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The Contribution of Agriculture to the National Economy of New Zealand¹

by
Robin Johnson²

Introduction

I have often been concerned with a misleading picture put about by some people about the role of agriculture in the New Zealand economy. There seems to be a confusion between production, value added, and productivity in the minds of these people. Perhaps we professionals are at fault for not making these important distinctions clear in what we say and publish? Perhaps what we have to say as advisors is not always consistent with the political message of the day?

In this paper, I look at the main statistical series and some supplementary data to establish the main economic contributions to the national economy and how they should be interpreted. How far can agriculture be regarded as the engine of growth in the economy and what is its relationship with other sectors? How far can any sector be regarded as more important than another? What are the linkages? Should one sector have priority over another? What are the export priorities?

Gross Domestic Product

In common with most western economies, farming contributes a declining proportion of gross domestic product in New Zealand (Table 1). Since 1960-61, the proportion has declined from 14.6% of GDP to 5.3%. The latter figure is still high compared with the UK or the USA. It is as well to remember that GDP is a value added concept hence it is not a substitute for the gross value of farm production (GAP). Over the years, value added has remained fairly consistently at 48% of GAP.

The UN Stats convention (SNA) used in New Zealand is to value product at first point of sale rather than at farm gate (a common error of interpretation). This convention thus requires that cost of transport to first point of sale is entered into the cost of intermediate inputs in the production accounts. Intermediate inputs (or non-factor inputs) are deducted from GAP to get GDP (or factor returns). Thus the GDP residual includes the returns to labour (including wages), the returns to land (including rent), and the return on other capital (including the interest on borrowings), plus any run-down in the capital assets (depreciation). The contrast here is with farm accounting systems which isolate profit before tax but after interest, or economic farm surplus which is earnings before interest and rent payments. The price indices associated with intermediate inputs are also commonly misinterpreted. The only relevant set is that on non-factor inputs *including* prices of purchases of livestock-any aggregate price index including wages or rents or interest is not relevant to national income comparisons.

Table 1 shows a declining percentage of nominal GDP and not declining agricultural GDP. Over the period concerned, GDP in agriculture has increased in nominal and real terms. All

¹ Paper contributed to Annual Conference of the Australian Agricultural and Resource Economics Society, 1999, Christchurch, New Zealand.

² Private consultant; formerly Policy Director, Ministry of Agriculture, Wellington.

that the figures show is that other sectors are growing faster than the farm sector and may well continue to do so. Agricultural sector growth is positive and still contributes positively to the economy.

Table 1: Contribution of Agriculture to Gross Domestic Product (GDP)
(\$m)

March years	Farming	Total Economy	Per cent
1960-61	410	2813	14.6
1965-66	560	4012	13.9
1970-71	590	5832	10.1
1975-76	1071	11668	9.2
1980-81	2161	23002	9.4
1985-86	2891	44719	6.5
1990-91	3912	73126	5.4
1995-96	5310	91739	5.8
1997-98	5209	98060	5.3

Source: Statistics New Zealand

Contribution to Exports

New Zealand is characterised by a very high ratio of agricultural exports to total exports (Table 2). But since 1960-61, the proportion in the total mix of exports has fallen from 92.5% to 53.4 %. The balance is made up from forest products and manufactured exports, which are growing at a faster rate than those of agriculture.

While it is unfashionable at the moment, it could be claimed that export lead growth is good for the economy. New Zealand has expanded agricultural exports in volume terms at a compound rate of over 2% per year since the war. To discourage this growth by national policies of monetary stabilisation and a desire for a level playing field is to forgo this contribution to total export growth. It could be argued that in the presence of an overvalued exchange rate (created by monetary policies pursued for other purposes), each extra \$ of exports is worth more than the \$ it actually brings in. This should surely be the shadow price for a set of incentives for greater export growth!

Table 2: NZ Agriculture and Exports
(\$m)

June years	Agricultural	Total Exports	Per cent
1960-61	519	561	92.5
1970-71	904	1132	79.9
1980-81	3787	6065	62.4
1990-91	8751	15065	58.1
1996-97	10905	20405	53.4
1997-98	11363	21250	53.5

Source: Statistics New Zealand

Interdependence

If one can accept that primary industry is a natural industry creating wealth out of local raw materials, then one can look for the wider effects in the economy of all the economic activities that are associated with primary production. This can be judged from input-output tables for all those industries which provide inputs or contribute to the processing of outputs into final consumer goods for a particular 'driving' sector (Table 3).

Table 3: Interdependence of Agriculture with Total Economy

March years	1995		1996		1997		1998e	
	\$m	% GDP	\$m	% GDP	\$m	% GDP	\$m	% GDP
Farming	4850	5.6	5310	5.8	5398	5.6	5209	5.3
Input supply to farming	1770	2.0	1887	2.1	2004	2.1	2042	2.1
Input supply to processing	1735	2.0	1871	2.0	1942	2.0	1969	2.0
Processing meat, dairy, textiles	3380	3.9	3882	4.2	4042	4.2	4109	4.2
Processing other agr. output	156	0.2	178	0.2	186	0.2	189	0.2
Transport	476	0.5	500	0.5	497	0.5	513	0.5
Wholesale/retail	752	0.9	819	0.9	831	0.9	819	0.9
Total Agricultural Economy	13119	15.2	14449	15.7	14900	15.6	14850	15.2
Total NZ GDP	86577	100.0	91739	100.0	95816	100.0	97940	100.0

Source: SONZAF 1998.

From this view, agricultural activities add up to 15% of the total economy in recent years. The most value added, after farming itself, comes from the processing industry for meat, dairy and fibre products. Other contributors are input industries like fertiliser manufacture, other processing industries, transport and wholesale/retail activities associated with agricultural products. The level of contribution of the total agricultural sector to the national economy has not declined in recent years.

Farming can be regarded as one of the driving sectors of the economy along with tourism and unprotected manufacturing. It is driving in the sense that if farming did not take place there would be no input supply industry and no need for a processing sector. It is also important, of course, in that it produces export goods efficiently at international prices. In this role, the farm sector is a major contributor to the growth of the economy when it is unfettered by conflicting macro policies. Given its biological basis of production, the farm sector requires certain protection from the uncertainties of the market place, particularly from wild fluctuations in product prices and exchange rates. There is a case to be argued for having institutions that help meet these uncertainties in the name of export growth. This would be a change from current policies.

Productivity³

³ The following discussion relies heavily on total factor productivity measures of economic productivity. Easton (1998) points out that, for short periods, the labour and capital measures used are rather poor approximations to the real use of the factors. He is particularly concerned about the write-down of capital assets following deregulation which

The greatest argument for increased investment in agriculture is the efficiency gains from the better use of resources in the farming industry in particular. Not only does farming contribute to positive growth in value added in real terms, but it also shows the greatest efficiency gains (Table 4) compared with other industries (Table 5) and compared with other countries (Table 6).

In terms of total input productivity and total factor productivity, New Zealand farming has significantly performed well through the turbulent years of the 1970s and the 1980s (Table 4)⁴. Whether the measure used is simple base year weightings based on a Laspeyre's index or a more sophisticated weighting system using Divisia indices, the results are the same. In the turmoil of restructuring in the 1980s, the rates of efficiency growth are actually higher than in the 1970s.

Table 4: Productivity Trends in New Zealand Farming 1972-1992

Variable	1972-83		1984-92		1972-92	
	Divisia	Laspeyre	Divisia	Laspeyre	Divisia	Laspeyre
			(Growth rates)			
Interm. Inputs	-0.2	-0.3	-1.1	-1.4	-0.1	-0.3
Capital	+0.4	-	-0.8	-	+0.1	-
Labour	+0.9	-	-1.4	-	-0.4	-
Total Output	+1.2	+0.9	+1.4	+1.5	+1.4	+1.5
Total Input	+0.3	+0.1	-1.2	-1.3	-0.1	-0.3
TIP	+0.8	+0.7	+2.6	+2.8	+1.6	+1.8
Factor Input	+0.7	+0.8	-1.2	-1.3	-0.1	-0.3
Factor Output	+3.1	+3.1	+5.2	+5.2	+4.2	+4.2
TFP	+2.4	+2.3	+6.4	+6.5	+4.3	+4.5

TIP = total input productivity ratio (includes non-factor inputs)

TFP = total factor input productivity ratio

Divisia = mean of base year and annual weights

Laspeyre = base year weights alone

Factor output = residual measure, unweighted

Source: Johnson (1996a)

Compared with other sectors of the economy, the agricultural sector has increased productivity the fastest in the period 1978-92 except in the Communications sector (Table 5). The Communications sector has particularly high labour productivity as might be expected, though not so high capital productivity, reflecting high investment growth in the industry (though not as high as in the aluminium industry). Overall TFP productivity growth in the New Zealand economy in the period 1978-92 was very disappointing at 0.7% per annum. The causes of this low growth rate are discussed further below. The growth rate of net output (value added) in agriculture compares well with fishing, forestry, mining, basic metals, electricity, communications and finance. This is in contrast to the poor picture

would require considerable adjustment to the perpetual inventory method. Over a period of 20 years these adjustments are not so important. One should also note that the aim is to measure the stock of capital in use not some outside valuation of capital in use.

⁴ I can never understand why the official MAF publication, SONZA, has never used and analysed the following data.

Treasury and others paint of the agriculture sector⁵. Since 1992, real output in the farm sector has increased by 2.6% per annum and total real GDP at 3.5% per annum.

Table 5: Productivity Growth across Sectors New Zealand 1978-1992
(Growth rates)

Sector	Net Output	Labour Productivity	Capital Productivity	TFP
Agriculture	3.8	5.1	4.2	4.5
Fishing	5.7	2.5	0.7	1.5
Forestry and Logging	4.3	6.4	4.2	4.1
Mining and Quarrying	4.7	8.3	-0.5	2.3
Food, Beverages & Tobacco	1.6	3.6	-2.2	1.6
Textiles, Apparel & Leather	-1.1	3.2	-2.1	1.6
Wood and Wood products	0.2	-0.5	2.3	-1.2
Paper, Printing & Publishing	2.0	3.4	0.7	2.1
Chemicals, Petroleum, Plastic	0.8	2.6	-8.0	2.9
Non-Metal Mineral products	-1.6	3.1	-2.1	0.5
Basic Metal industries	4.9	6.8	-2.6	2.6
Machinery, Metal products	-1.2	2.0	-2.8	0.3
Electricity, Gas, Water	3.3	5.0	1.7	2.6
Building & Construction	-3.0	0.1	-0.6	-0.4
Trade, Restaurants, Hotels	0.0	-1.0	-3.4	-1.9
Transport & Storage	2.3	4.9	0.5	1.6
Communications	6.2	7.3	1.5	4.7
Financing, Ins. & Real Estate	3.7	0.1	-2.4	-1.5
Owner Occupied dwellings	2.0	-	-0.2	-
Comm'ty, Social&Personal Serv	1.8	-0.5	0.9	0.3
General Govt Services	0.1	0.3	-1.4	0.0
Total Economy	1.4	1.8	-0.8	0.7

Weights = average sector factor shares in sector GDP

Source: Philpott (1993)

Compared with other countries the New Zealand record in agriculture is outstanding (Table 6) though the rest of the NZ economy does not compare so well! New Zealand shows the greatest agricultural productivity growth in the whole of the OECD between 1973 and 1989. No other country approaches it. Indeed the poor results in the business sector (where real output growth has been small in spite of investment) are normally concealed by the continued good results for farming and associated industries.

Table 6: Comparative Analysis of OECD Productivity Trends 1973-89

Country	Agriculture			Business sector		
	Labour	Capital	TFP ¹	Labour	Capital	TFP
(Growth rates of productivity ratios)						
Austria ²	4.7	2.4	2.7	2.4	-2.3	0.9
Australia	2.4	2.9	2.0	1.6	-0.7	0.8
Canada	4.2	0.5	1.9	1.4	-1.1	0.6
Denmark	6.1	1.9	2.3	2.3	-1.4	1.2
France	4.5	1.3	2.3	2.7	-0.5	1.7

⁵ An official at a MAF training course stated after looking at the constant price GDP series for the period 1978-96 that 'agriculture has not been strongly growing in recent years.....it had missed out on the rapid growth of the economy in the last few years'. See also comments by G Morgan below.

Germany ³	3.9	1.1	1.6	2.1	-0.9	1.2
Ireland	3.9	1.3	1.3	3.8	-1.1	2.8
Italy	3.9	0.5	2.2	2.3	0.1	1.6
Japan	3.0	-1.2	1.0	2.9	-2.1	1.7
Netherlands	4.1	-0.7	1.6	2.0	-0.1	1.3
New Zealand ⁴	5.3	4.6	5.0	0.8	-2.1	-0.3
UK	2.9	0.8	1.6	2.0	-0.2	1.3
US	3.8	3.3	1.9	0.4	-0.8	0.0
OECD ⁵	4.1	1.4	2.1	2.1	-1.0	1.1

Notes:

¹ Weighted average of input growth rates including non-factor inputs; weights are sample period averages.

² Includes forestry

³ Prior to reunification

⁴ Agriculture data estimated by the author for same period.

⁵ Simple average for 13 countries

Source: OECD Secretariat

An Export Strategy: There is considerable evidence that the low growth rate of the economy in the last 12 months has been associated with a decline in export earnings brought on by exchange appreciation between 1996 and mid 1998 (BERL 1998). The currency appreciation was driven, in turn, by the inward flow of capital funds associated with the Reserve Bank's monetary stabilisation policy of high interest rates and low inflation rates⁶.

A similar spurt in exports occurred in the period 1993-95 (Johnson 1996b). Export prices increased by 8.1% in 1992-93 and export volumes increased by 9.7% in 1993-94. Import volumes picked up by 10.6% in 1993-94 and by 16.3% in 1994-95. The increase in real GDP was 1.2% in 1992-93, 6.2% in 1993-94 and 5.3% in 1994-95. The boomlet ran out of steam in 1996-97 as export earnings were not maintained.

The Government and the Reserve Bank persevered with their low inflation policy right up to the middle of 1998. The harmful effects on the export sector were acknowledged. During 1996 the Reserve Bank went on the attack and remonstrated with farmers that any easing of monetary policy would only produce some initial gains, but the benefits would be short-lived as easing monetary policy would only trigger inflation and increased farm input costs. 'Enduring competitiveness can only be ensured by productivity, innovation and marketing' (Reserve Bank 1996, p.9). Since September 1998, the Bank has announced that monetary controls will be eased hence by implication the pressure will be taken off the exchange rate. In fact, there has been a mild depreciation of the exchange rate all through 1998 and the effects of the monetary easing have only shown up in 90 day interest rates since July. A further unwinding of the relationship has still to come.

The loss of export earnings has to be seen, in retrospect, as the price to be paid for monetary stabilisation during the 1994-95 boomlet and the following years of decline. The position was not reversed when the boomlet first came off the boil. It seems inescapable that if the nation wants economic growth then the nation needs an export strategy. Such a strategy

⁶ 'It appears that the 1998 downturn was the price New Zealand had to pay for having had growth in the mid-1990s that pushed economic activity to levels that were inconsistent with maintaining inflation in a 1-2% range. Underlying inflation peaked at 2.4% in 1996' (Ulf Schoefish, NBR, Nov 13 1998).

should give more attention to the management of the exchange rate, and to investment in the export industries. As far as agriculture is concerned, such investment needs to recognise the longer lead times in biological production and the need for some stabilisation of price incentives between years to provide a steady forward outlook for primary producers as far as re-investment is concerned. As far as can be seen, this advice remains unpalatable to the Government's advisors.

Compared with other similar sized countries New Zealand's export record is dismal (Table 7). Ireland has had exceptional help from the EU to build up its economy, but Norway, Chile and Singapore are all far more export oriented than New Zealand and likely to benefit from export growth policies. An appropriate strategy to maintain export growth in New Zealand has yet to be worked out. It should certainly include older industries that can adjust to new products and markets as well as new industries which utilise human investment and capital growth.

Table 7: Comparative Export Performance

Country	Population (m)	GDP/Nat Y (\$bn)	Exports (\$bn)	%
Singapore	3.1	160	187	116
Norway	4.2	250	98	39
Ireland	3.5	128	90	70
Chile	14.7	160	38	24
New Zealand	3.8	100	21	21

Source: I. Donald, NBR, Nov 27 1998.

Shifting Resources

In a series of newspaper articles Gareth Morgan has been articulating a growth strategy based on re-allocating resources to more productive uses (*Evening Post*, various). 'The last 14 years have seen some shift of financial resources away from commodity production but clearly nowhere enough to mitigate the impact of what is a downtrend (not a cycle) in those prices. Why do NZers continue to invest large dollops of available capital in forestry and agriculture, when it's so obvious their output prices just slide? The answer: tax breaks and regulatory encouragement'. He favours deregulation of the producer boards, removal of all forms of protection, removal of tax incentives for forestry, and eliminating the non-neutrality of tax with respect to investment in owner-occupied housing. 'The slide in living standards here over the last 25 years is no accident or infliction of bad luck- it is the result of lazy policy making. 'The xenophobia of the electorate is pulverising the ability of the government to pursue a human capital and wealth-enhancing strategy'.

From Morgan's point of view, primary industry is still too protected from real economic forces. There are remnants of former protection policies in taxation, especially for forestry, and in agricultural marketing. As Morgan points out, one thing leads to another: it is possible for a dairy farmer to obtain finance at a lower rate of interest than a computer software venturer because the marketing board [and the government?] stands as a guarantor of the dairy farmer's returns. It's the shift of resources to new growth industries, whatever they are, which is important, and not the continued encouragement of the primary industries.

This has to be judged against the productivity data already reviewed. In one sense, agriculture has been able to have a high rate of productivity growth (and investment) because it had the extra assistance. But on the other, some experts would say that agriculture has had to

produce the goods because there was no alternative to financial survival. I lean to the latter view and believe that productivity increase in agriculture has historically always been used in New Zealand to finance industrialisation and full employment programmes, to counter declining terms of trade, to counter mistakes in Government policy with regard to import programmes, and to take the brunt of Government's monetary stabilisation programme in recent years. I believe that artificial protection for the sector has to be removed, but that it may well be possible that value adding in primary products could still compete with other enterprises favoured by Morgan⁷. Ian Donald makes the point that 'adding value' is a misnomer in business terms and that it would be more correct to talk of 'adding margins' as this would preclude non-profitable development of added value exports such as Challenge Meats were involved in the 1980s.

I conclude by dedicating these pages to my former mates at MAF and challenging them to take up the real arguments for maintaining a healthy agricultural export sector.

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Farming still mainstay of the economy

The farming sector is still the mainstay of the New Zealand economy, says Dr Robin Johnson, in a paper to the Australian and New Zealand agricultural economists' conference in Christchurch this week. Dr Johnson, a former policy director at the Ministry of Agriculture in Wellington, maintains that agriculture is still one of the main driving sectors of the economy along with tourism and unprotected manufacturing.

Across the economy, farming contributes 15.2% of gross domestic product and 54% of total merchandise exports. These activities provide jobs for 16% of the employed work force.

⁷ Even Michael Porter supports this view (NZ InfoTech Weekly, 371). He supports tax incentives for reaching certain levels of investment in training or research and development. He supports the concept of NZ sticking to what it knows. NZ should develop a whole raft of agricultural technology industries round its core strengths, as well as new ventures such as the software industry.

They include input supply industries like fertilisers, service industries like the stock agents, and distribution activities like transport and exporting. In addition, farming competes with the communications sector for the highest sectoral productivity growth rate in the economy since 1978.

`If farming production on this scale and with these efficiency gains did not take place, there would be no need for an input supply industry, no need for a processing or transport sector, and no jobs for a lot of people" says Dr Johnson in his paper.

Dr Johnson also maintains that past productivity increases in the farm sector have been used by successive governments over a long period: to finance industrialisation and full employment programmes, to counter the declining terms of trade for farm products, and to counter mistakes in Government policies with regard to import programmes. In more recent times, the farm sector has been used to bear the burden of the Reserve Bank's monetary stabilisation programme.

`The loss of export earnings in recent years has to be seen as the price to be paid for monetary stability since 1992-93' says Dr Johnson. `If export earnings had been growing in this period, significantly greater growth rates of national income would have been achieved in the following years. It seems inescapable that if the nation wants economic growth then the nation needs an export strategy. As far as agriculture is concerned, such a strategy should include management of the exchange rate, and encouragement of investment in export industries. Such investment needs to recognise the longer lead times in biological production and the need for some stabilisation of the price structure between years to provide a steady forward outlook for primary production. As far as can be seen, this advice remains unpalatable to the Government and it's advisors' concludes Dr Johnson..

Dr Johnson is a retired policy analyst living in Wellington. He is a brother to Eric Johnson the well-known fisherman at Scarborough, who recently featured in these pages!

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