the farming contribution was 97.9 percent of that for total agriculture in 1982 (\$18,500 of \$18,900) and 70.6 percent in 1992 (\$30,000 of \$42,500)). The growth in the GDP generated per person employed in the processing sector is particularly significant. It can also be observed that the GDP per person working in the agricultural sector is declining as a proportion of the GDP generated per person working in the rest of the economy (88.3 percent in 1982 compared with 73.3 percent in 1992).

The information presented in Tables 6, 7 and 8 indicates a decline in the relative return to the labour employed in the farming sub sector and a decline in the importance of the agricultural sector as a whole, with respect to the rest of the economy. However, in spite of the decline, the agricultural sector still contributes over 50 per cent of New Zealand's exports and represents over 12 per cent of GDP and approximately 17 per cent of the workforce. A decline in the importance of the sector relative to other sectors is an indication of the broadening of the economic base in New Zealand and perhaps the growth of a more stable economy which may not be affected as significantly as in the past by fluctuations in the agricultural economy.

5. Where Does Agriculture Go From Here?

New Zealand has moved a considerable distance from the days of early development (late 1800s) and outright dependence upon the agricultural sector. The process of developing alternative activities has proceeded at a variable pace depending upon the external market environment and internal policies involving import replacement encouragement and subsidies

for agriculture. At the present time, the policy stance is in favour of a "cleaner" relationship between the internal New Zealand market and that provided by overseas suppliers and importers. This has resulted in the decline in internal assistance to import replacement industries and a decline in support for export oriented sectors. The outcome of this has been the development of a stronger export sector as a wider range of companies and industries has become involved in the export sector through the realisation that export opportunities are available for non agricultural products and that, at current exchange rates, NZ manufacturers are able to supply products at competitive prices. The removal of export sector support in the form of subsidies for producers and export incentives for actual exporters has resulted in improved competitive ability in New Zealand based mainly on gains in productivity.

The outcome of this has been the decline in the agricultural sector as a proportion of export earnings, as a proportion of GDP and as a contributor to employment.

What is the future?

The short term outlook for agriculture has been presented in other publications (see Sheppard, 1993a, Thomson and Sheppard, 1993 and MAF, 1993) and therefore has not been repeated in this Paper. However, the longer term outlook, especially with respect to the relationship between the agricultural sector and the rest of the economy, deserves some attention.

The long term outlook for agricultural producers in all countries is a declining importance within the world economy. As food products become more "sophisticated", involving more complex processing and packaging, the off-farm agricultural sector will grow in importance. This has been observed over the history of New Zealand and can be expected to continue.

In addition to the decline in the importance of production within the agricultural sector, a decline in the importance of the sector as a whole can also be expected. As incomes increase in a world wide sense, the proportion of that income that will be spent on food items will decrease. More disposable income will be spent on other consumables and in particular the "service sector" can be expected to continue to grow both absolutely and as a proportion of total economic activity.

The goal for those involved in agriculture must therefore be the continuous development of more efficient means of production and processing both in terms of the output able to be achieved per land and labour unit and the efficient use of capital. Technological development must be seen as the means by which agriculture will progress in the future and such progress should be measured in terms of reductions in the amount of inputs required to achieve specified outputs. At the same time, the sector will need to concentrate on producing those products which are in demand and in developing a flexibility to respond to changes in demand. This will involve the further expansion of the off-farm sector as a proportion of the total agricultural sector with the expansion being achieved in ways which reflect increasing productivity and responsiveness to demand movements.

From a longer term point of view, it is my opinion that the present rigidity in the farm production system which is exemplified by the current growth in beef production while markets are declining, will have to be addressed by producers, processors and marketers. The decision to produce either sheep meat or beef will have to be replaced by a decision to produce "what level of meat protein?". Under this scenario, the way in which the protein

is produced will depend upon the most economical/efficient production system whether it be via the use of sheep, cattle, pigs, poultry, etc. In other words, the demand in world markets will be (and currently is) for meat protein. The sources of that protein are substitutable between the different animals. Within a short time (a decade or two) the source animal will not be important. Meat protein will be seen as an industrial material input (as is milk protein at present) and farmers will make decisions about the level of protein they will produce and then concentrate on the most economical way of producing it. This will mean that the farm sector will become more responsive to market demand, in terms of supplying the amount of protein required in the most cost efficient way and the off-farm processing sector will handle the meat protein input as a raw material from which it produces desirable protein based food products.

In addition to this form of production system, opportunities will continue to exist for small niche market products at a high cost and price with specialist marketing and branding systems. The successful development of such products and markets will require tight product control from production through to the final consumer and therefore implies the need for the development of a vertically integrated industry. This could involve ownership of production systems by product marketers and processors or ownership of processing and marketing systems by producers. Alternatively, strong contract arrangements will be required between processors and marketers and their producers. From an international point of view, historical development implies that the control of the system will rest with the marketers and processors with contracts being formed with the producers in order to achieve the required level and quality of supply. This does not imply that the producers are necessarily disadvantaged in such a system as the business of the processors and marketers depends upon the product supplied by the producers and the quality and reliability of that supply. The whole system becomes interdependent and must be seen in this way, rather than as a confrontational process.

In summary, the NZ agricultural sector can be expected to continue to decline in importance relative to the rest of the economy. This will be a result of the growth of total disposable income within the economy and internationally and the growth in demand for non-agricultural products and services. The objective for the sector should be the continued development of new and existing technology in order to operate more efficiently and so attempt to maintain and improve returns to the resources involved in agricultural production, processing and marketing. The non farm part of the agricultural sector can be expected to continue to grow as a proportion of the agricultural sector as processing (including packaging) and marketing become more important components of agricultural products. Over time, agricultural production will need to focus on the consistent delivery of raw materials for processing and marketing with the form of production of undifferentiated material being decided according to the most cost efficient production method. Vertical integration can be expected to continue through either ownership of factors of production or through the creation of binding supply contracts.

The future for the agricultural sector depends upon the continuous development of efficiency improvements in the production, processing and marketing processes. Such efficiency improvements can only be achieved through the continued investment in scientific research and development and the application of new technologies to the agricultural system process.

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APPENDIX

Changes in Labour Productivity in the New Zealand Meat Processing Industry

The New Zealand meat industry has been characterised by rapid change over recent years in contrast to a long period of stagnation through to 1984. In order to understand the NZ meat industry situation, some appreciation of the history of development is essential.

Almost since the inception of the NZ meat industry, there have been regulatory controls over the establishment of meat processing plants. Since the 1950s, these controls have taken the form of licensing of plants for export. The licences have been issued by the NZ Meat Producers Board. In this way, the number of plants has been restricted by the allocation of meat export licences. In addition, during the 1970s, proposals for the establishment of new plants had to indicate how such plants could be established without "damaging" the existing industry. Licences to operate were issued by the Ministry of Agriculture on the recommendation of a Meat Industry Authority which was made up of representatives from the industry, the Meat Board and Government. This situation meant that the industry was able to shelter behind a significant degree of protection while it undertook a "rational approach" to meeting hygiene requirements imposed by the EEC. This situation persisted until 1980 when the "economic criteria" for licensing killing and processing facilities were removed. Since 1980, companies have been able to establish new facilities by being able to comply with normal hygiene and local planning requirements and have therefore been able to establish in a competitive manner.

However, little development took place in the early part of the 1980s as the environment in terms of meat markets and prices became quite hostile. High stock numbers resulted in an increased supply of animals for slaughter and reasonable levels of capacity utilisation for the existing slaughter plants. However, market returns were low and payments to farmers (before subsidies) were also very low. This resulted in the NZ Meat Producers Board taking over the marketing of lamb in 1982 and the meat companies taking up a "commission selling and processing" role on behalf of the Meat Board. During the period from 1982 to 1985, the meat companies were able to accumulate substantial profits while operating on a guaranteed income basis through Meat Board payments. Eventually, by December 1985, the cost of operating the market intervention scheme became too great for the Meat Board and, following agreement between Government, the Board and the industry, the responsibility for NZ sheepmeat was handed back to the industry. From the 1985/86 season on, Government subsidies (Supplementary Minimum Prices) to farmers were removed. This led to a major reduction in sheep numbers as farm incomes fell rapidly. This was accompanied by a rapid fall in land values (by about 40 per cent), a rise in farmer interest rates to commercial levels and a consequent dramatic fall in farm investment and output.

The fall in farm output provided severe pressure on the meat processing companies. The companies depended upon continuation of a "satisfactory" level of capacity utilisation in order to maintain profitability. As utilisation fell, there was no opportunity to increase killing and processing charges as farmers were not able to bear any increase. At that time, returns for adult sheep, after killing and processing charges were deducted, were negative in many cases, while returns for lambs were very low. With the fall in sheep numbers, the

over capacity of the meat processing industry was clearly exposed. This led to the rapid realisation that many plants would have to close if the industry was to remain viable. Additionally, processing costs would need to reduce if farmers were going to be able to continue in production and so maintain a supply of sheep to the processing facilities.

As a consequence of this situation, a process of rationalisation has occurred. Table 9 provides a brief description of the changes in the plant and chain availability over the period from 1981 to 1989. These changes were accompanied by significant changes in meat processing plant ownership. The most significant was the withdrawal from the industry of Waitaki International Ltd which was the largest company in the meat industry. Waitaki plants in the North Island were sold to the Auckland Farmers Freezing Co-operative and the South Island Waitaki plants were sold to the Alliance Freezing Co-operative. During the sale process a number of plants were closed and labour redundancies negotiated. These are reflected in the data from 1985 to 1989 (Table 9).

Table 9
Processing Plant and Chain Rationalisation

	1981-1984		1985-1989		1981-1989	
New Plant Openings	4		11		15	
Upgradings of Abattoirs	7		7		14	
<u>Total Extra Export Plants</u>	11		18		29	
Whole Plant Closures	5		7		12	
Partial Plant Closures	-		5		5	
	Sheep	Beef	Sheep	Beef	Sheep	Beef
New Chains Opened	9	-	6	5	15	5
Ex Abattoir Chains	6	7	4	7	10	14
<u>Total Extra Export Chains</u>	15	7	10	12	25	19
Export Chains Closed	13	3	33	8	46	11
<u>Net Export Chains</u>	2	4	-23	4	-21	8

Source: Ministry of Agriculture and Fisheries

As a consequence of these changes, there was a dramatic fall in the total full time employment in the meat processing sector of around 25 per cent. Also, wage awards did not kept pace with inflation resulting in falling real wages and an increase in productivity. In addition, there was an introduction of shift work at at least two plants which increased the capital utilisation. Table 10 provides evidence of the fall in meat processing industry employment and relative wages.

Table 10
Meat Processing Industry Employment and Wages

	Full Time Employment	Ratio of Meat Processing Wages to Average Economy Wide Wages
1980	38,904	1.62
1981	38,715	na
1982	37,585	1.47
1983	37,647	1.51
1984	37,009	1.51
1985	38,248	1.54
1986	38,209	1.34
1987	34,649	1.29
1988	30,021	1.19
Change 1980-88	-22.8%	-26.5%
Change 1984-88	-18.9%	-21.2%

Source: Savage, 1990

The cause of much of the reduction in employment in the meat processing industry was the fall in livestock numbers and the consequent decline in animals available for processing and the output from that industry. Table 11 provides information on this.

Table 11
Livestock Inventory and Meat Production

June Year	Livestock (000 head)		Production (000 tonnes)		
	Total Sheep	Beef Cattle	Lamb	Mutton	Beef & Veal
1980	68,772	5,142	383	167	480
1981	69,884	5,094	426	198	504
1982	70,301	4,885	428	191	507
1983	70,263	4,481	480	199	538
1984	69,739	4,515	474	196	419
1985	67,854	4,595	498	213	495
1986	67,470	4,848	424	137	423
1987	64,244	4,804	436	180	512
1988	64,600	4,858	414	162	529
1989	61,158	4,470	387	163	600

Source: Reynolds and SriRamaratnam, (1990)

A "crude" measure of industry productivity can be arrived at by comparing the tonnes of meat produced with the number of full time employees required in the meat processing industry. In order to do this, the number of tonnes of lamb, mutton and beef have been added together and this total has been divided by the number of full time employees in the meat processing sector. The results of this are given in Table 12.

Table 12
Meat Processing Industry Labour Productivity

	Total Tonnes Produced (000)	Full Time Employees	Tonnes per Full Time Employee
1980	1,030	38,904	26.5
1981	1,128	38,715	29.1
1982	1,126	37,585	30.0
1983	1,217	37,647	32.3
1984	1,089	37,009	29.4
1985	1,206	38,248	31.5
1986	984	38,209	25.8
1987	1,128	34,649	32.6
1988	1,105	30,021	36.8

It should be noted that the "crude" analysis contained in Table 12 does not make any provision for changes in the number of hours worked by employees over the decade. However, the data illustrate the time when the issue was seriously addressed by the industry when productivity fell very sharply in 1986. This induced a period of rapid change as has been illustrated. Thus the total productivity improvement from 1980 to 1988 was 38.9 per cent in terms of tonnes of meat per employee. The productivity improvement can also be assessed after allowing for the fall in meat processing wages relative to the rest of the economy over the same period where there was a 26.5 per cent fall from 1980 to 1988 (Table 10). This means that the 30,021 employees in 1988 were equivalent (in cost) to 22,065 employees in 1980 relative cost terms. The output per adjusted employee in 1988 was therefore 50.1 tonnes. This represents an improvement in labour cost productivity of 89.1 per cent since 1980. While this appears to be a remarkable achievement, it must be viewed in the light of the serious over capacity that existed in the industry in 1980, the history of sector protection which had allowed this to develop and the period of continued protection from 1982 to 1985 while the Meat Board had ownership of all export sheep meat. Exposure of the meat processing and farm sector to "market conditions" in 1985 and the fall in stock supply in 1986 resulted in the dramatic changes recorded.

Continuing developments have included the ongoing establishment of small plants with larger older plants being closed. [For more complete information on the changes in meat industry structure, see the Supplement to the New Zealand Meat Producer, Volume 18, Number 3, 1990 ("The Players") and the New Zealand Meat Producer, Volume 21, Number 1, 1992.] However, significant capacity problems continue in the industry. The recent decision by the Auckland Farmers Freezing Co-operative to close sheep processing chains is an example of

the changes that can be expected to continue. The Alliance Freezing Co-operative, which took over a large number of the South Island meat processing plants formerly owned by Waitaki, also has what appears to be excess capacity. This situation will need to be resolved within the next couple of years and further closures are therefore possible. This should lead to further improvements in meat industry productivity, although the dramatic changes seen since 1986 are not likely to be repeated.

The development of the industry over this recent period reflects an inevitable consequence of the accumulation of protected inefficiency. The changes that have happened would have occurred at a slower pace over a longer period had the industry not been protected for many years. The past levels of protection have therefore been very expensive for the farming sector as can be seen from the major drop in processing costs that has occurred following rationalisation. A further change which has occurred through the rationalisation process is that farmers now control approximately 70 per cent of the meat processing industry through farmer co-operatives. The major companies of Alliance, AFFCO and PPCS are all farmer co-operatives. Richmonds and Fortex both have substantial farmer ownership. Other significant companies are Weddel Crown, Lowe Walker and the Riverlands Group which are not farmer controlled. There are a significant number of other small processors also operating, some of which have a significant farmer ownership. (This is also a significant development as in 1986, there was only one such small export meat processing company.)

Future development of the industry will depend upon the continuation of the deregulated atmosphere which currently allows competitive processing development. However, there is some dissatisfaction with the present system being expressed by some of the "players" in the industry. While excess capacity continues to be a problem, there is some resistance to the development of further small works which make the capacity situation more difficult for those with large capital investments in older, large plants. This has led to some calls for control over the development of further competitive capacity. However, such an attitude can only lead to a repeat of the previous situation and it is most likely that such calls will continue to be ignored by Government, so allowing competitive operations to be established leading to a resolution of the residual capacity problems in the existing industry.

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