



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

New Zealand Agricultural Policy Review: 1994-1996 I: Macro Policy

R.W.M. Johnson*

The period under review has seen a resurgence of economic growth in New Zealand with consequent improvements in employment and a turn-around in the fiscal deficit. Inflation has been controlled by strict monetary policy with consequent effects on the TWI. As a result, prices of tradable goods have been depressed in a period of growth. The agricultural export sector has been disadvantaged in this environment and shows little real growth in output but continues its remarkable productivity gains. The policy parameters for agriculture continue to be set in the macroenvironment as set out in previous reviews. This article brings up to date the discussion of national policy attitudes and performance of the agricultural sector while a second article sets out the continuing search for new and modified marketing institutions in New Zealand.

1. Introduction

This review follows previous surveys of the impact of deregulation on the New Zealand agricultural sector (Johnson, Schroder and Taylor; Johnson 1991; Johnson 1993). The aim is to cover policy developments in the period mid 1993 to mid 1996. The review covers macroeconomic factors affecting the agricultural sector, performance of the sector as a whole, and changes in production, incomes and investment. Changes in marketing board legislation are covered in Part II of the review.

In this period, the conservative government of the Rt Hon James Bolger has continued in power; the Hon Ruth Richardson was replaced as Finance Minister after the General Election in 1993 by the Hon Bill Birch; the Hon John Falloon was replaced as Agriculture Minister in early 1996 by the Hon Dr Lockwood Smith. As discussed previously, there still do not appear to be explicit government policies for the agricultural sector; rather there are macroeconomic policies which bear quite heavily on the fortunes and performance of agriculture. These particularly concern the arrangements for monetary policy as administered by the Reserve Bank and the consequent effects on interest rates and exchange rates. A General Election was held on October 12 1996, but a new govern-

ment had not been formed in time for completion of this review.

1.1 The 1996 Budget Provisions

In the 1996 Budget, the rhetoric is the same as reviewed previously (Johnson 1993, p.375). Separate sectors are not identified except that manufacturers are given the credit for facing world competition at home and abroad by raising their real value added by 23 per cent between 1991 and 1995 (Budget, p.5). Infrastructural and environmental spending are highlighted, and a general plug is given for maintaining competitive advantage by continuous improvement in private industry, especially in product development and marketing (Budget, pp.6, 16, 18).

The Finance Minister sets out 'five enduring principles' which encompass as well as anything the guiding principles of the government in the period under review:

- (a) *An open economy* delivers goods and services in greater diversity at better prices. At the same time, it hones the skills and know-how of producers to the best possible degree.
- (b) *Stable prices* play a crucial role in public confidence. High inflation steals our savings. It pushes up the cost of investment. It damages the reliability of all social and economic decision-making.
- (c) *Flexible labour markets* are essential to efficient cooperation between employer and employee, to make the most of the energy, skill and enterprise of both parties.

* Consultant, Wellington. Review was completed in September 1996. I am grateful to Richard Wallace and Prakash Narayan for useful advice and suggestions.

- (d) *A low-rate broad-based tax system* underpins these principles by collecting the revenue required to fund Government objectives with minimum damage to the incentives that drive the progress of the nation.
- (e) *Effective government management* is equally critical, to reduce public debt, and deliver goods valued by the community at the lowest possible cost to the tax-paying public.

(Budget 1996, p.6, italics in original).

The Minister states that progress has been achieved in the areas of economic growth, inflation, unemployment, the reduced government deficit, the reduced public debt, with increased spending in the key areas of health and education. As with the previous Minister, the 1996 Budget Statement lays considerable stress on *the quality of its financial management*:

The outcome of this combination of quality policy with quality management is a fiscal balance unlike any seen in New Zealand for a very long time. Government, in the red for 15 years, has, since 1991-92, moved from a \$5 billion deficit to a projected surplus of \$4.9 billion in 1998-99 (Budget, p.9).

This review will therefore assess these changes in the New Zealand economy from the point of view of the agricultural sector and endeavour to weigh up the opposing arguments for tight monetary control versus an expansionary moderate-inflation policy that encourages the growth of the tradable goods sector as a whole.

2. The Macroeconomic Environment

2.1 The Economy

In this section, the macroeconomic data is presented in Table 1 and is consistent with the earlier series (Johnson 1993, p.377). With revisions, as indicated, the tabular material in both reviews is directly comparable.

2.1.1 Growth

The last review commented on the slow rate of growth of the economy following deregulation and suggested that the lack of growth was attributable to the tight monetary policy then followed, declining external terms of trade and lack of confidence. In this period, the economy has shown remarkable resilience and has grown by an average of 4.3 per cent per year since

Table 1: Trends in the national Economy 1991-92 to 1995-96 (Annual Percentage Changes)

Year	Real GDP	Employment	CPI	Export Volumes	Export Prices	Import Volumes	Import Prices	Terms of Trade	Balance of Payments (%GDP)	Govt Deficit (%GDP)	Unemployment (%Lab Force)
1991-92	-1.2R	-0.8	+1.3R	+11.5	+2.7	-2.8	+4.0	-1.3	-1.9R	-2.5R	9.9
1992-93	+1.2R	+1.0	+1.4R	-1.5	+8.1R	+7.7R	+4.0R	+4.1R	-1.7R	-4.7R	11.1
1993-94	+6.2	+3.9	+2.8	+9.7	-4.3	+10.6	-3.7	-0.6	-1.3	+0.7	10.2
1994-95	+5.3	+5.0	+2.9	+5.9	-0.4	+16.3	-1.0	+0.6	-3.8	+3.8	6.9
1995-96E	+3.1	+3.9	+1.2	-3.0	-0.5	+5.9	-0.6	+0.1	-2.9	+3.8	6.5

R = revised
E = estimate

Real GDP (production basis) March years.

Employment is per Household Labour Survey (revised). March quarter.

Consumer Price Index, December quarter.

Exports and Imports. June years.

Balance of Payments on Current Account. March years.

Government deficit before borrowing and financing of major projects. June years.

Unemployment, persons seeking work (revised). March quarter.

Sources: Key Statistics (August), Statistics New Zealand (1996).

1991-92 (Table 1). There was a marked improvement in the terms of trade in 1992-93 followed by marked increases in export volumes in the following two years which seem to be the most important factors driving the initial recovery. As a result of this resurgence of economic growth, the number of jobs available increased rapidly, and the government wiped out its budget deficit as the revenue improved. As might be expected, import volumes followed the boom upwards with a lag and have only recently fallen back. This has implications for the balance of payments on current account of which more below.

As the Budget statement (p.7) puts it:

The economy is in the process of adjusting from the very high growth rates of 1994-95 in excess of 6 per cent, to the solid sustainable rates clearly indicated in medium term forecasts. Growth, actual and projected, from mid 1993 to mid 1999 shows an annual average of 4.1 per cent for the six year period, compared with an average of 1.4 per cent in the 15 years 1976-1990. Economic growth for a wide variety of reasons, including international markets, will always vary from year to year. Under present policies New Zealand is experiencing its strongest and most sustained period of economic growth since Britain joined the EEC.

2.1.2 Inflation

At the last review, the rate of increase of the CPI had decreased from 18.2 per cent per year in 1986-87 to 1 per cent in 1992-93. In the current period, there has been a slight acceleration in the inflation rate as the economy was growing strongly (Table 1). Under the Reserve Bank Act, the Bank has the power to manipulate monetary policy to try and keep the underlying inflation rate below 2 per cent per annum and this instruction has been followed to the letter over the period. In turn this policy has kept interest rates much higher than international averages (Table 2), with certain consequences for the cost of borrowing for re-investment. It also has profound implications for exchange rates which is discussed further below.

The Government view of inflation is as follows (Budget p.7):

Inflation in the 1975-1990 period, averaged 12.3 per cent per year. Enormous ongoing

costs were imposed on New Zealand. Under this Government, since September 1991, we have cut the average annual rate to 1.9 per cent - one sixth of its former level. The nation has begun to claw back the losses of those earlier years.

2.1.3 Employment

At the last review there was no growth in total employment. In this period unemployment has been sharply reduced by the growth in the economy and the total labour force employed has expanded by 14 per cent (Table 1). During 1995 the rate of unemployment dropped to 6.2 per cent in some months and in some urban centres is much below this. The Government claims that economic growth and the Employment Contracts Act (see Johnson 1993, p.383) have slashed the unemployment rate putting New Zealand among the better performers in the OECD. The number of jobs created is stated to be 202,900 (+13.9 per cent) in the last four years (Budget p.8).

2.1.4 Terms of Trade

Movements in the terms of trade in the current period have not been as favourable as the period last reported. Export prices were generally expanding ahead of import prices until 1990-91 though with little impact on the national economy (Johnson 1993, pp.373-378). In this period, there was a boost in export prices only in 1992-93 (volumes were more favourable in later years) along with very moderate changes in import prices. As a result the terms of trade has not been a significant growth factor in the period under review.

New Zealand continues to run a balance of payments deficit on current account at roughly the same (negative) levels of GDP through the whole ten year period (Table 1). In the last two years the deficit appears to be growing. Since the Government has a policy of paying off foreign public debt, there has been a massive switch from government held foreign debt to private held debt. This is related to the inflow of investment and equity funds attracted by the Reserve Bank's interest policies and the relaxation of rules governing foreign ownership in New Zealand.

Recently, there has been immense public interest in the use of the funds created by the sale of the Government's forestry assets - the Government claims that foreign debt has been reduced to zero. This is discussed further below.

2.1.5 Budget Deficit

In the last review it was reported that the budget deficit has turned negative in the 1991-92 and 1992-93 fiscal years. In the 1993 Budget, the then Minister of Finance announced considerable reductions in public expenditure especially on the welfare side. This tight approach has generally been followed in the following budgets with total expenditure effectively stabilised in money terms; expenditure rose by 5.7 per cent in 1992-93, dropped by 5.7 per cent in 1993-94 and rose by 2.7 per cent in 1994-95. On the other hand, total revenue rose by 9.4 per cent in 1992-93, 1.1 per cent in 1993-94, by 11.4 per cent in 1994/95, and is expected to rise by another 4.2 per cent in 1995-96 (Pre-election Financial Statements 12 September 1996). The resulting improvement in the government's finances has resulted in a movement from budget deficits to substantial budget surpluses (Table 1).

The Government's view on these events was as follows (Budget p.8):

We have moved the Government accounts from persistent deficit into a new era of large and sustainable surpluses. By combining growth with discipline we have been able to increase the volume of Government spending, and at the same time, to reduce that spending as a proportion of GDP. New Zealand's public debt level, 52 per cent of GDP in 1991-92, was an unacceptable risk to both the economy and the security of health, education and welfare services. In the four years since, the Government has reduced that to 32 per cent. We aim now, as a top priority, to lower it rapidly to below 20 per cent, followed by more gradual reductions later.

The Economic and Fiscal Update on September 12 included details of the fiscal outlook to 1999-2000 (p.26). Revenue is expected to rise to \$38.5b and expenditure to \$32.8b. The operating balance of \$6.4b (which includes other items) is equivalent to 5.9 per cent of estimated GDP compared with the 3.8 per cent for 1994-95 shown in Table 1. In the course of the General Election in October 1996, various promises have been made to increase welfare spending but Government Ministers held firm to the above official projection issued just before the election. There are other major uncertainties, of course, in the economic

outlook and future governments will have to cut their cloth to suit the circumstances when the time comes.

2.1.6 Monetary Policy

Monetary policy is implemented by the Reserve Bank under the terms of the Reserve Bank Act 1989 and the Policy Targets Agreement between the Governor of the Bank and the Minister of Finance. The bank's objective is to achieve price stability (defined as 0 to 2 per cent annual increases in the underlying rate of the CPI) and then to maintain it. The Bank operates through controlling the amount of cash balances and short-term Reserve bank bills held by the settlement banks.

In 1993-94 and in 1994-95 the rate of inflation has exceeded the target rate and the bank has tightened the money supply accordingly. (The bank actually works on a measure which has oil prices, interest rates, indirect taxes and changes in government charges where these exceed one quarter of a per cent, removed from the index calculation-the underlying rate). The effect of the monetary restrictions is to make borrowing more expensive both in the short term and the long term (Table 2). Long term Government Stock has moved from an average of 7 per cent in May 1994 to 8.8 per cent in May 1996. Overdraft lending has increased from 9.2 per cent in 1994 to 12.1 per cent in 1996. The inverted yield curve is not likely to reverse itself until mid 1997 according to some experts (S. Hanke in the *The Evening Post*, Sept 23., 1996).

This policy-directed result in turn attracts foreign investment in New Zealand securities and shares which in its turn puts pressure on exchange rates (Table 2). At September 20 1996, overseas money markets were lending money at 4.6 per cent when short term money was 9.8 per cent in New Zealand (*National Business Review*, Sept 20., 1996). Foreign ownership of government-issued Treasury Bills has risen from \$0.8b to \$2.9b in three years. Since 1992 the trade weighted exchange rate index (TWI) has increased by 18 per cent as a result of these flows, and the \$NZ has appreciated against the \$A by 15 per cent. This phenomenon puts a great deal of pressure on the tradable goods sector and agriculture in particular with reduced revenues and incomes for farmers as a result.

The Government is not unaware of these problems:

On balance, the short term outlook is for underlying inflation to remain near the top of

Table 2: Annual Trends in Interest and Exchange Rates

Year	Interest Rates ¹		Exchange Rates ²		AS/NZ\$ % change
	Government Stock (5-7 years) (Issue rates)	Bank overdraft (Weighted ave)	Trade Weighted Index (100=1979)	% Change	
1991-92	8.3	11.4	55.1	-7.1	-5.5
1992-93	7.1	10.9	53.6	-2.7	+5.5
1993-94	7.0	9.2	56.2	+4.8	+7.6
1994-95	7.6	12.2	59.2	+5.3	+4.9
1995-96	8.8	12.1	63.2	+6.8	+2.2

1 = May average
2 = June years

Sources: Key Statistics (August), Statistics New Zealand (1996).

the target range in the next few quarters, before falling to about 1 per cent in early 1997. CPI inflation should broadly follow the same path. Inflation pressures are forecast to increase during 1997, reflecting the expected pick-up in activity. The maintenance of firm monetary conditions, however, should ensure underlying inflation remains between 1 and 1 1/2 per cent for the remainder of the forecast period (Budget Economic and Fiscal Update p.50).

On the effects on the exchange rate:

Monetary conditions will need to remain firm to lean against inflation pressures. The [Treasury] projections incorporate the assumption that the nominal exchange rate appreciates by around 1 1/2 per cent each year, based on the difference between new Zealand's inflation rate and the average inflation rates of our major trading partners. Consistent with this, only a gradual fall in interest rates and narrowing of the yield gap is expected towards the end of the forecast period [1999-2000] as inflation pressures taper off. (ibid p.50).

As far as the effects on tradable goods are concerned:

Over the past two years, the exchange rate has appreciated significantly. The central forecast contains a judgement that New Zealand firms maintain their international orientation and are able to adapt to changing circumstances, including the higher ex-

change rate, through continuing efficiency improvements. *If this is not the case, the export sector could perform worse than expected.* It is likely that a weaker performance would be accompanied by slower investment and productivity growth and a larger current account deficit (italics inserted) (ibid p 52).

The only mention of agriculture in the Budget then follows(!):

Such poorer business conditions would reduce firms' confidence and could result in significantly less investment in plant and machinery. *Further, lower profit growth, particularly by exporters in the rural sector, would lower household income, reducing confidence as well as consumption and residential investment growth* (italics inserted) (ibid p.53).

2.1.7 The Exchange Rate Debate

The above policy stance therefore has profound implications for the agricultural sector. As Table 5 shows, in the three years since 1993 the number of \$NZ earned per unit of foreign exchange has fallen by over 16 per cent. This measures the average effect over all export goods. For some commodities, the effect is worse. For apples (sold in UK and US currencies) the exchange rate appreciation has been 31 per cent in three years, and for lamb (UK and European currencies) the appreciation has been 28 per cent. Less affected are cheese - 8 per cent (Japan and US) and kiwifruit - 11 per cent (Germany, Japan and US)(McConnell and SriRamaratnam).

The farmers' organisations, the Dairy Board and the Apple and Pear Board have all made representations to government to ease up on monetary policy. The response so far from government is indicated in the above statements from the 1996 Budget.

However, the Reserve Bank itself has been heavily criticised and it has felt it necessary to issue its own analysis of the situation. In August 1996, the Bank issued an information package directed at their farmer critics. Some passages of their justification for present policies are worth repeating as such reassurances did not emerge from Government.

After justifying short term interest rate levels (along the lines described above), the Bank claims that long term interest rates are much closer to or below those of other developed countries (Reserve Bank, p.4)(the inverted yield curve). 'The path to consistently low interest rates is through a record of consistently low inflation, and a clear commitment to achieving and maintaining price stability'. On easing monetary policy, it states:

An easing of monetary policy would allow the exchange rate to fall, which would provide some initial gains in profitability. However, unless the easing was justified by an improved inflation outlook, the benefits would be short-lived, as easing monetary policy would also trigger inflation. Increased farm input costs (services, materials and labour), higher interest rates and increased personal living costs would erode the initial benefits (ibid p.5).

Remember that inflation is particularly harsh on farmers. A wage and salary earner, faced with inflation, can seek a pay rise. A local merchant confronted with higher costs can raise prices. However too often farmers don't have these options - too often they are price takers. The prices New Zealand farmers receive are set by international markets, which farmers generally cannot influence (ibid p.6).

Observing that beef prices (at farm gate) have decreased by 52 percent over the three years to 30 June 1996, the Bank notes that 77 per cent of this fall was due to declining international prices of beef and 23 per cent due to appreciation of the \$NZ. They then generalise to say that some commodities are doing well internationally and others are not (!) and conclude:

There is no doubt that in the short term an appreciating exchange rate impacts adversely on export returns, but over the longer term this is generally balanced by the benefits of low inflation, i.e. lower input costs. *The principal challenge faced by farmers is how to achieve better prices for their products on international markets (ibid p.7)(italics inserted).*

A conclusion is then reached:

Wasn't achieving price stability supposed to ensure our competitiveness as exporters? Not in itself - price stability on its own cannot make exporters in every sector competitive abroad, although, longer term, price stability is crucial to New Zealand's and farmers' overall economic success. Price stability and the exchange rate interact, so that long term competitiveness cannot be engineered or faked by either low inflation or a low dollar on their own. *Enduring competitiveness can only be ensured by productivity, innovation and marketing (ibid p.9)(italics inserted).*

2.1.8 Asset Sales

In September 1996, the Government sold the Forestry Corporation to private interests for NZ\$2 billion. The Minister of Finance announced that the sale would wipe out currency and interest rate risk linked to foreign debt (*Evening Post* 21 August 1996). This was generally taken to mean that the sale proceeds would eliminate foreign debt. If true this would lift the heavy burden of interest charges on government-held debt and help to sustain the projected budget surpluses.

It turns out the Minister of Finance was quoting from a table of net government foreign currency debt (*The Independent* 6 Sept 1996). In the 1996 Budget (Fiscal Update, p.202), total NZ-dollar debt is put at \$31.8b, foreign-currency debt at \$10.3b (total \$42.1b). Financial assets are shown as totalling \$13.1b (foreign currency holdings, advances to state-owned enterprises, and student loans) making net public debt of \$29.0b. If foreign-held financial assets are deducted from foreign-currency debt, the net foreign-currency debt was \$1.1b on 30 June 1996. More realistically, foreign-currency debt will reduce from \$10.285b in June 1996 to \$7.375b by June 30 1997 and this will be the foreign debt needed to be serviced out of the tax revenue (plus of course \$31.3b of NZ-held debt to be serviced). Indeed the Minister correctly anticipated this when he

referred to *the reduction of currency and interest rate risk linked to foreign debt*. Foreign-held financial assets are not without risk, however, and some commentators have pointed out that the risk is being reduced on the borrowing side and increased on the asset side (*The Independent*, 20 Sept 1996).

Curiously, the appreciation of the NZ\$ in recent years (due to the tight monetary policy among other things) has lessened the burden of fiscally paid interest on foreign debt. In the old days of devaluation adjustment to falling commodity prices it was the rising cost of servicing foreign debt that moderated government impulses to give, in effect, the farmers better prices. But a risk is a risk in any situation, and any trading country with foreign debt is at the mercy of sudden changes in the terms of trade as far as servicing foreign debt is concerned (probably more so in developing countries than NZ).

New Zealand does have an open economy and trade is dominated by primary products and their derivatives. Present government macroeconomic policies to reduce government-held foreign debt is a precautionary stance that protects the agricultural base of the export economy from future fluctuations in the terms of trade and increased tax burdens in times of financial adversity.

2. Commentary

This discussion of the macroeconomic environment has been longer than in previous reviews. It demonstrates the author's conviction that sectoral policies have disappeared in the new economic framework and that they have been replaced by general policies which stabilise the economy, encourage growth, and do not pick sectoral winners. The key issue is responding to international economic pressures which continue to affect the economy. Current philosophy favours monetary controls to reach the stability objective but otherwise to allow the resilience of the economy to adjust to other international pressures including the long term decline in the terms of trade for agricultural commodities. Of no less importance are the fiscal policies which keep the domestic budget balanced and restrict political opportunism with respect to public demands for better and greater health and education expenditures.

The New Zealand economy has made great gains since the last review (Johnson 1993). A period of static economic growth has been replaced by an astounding

leap forward (though not that great in terms of some Asian developing economies). Some commentators have characterised the changes as an outstanding experiment in economic planning (David Henderson, *The Dominion*, Sept 10, 1996). In the period before 1984, Henderson notes that New Zealand was no more highly regulated than a number of other OECD countries. After 1984, New Zealand was part of a broad stream of reforms taking place in a range of OECD countries that were not localised to 'Anglo-Saxon' countries. Nor was the fact that a New Zealand left-of-centre government drove the reforms unusual - Greece, Spain, Sweden, Australia, France, and Finland had governments at least as left-wing. Countries liberalised their economies through the failure of current policies rather than as an endorsement of liberal policies in themselves.

Henderson says that it is clear from the evidence, both qualitative and quantitative, that the extent of liberalisation over the last 10 years places New Zealand in a class of its own in OECD countries. 'No other OECD country has attempted so systematically to redefine and limit the role of government, and to make public agencies and their operations more effective, more transparent, and more accountable. It is in this important extra dimension, as well as in the range and scope of reforms that have their more obvious counterparts elsewhere, that gives the New Zealand programme its special character'.

The agricultural sector in New Zealand has adjusted to the new situation since 1984. It is still the dominant contributor to foreign exchange earnings. According to MAF, the total agricultural sector (including input supply, processing and transport links) generates some 15.4 per cent of total GDP and provides employment for 17.1 per cent of the total labour force (SONZA 1996, p.124), and 54 per cent of exports in 1995 (SONZA p.121). As discussed below, the sector's productivity performance has been the highest in the OECD over the whole period since 1972 and particularly in the period since 1984 (Johnson 1996a). Farm incomes are largely based on sales of export products and have fluctuated with the terms of trade as well as with exchange rate movements. At present, dairy products are enjoying relatively high terms of trade (Table 6), and sheep and beef farms rather less so (Table 6). Overall farm revenues appear to be static in nominal terms (Table 3), and advances in income must derive from diversification and increased productivity. These adjustments are happening and seem likely to continue to happen in a changing world of international trade.

Table 3: Agricultural Sector Performance 1992-1997 (\$m)

March Years	Production	% Change	GDP	% GDP	% Change	Real GDP 90-91 Prices	% Change
1992	9,274	+9.2	4,487	6.1	+14.8	3,827	+1.0
1993	10,135	+9.3	4,387	5.8	-2.2	3,784	-1.1
1994	10,515	+3.7	4,517	5.6	+6.4	4,027	+6.4
1995	10,246	-2.6	4,469	5.2	-0.5	4,047	+0.5
1996E	10,348	+1.0	4,501	5.0	+0.7	4,047	+0
1997F	10,645	+2.8	4,702	4.9	+4.5	4,128	+2.0

Sources: Situation and Outlook Report, Ministry of Agriculture (1996), Statistics New Zealand (pers. comm.)

3. Agricultural Policy

In previous reviews, three year changes in legislation and administrative arrangements affecting agriculture have been discussed. In this review, a different arrangement has been achieved by inviting outside authors to discuss developments and problems in their areas of expertise - in this way interested readers are referred to separate articles on marketing board reform, the Resource Management Act, and urban development. Other areas where policy has developed or changed are briefly discussed next.

3.1 Occupational Safety and Health

Farm-based accidents and injuries have been the subject of two recent articles in the *Review* (Brush and Clemes; Low and Griffiths). Attention to this subject matter is a relatively recent development. Clearly, farm-related accidents and lost work time have a high social cost to society; such accidents account for the third highest number of claims to the ACC after back injuries and motor vehicle accidents (SONZA 1996, p.21).

In November 1994, the Accident Rehabilitation and Compensation Insurance Corporation (ACC), launched a five year strategy aimed at reducing the number and severity of farming injuries. Phase One of the strategy focuses on reducing injuries from farm vehicles, especially tractors, all-terrain vehicles (ATVs) and motorbikes by the use of resource kits, training and information, and general awareness campaigns. Phase Two of the campaign focuses on reducing injuries from farm animals and manual handling. ACC provides accident compensation on a no-fault basis and is funded by differentiated levies on earnings.

The Department of Labour (whose Occupational Safety and Health Service (OSH) administers the Health and Safety in Employment Act) (HSE), has coordinated with Federated Farmers in producing a guide to the application of the legislation to farmers. The need was apparent that farmers were unclear as to their responsibilities under this new legislation. OSH also plan to publish guidelines for agriculture to help illustrate how the HSE Act applies to the farm sector. Some farming communities have restricted access to their land to avoid penalties under this legislation.

3.2 Commodity Levies Act

This was previously discussed in the 1993 review (Johnson 1993, p.382) in the context of funding science activities through farmers' organisations. Organisations can use the Commodity Levies Act to collect compulsory levies from producers of commodities to provide funds for specified purposes. There is still debate over the method of collection of the levies (SONZA 1996, p.28) particularly over compliance costs. Still, thirteen new levies were approved in 1995, on fresh vegetables, processing vegetables, fresh tomatoes, processing tomatoes, potatoes, asparagus, export squash, avocados, orchard fruit, berry fruit, black currants, blueberries and farmed deer products. It is noted that some orchardists end up paying several levies.

In response to the policy of supporting industries that are prepared to fund research themselves, agricultural industry groups are using the legislation to raise funds for agricultural research among the other specified purposes of the compulsory levies. The funds coming from this source are still very small and it seems unlikely at this stage that producer-controlled research funds will ever become as important as they are in Australia.

3.3 Science Funding

The Public Good Science Fund (PGSF) is now set at \$267m for 1996-97 and is scheduled to increase by a further \$15m in 1997-98 (see Johnson 1993, p.381). These monies are distributed to 'science providers' through a competitive process managed by the Foundation for Research, Science and Technology (FRST). The original 10 crown research institutes have been reduced to 9 as the proposed social science institute was disbanded in 1995 due to a lack of income and its small size. Data for 1992-93 (the latest available) show that government was funding 60 per cent of total science expenditure in New Zealand, the business sector 30 per cent and universities, private non-profit organisations and overseas organisations 10 per cent (MoRST 1995). This total was 1.0 per cent of GDP compared with the OECD average of 1.8 per cent.

The NZ Pastoral Agriculture Research Institute (AgResearch) reported in 1995 that 36 per cent of its revenue was earned from non-government sources (AgResearch 1995, p.6). The chairman's report was not altogether positive about future developments: 'While revenue remained almost static from the PGSF, it increased slightly from new and expanded relationships with commercial interests.... Revenues from the traditional pastoral agriculture outputs in the PGSF are forecast to decline in the short term, given the recent changes in the priorities for science funding.... Non-PGSF sources represent the greatest long-term opportunities for the growth of AgResearch. Revenue from commercial sources is expected to increase significantly in the years ahead, as commercial organisations seek new agri-technologies and biotechnologies to exploit the opportunities offered world wide under GATT and other liberal trade agreements'.

The NZ Wool Board is an example of a producer organisation which directly funds agricultural research. Research contracts for the year ending 30 June 1996 totalled \$NZ5.8m. Of this \$1.2m was directed to 'on-farm' research and \$4.6m to post-harvest research. The latter is paid to the Wool Research Organisation of New Zealand (WRONZ) which has a budget in 1995-96 of \$11.4m, 34 per cent from the Wool Board, 41 per cent from the private sector and 21 per cent from government. To compensate for the decline in PGSF funding in the sheep sector, the Wool Board (Wools of New Zealand) is increasing its funding to on-farm research by 75 per cent in 1996-97 (NZ Wool Board annual report, pp.18-19).

In 1994 the government set up the Marsden Fund to support basic research outside the PGSF. It is managed by the Royal Society. The sums voted were \$5.9m in 1995-96 and \$11.1m in 1996-97. The Minister of Science has emphasised that some support was still needed for pure science in a system devoted to commercially driven research (*Public Sector* 1995, p.5). 'I was particularly concerned that the switch to output funding according to socio-economic (rather than scientific) priorities could remove research opportunities for extremely capable scientists whose retention in New Zealand relied on their ability to deliver first-class results and publish internationally rather than simply fulfil contracts...It is a response to the particular nature of the process of scientific enquiry rather than an application of *institutional theory*' (italics inserted).

3.4 Environmental Legislation

Major changes took place in the legislation covering agri-chemicals, hazardous substances and new organisms, and legislation is pending in the areas of pesticides, animal remedies and fertilisers (SONZA 1996, p.31). This phase of new legislation is in response to changes brought about by the Resource Management Act 1991 and enables the Government to consolidate and modernise the respective acts of Parliament.

The Hazardous Substances and New Organisms Act was passed in May 1996 and will come into force in 1997. The act will establish a new system for managing risk from hazardous substances and new organisms. A new agency, the Environmental Risk Management Authority will administer and advise on the use of and import of substances and organisms considered to be hazardous to the environment. In its deliberations on applications for production/importation, the Authority has to have regard to any risks to human health, and to the environment. There is some conflict between the provisions of the act and the requirements of the WTO sanitary and phytosanitary agreement (Johnson 1995). When the new Authority is appointed, one of its tasks will be to determine the rules for meeting international trade standards in its licensing system, as well as determine procedures for approving applications for permits (Johnson 1996b).

The remaining Bill, the Agricultural Compounds Bill, was introduced to parliament in the 1996 session but its third reading was not completed when parliament rose for the 1996 Election. This bill will provide a new framework for regulating compounds (such as pesti-

cides, fertilisers and drenches) used in the management of plants and animals i.e. in farm production. The authority, in this case the Ministry of Agriculture, has to have regard, in granting permits for production and/or importation of compounds, to the risks to trade, to animal welfare and to agricultural security arising from the use of such compounds (SONZA 1996, p.31). The wording in this act with regard to WTO requirements appears to be consistent with the aims of the SPS agreement (Johnson 1995).

4. Performance of the Agricultural Industry

In this section total farm returns are examined in nominal and real terms, trends in on-farm productivity are examined, recent trends in wholesale prices of major commodities are traced, the real rate of exchange for agricultural industry is detailed and micro-statistics of performance of dairy and sheep/beef farms are reported.

4.1 Sectoral Performance

Output of the agricultural sector appears to have stabilised in recent years in money terms (Table 3). After deducting intermediate inputs (non-factor costs) the contribution to money GDP has fluctuated about a level plateau as well. As the economy has been growing in the same period (Table 1) the proportion of total GDP earned in agriculture up to point of sale has declined from 6.1 per cent to 5.0 per cent from 1991 to 1996. Statistics New Zealand calculates the real increase in agriculture GDP by the double deflation

method. Thus production and intermediate inputs are deflated by their own price indices and real GDP derived by difference. Recent changes in real GDP show that the series fluctuates broadly in agreement with the nominal series (Table 3) though contrary movements can occur in some years.

4.2 Aggregate Productivity

Aggregate productivity is measured from the real GDP series published by Statistics New Zealand (Johnson 1996a). Following OECD convention, total factor productivity (TFP) is measured as the ratio of real output to the weighted average of labour, capital and intermediate inputs with factor shares as weights. A comparison with other economies with similar agricultural sectors shows that New Zealand has a productivity performance in the partial productivities and TFP well above other countries for the period 1973-89 (the period of the OECD study) (Table 4). In comparison, with the business sector, Australia, Canada, New Zealand, the UK and the US all had higher rates of growth in agriculture.

The agricultural sector in New Zealand has thus made a remarkable contribution to the well-being of the New Zealand economy in recent years, not only in generating nearly half the exports that led to take-off in 1993-94, but in producing a share of the national GDP at extremely efficient levels (the balance of export growth came from the non-food manufacturing sector). Neither the Budget Statement nor even the official report on the sector from the Ministry of Agriculture (SONZA) mentions this remarkable feat. Indeed, the 1996 Budget emphasises the contribution

Table 4: Comparative Productivity Growth - OECD Countries 1973-89 (percentage growth rates)

Country	Labour	Agriculture Capital	TFP	Labour	Business Capital	TFP
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
Ireland	3.9	1.3	1.3	3.8	-1.1	2.8
New Zealand	5.3	4.6	2.6	0.8	-2.1	-0.3
United Kingdom	2.9	0.8	1.6	2.0	-0.2	-1.3
United States	3.8	3.3	1.9	0.4	-0.8	-0.0

TFP growth is output divided by weighted inputs of labour, capital and intermediate inputs. The same period averages are used for weights. New Zealand data for agriculture estimated by the author.

Sources: OECD Secretariat; J.C. Bureau, INRA (pers. comm.).

of the manufacturing sector to exports in typical ignorance of the facts (Budget Statement p.1). It is a tribute to the resilience of farmers that they have adjusted completely to the deregulation of the economy and continued to produce the exports on which the expansion of the economy ultimately rests. Even Treasury admits this in its discussion of its projections that the export sector is the goose that lays the golden eggs! (Budget Economic and Fiscal Update 1996, p.52).

4.3 Terms of Exchange

This section contains information on the international wholesale markets that New Zealand products are supplied to, the influence of exchange rate mechanisms and trends on New Zealand commodity f.o.b. returns, and the real rate of exchange for pastoral products. The terms of exchange at farm gate are discussed in sections 4.4.2 and 4.4.3 along with other farm performance indicators.

4.3.1 Wholesale prices

In the period under review, world commodity markets have fluctuated considerably though there was a general improvement in the 1992-94 period which benefited New Zealand immensely (Table 5). Compared to Australia, New Zealand has a less diversified export

mix and hence is exposed to more market risk. The beef market in the United States was favourable in 1991 and 1993, but has since declined considerably. The lamb market in the United Kingdom was particularly robust in 1992 and 1993 but fell back in 1995. Butter has been consistently up-market as the EU has reduced its surpluses in recent years, and it and other dairy products have been responsible for a marked change in enterprise choice as well as enhanced incomes (Table 7). Wool as a commodity shows the greatest fluctuation in price and reflects the world oversupply situation which developed from 1991. As a whole, meat and livestock farming (including wool) has not benefited from international market prices in the period under review compared with dairy farming. Part of the reason for this is the appreciation of the \$NZ by around 18 per cent since 1992 which has affected beef and lamb prices particularly (McConnell and SriRamaratnam) and the extensive use of forward exchange rate cover by the NZ Dairy Board.

The *Economist* commodity price indices (Table 5) indicate that calendar year 1992 was the low point of the commodity price cycle and all commodity groups (in SDR terms) have improved since. Non-food agriculturals and food prices have improved by 25-30 per cent since 1992. During the first 3 quarters of 1996, the signs are also positive.

Table 5: Trends in Wholesale Prices 1991-1996 (annual percentage changes)

Calendar Years	Beef a	Lamb b	Butter c	Wool d	<i>Economist Indices</i> e f	
1991	+3.9	-12.7	-4.0	-22.8	-10.8R	-7.4R
1992	-7.8	+10.3	+7.2	+3.9	-4.3R	-6.0R
1993	+6.6R	26.3R	+10.0R	+10.1R	+8.6R	+6.8R
1994	-10.9	+0	-2.2	+22.5	+20.3	+25.2
1995	-18.2	-13.3	+13.6	+19.4	+2.1	-3.3
1996E	-4.2	+6.1	+1.7	+2.1	-1.1	+5.3

Notes on pricing points:

a = Beef: US imported frozen boneless from Australia and New Zealand; 85% visible lean cow meat, import price. \$US f.b.b., port of entry, average of daily quotations.

b = Lamb: NZ PL. Smithfield, London, sterling, average of daily quotations.

c = Butter: NZ Best Quality, selling prices, sterling, London Provision Exchange (duty paid).

d = Wool: Australia-New Zealand 50's, UK-Dominion 50's, clean dry, combed basis.

e = Non-food Agriculturals: *The Economist* SDR Commodity Price Index, annual average; 1996 = first 3 quarters.

f = Food: *The Economist* SDR Commodity Price Index, annual average.

Sources: IMF (1996), *The Economist* (1996).

4.3.2 The real rate of exchange for pastoral products

A broad view of the effects of exchange rates and internal costs on farm prices can be obtained by comparing prices actually received with what they might have been without exchange rate changes (Table 6). The f.o.b. price index for pastoral products is measured loaded at the wharf as the point of departure of exports. A 'foreign price' equivalent can be calculated by averaging the changes in the trade weighted exchange rate index for each year. The resulting 'foreign price' is still at f.o.b. level but signifies what might have been. Since the f.o.b. price index represents all farm goods as processed and ready for shipment, it represents the whole primary industry from farm to wharf. The prices of inputs for this concept of the industry can be represented by those sections of the producer price index (outputs) that produce goods for the internal market. Thus the terms of exchange or the real rate of exchange facing the industry as a whole can be calculated (Table 6). The table is constructed so that the signs are additive across the table.

As the Table shows, the level of actual prices received (at f.o.b.) was favourable on average in 1992 and 1993 after quite a sharp fall in 1991. In 1994 and 1995, average prices received have declined by 10 per cent. From 1991 to 1993, these price trends were helped by a depreciation of the \$NZ of some 14 per cent. This

was a period before growth in the economy as a whole accelerated and monetary policy was not as rigorous as more recently. In 1994, world prices for the NZ mix of products fell slightly and this was exaggerated by appreciation of the \$NZ. Improvements in world prices in 1995 and 1996 have been reversed by the appreciation of the \$NZ in these years.

On the other hand, the period under review has been one of internal price stability (Table 1). *Producers' prices of non-tradable outputs have only increased by an average of 1.2 per cent over 6 years.* This is a significant achievement and one little understood by observers. As a result, the pastoral industry as a whole (producing exports worth \$10b) has still faced marked changes in its real rate of exchange as high as + or- 12 per cent in some years. In recent years the decline in the terms of exchange would have been avoided if the tight monetary policy followed had been different. The Governor of the Reserve Bank continues to state that the control of internal costs is the main benefit to farmers (as discussed above in section 2.1.7) and that the gains from possible devaluation would soon be lost through increased internal inflation. It certainly seems as though agriculture would fare better in a low growth scenario as in the early 1990s rather than a high growth scenario, and farmers might have a vested interest in restricting growth in the rest of the economy if it can be done without appreciating the exchange rate. This the Governor of the Reserve Bank refuses to contemplate as do his political masters.

Table 6: Decomposition of Real Rate of Exchange for New Zealand Pastoral Products Industry 1991-1996 (annual percentage changes)

June Years	"Foreign Price"	Exchange Rate Index	"Wharf Price"	Input Price Index	Real Rate of Exchange
1991	-11.6	+2.5	-9.5	-2.4	-11.6
1992	-3.2	+7.6	+4.2	-0.4	+3.7
1993	+5.4	+2.8	+8.3	-1.2	+7.1
1994	-1.8	-4.6	-6.3	-1.3	-7.5
1995	+1.7	-5.1	-3.5	-2.2	-5.6
1996E	+9.0	-6.3	+2.1	+0.2	+2.3

"Foreign Price" (at wharf): Index of pastoral export prices x Exchange Rate Index.

Exchange Index: Trade weighted index on June year basis expressed as NZ\$ per unit of foreign exchange.

"Wharf Price": Price index of external trade, all pastoral products, free-on-board (FOB).

Input Price: Price Index of non-tradable goods (outputs); negative sign is a rise in index but data is additive across the table.

Real Rate of Exchange: Wharf Price/Input Price.

Sources: Key Statistics (August), Statistics New Zealand (1996).

Table 7: Microeconomic Indices of Production, Income and Investment 1991-1996

Farm Years Ending	1991	1992	1993	1994	1995	1996E
Dairy:						
Milk prodn (m litres)	7,870	8,186	8,365	9,368	9,386	9,830
Prices received	1,000	1,228	1,461	1,314	1,315	n.a.
Prices paid	1,000	985	1,007	989	1,020	n.a.
Ratio (1991=1000)	1,000	1,246	1,451	1,328	1,289	n.a.
% change	-27.7	+24.6	+16.3	-8.4	-2.8	n.a.
Revenue/farm \$NZ	145,900	172,526	203,088	201,294	203,185	233,633
Expenses/farm	112,861	121,689	145,259	141,979	144,819	159,301
Net income/farm	33,039	50,657	57,829	59,315	58,366	74,362
Sheep and Beef:						
Lamb slaughter m	27.2	28.1	23.3	26.2	26.7	24.6
Sheep slaughter m	7.2	7.8	6.7	5.9	6.9	6.3
Cattle slaughter m	2.9	2.9	3.1	2.9	3.7	3.7
Prices received	1,000	946	1,175	1,193	1,071	1,061
Prices paid	1,000	963	951	943	970	988
Ratio (1991=1000)	1,000	982	1,236	1,265	1,104	1,074
% change	-14.6	-1.8	+25.8	+2.3	-12.7	-2.7
Revenue/farm \$NZ	133,653	135,077	149,780	167,202	156,900	148,900
Expenses/farm	104,869	104,012	113,564	118,500	117,600	114,700
Net income/farm	28,784	31,065	36,216	48,702	39,300	34,200
Investment:						
Building and Cons \$m	193.4	223.0	256.0	284.0	284.0	277.0
Vehicles and mach	323.0	290.7	320.0	406.0	390.0	398.0
Land development	72.3	77.8	92.0	105.0	97.0	104.0
Total	588.7	391.5	668.0E	795.0E	771.0E	779.0E
% change	-7.4	+0.7	+13.0	+19.0	-3.0	+1.0
E = estimate n.a. = not available						
Sources: Ministry of Agriculture (1996, Tables 5, 10, 11, 14, 14, 16, 17, 23, 24); Investment: author's estimates; New Zealand Wool Board; New Zealand Dairy Board. Revenue excludes off-farm income; net income is farm profit before tax.						

4.4 Production, Income and Investment

This section deals with the microeconomic data applying to farms and production capacity.

4.4.1 Livestock capital

Up to 30 June 1995, the trend of reduced sheep numbers and increased cattle numbers continued. Total sheep numbers were 48.8 m, beef cattle 5.2 m, and dairy cattle 4.1 m. Relative returns for each class of livestock were driving these changes up to 1995 but it is likely that the expansion of the beef herd has now

ceased following recent poor returns in the US market. Conversion of sheep farms to dairy farms is increasing the dairy cattle herd in districts climatically suitable.

4.4.2 Dairy farms

Milk production has been expanding in the period under review, 25 per cent in 5 years. Prices received have increased by 31 per cent but are likely to decline somewhat over the 1996-97 season. The prices paid index has shown little change in the period, hence the terms of exchange at farm gate has been relatively favourable. This is reflected in the level of farm

income generated in the Dairy Board's survey of farm production and income of owner-operators (Table 7). By convention, net income is after depreciation and interest charges but before payment of tax. Remembering that farm equities average just under \$1m, and wages of management must be deducted, profit of \$60,000-70,000 per farm still represents only a return on equity of around 2-3 per cent (NZ Dairy Board, p.30).

4.4.3 Sheep and beef farms

The sheep and beef sector is static at the present time. The capital stock is not expanding and farms are being sold at the margins for either dairying or forestry or suburban development. Slaughter statistics support this view (Table 7). The prices received index has not risen substantially since 1991, and though input prices have been contained, the terms of exchange have not been favourable except in the 1993 season. These events are reflected in static net incomes to farmers. Return on equity is estimated at 1-2 per cent (NZ Meat and Wool Boards' Economic Service).

4.4.4 Investment on farms

Estimates of capital expenditure on farms show a marked increase in the years after 1992 (Table 7). This is explained by the increased resources going into conversion of dairy farms and increased levels of on-farm forestry both of which are capital intensive in early years. Recent data shows some slowing down of this rate of re-investment and some retrenchment from these levels could be possible in the future.

4.5 Farm Asset Values and Indebtedness

4.5.1 Land prices

Comprehensive data is collected by Valuation New Zealand (SONZA p.107). For the calendar year 1995, the Valuation New Zealand total rural sale price index increased by 10.7 per cent after rising by 22.2 per cent the previous year. This increase appears to be spread evenly over all farm types, with grazing farms (more extensive sheep and beef farms) showing the greatest increase. There is obviously great pressure being exerted on asset values in New Zealand farming at the present time in spite of low returns in some sectors. Most commentators attribute this to dairy farm conversion on higher class land and forestry expansion on to former grazing land. Comparative data published indicates that dairy land and buildings sells for \$NZ0.24

per kg of milk solids produced (an average cow produces 300 kg of milk solids). Such land (including improvements) sells for \$NZ13500 per ha. On the other hand, the average sale price of grazing land was \$NZ1250 per ha in 1995.

4.5.2 Asset values

Evidence from sheep and beef farms shows continuing increases in asset values in spite of stable produce returns (SONZA, p.118). At 30 June 1994, the average asset value was \$NZ1.33m, of which \$NZ1.04m was represented by land and buildings (78 per cent). Since these survey figures are regularly up-dated by reference to tax valuations, they tend to reflect market prices as indicated in section 4.5.1. For owner-operated dairy farms, average farm asset value was \$NZ1.313m at 30 June 1995, of which land and buildings was \$NZ1.0m (76 per cent). Average number of cows milked was 181.

4.5.3 Indebtedness

The sheep farm data shows a nominal increase in indebtedness over the period under review but a declining percentage to total asset value. As at 30 June 1994, the debt-asset ratio on sheep and beef farms was 17 per cent, a fall from 28 per cent in 1989. Evidently, conservative management of financial risk prevails and probably reflects the poorer prospects of this type of farming in current circumstances. Debt has increased more on owner-operated dairy farms and was 28 per cent of asset value at 30 June 1995, as compared with 33 per cent in 1989 (NZ Dairy Board, p.34).

5. Concluding Remarks

The approach taken in this review has been to examine recent macroeconomic data and official statements to identify how decision makers see the agricultural sector. The examination reveals that neither agriculture nor other sectors feature in public pronouncements. The welfare of individual sectors in the deregulated economy does not seem to be a matter for political concern. Rather the emphasis is on the overall fiscal and monetary situation, employment, and on the expected rate of economy-wide growth.

This seems to be an unfortunate development from the point of view of agriculture. Simple statistics such as percentage of GDP earned in agriculture are offered up as measuring the overall contribution to the econ-

omy. As this review shows, agriculture can perform as an economic user of resources with increasing efficiency levels. There is no recognition of this fact in official announcements.

At the farm level, dairy farm incomes are much higher than in the sheep and beef sector. Correspondingly, the return on equity is also divergent. It also appears that asset values (value of land and buildings) are particularly responsive to changes in income. In turn this fact would tend to lower the rate of return on equity. Asset values also seem to be rising faster than income levels would justify, particularly in the case of grazing land. This land has extra value in forestry at current prices and there may be a scramble for ownership going on as owners seek new properties after selling out to forest interests.

References

- BRUSH, G.J. and CLEMES, M.D. (1995), 'Market failure and chemical use', *Review of Marketing and Agricultural Economics* 63(3), 394-407.
- JOHNSON, R.W.M., SCHRODER, W.R., and TAYLOR, N.W. (1991), 'Deregulation and the New Zealand agricultural sector: a review', *Review of Marketing and Agricultural Economics* 57(1,2,3), 47-74.
- JOHNSON, R.W.M. (1991), 'Current changes in New Zealand agriculture: a review', *Review of Marketing and Agricultural Economics* 59(2), 38-56.
- JOHNSON, R.W.M. (1993), 'New Zealand agricultural policy review 1991-93', *Review of Marketing and Agricultural Economics* 61(3), 375-400.
- JOHNSON, R.W.M. (1995), 'SPS measures for meat and other products in Pacific Basin Countries', International Agricultural Trade Research Consortium, Tucson Meeting, 14-16 December.
- JOHNSON, R.W.M. (1996a), 'Agricultural productivity trends for New Zealand', *MAF Policy Technical Paper 96/2*, Ministry of Agriculture, Wellington.
- JOHNSON, R.W.M. (1996b), 'Cost benefit and the environment debate', paper presented to New Zealand Agricultural Economics Society Conference, July 5-6, Blenheim.
- LOW, J.M. and GRIFFITH, G.R. (1996), 'The cost of Australian farm injuries', *Review of Marketing and Agricultural Economics* 64(3), 290-300.
- MCCONNELL, N. and SRIRAMARATNAM, R. (1996), 'Exchange rate impacts on farm income: an historical analysis (1981-1995)', paper presented to New Zealand Agricultural Economics Society Conference, July 5-6, Blenheim.
- MINISTER OF FINANCE (1996a), 'Budget and fiscal strategy report 1996', (The Budget) B.2, GP Print, Wellington.
- MINISTER OF FINANCE (1996b), 'Budget economic and fiscal update 1996', B.3, GP Print, Wellington.
- MINISTER OF FINANCE (1996c), 'Pre-election financial statement, September 12 1996', B.11, GP Print, Wellington.
- MINISTER OF FINANCE (1996d), 'Pre-election economic and fiscal update, September 12 1996', B.16, GP Print, Wellington.
- MINISTRY OF AGRICULTURE (1996), '*Situation and Outlook for New Zealand Agriculture 1996*' (SONZA), Ministry of Agriculture, Wellington.
- MINISTRY OF RESEARCH, SCIENCE AND TECHNOLOGY (MoRST)(1995), *New Zealand Research and Experimental Development Statistics 1992-93*, Publication No 13, Wellington.
- NEW ZEALAND DAIRY BOARD (1995), *Economic survey of factory supply dairy farms 1994-95*, Livestock Improvement Corporation Limited, Hamilton.
- NEW ZEALAND WOOL BOARD (1996), *Annual Report 1996*, Wellington.
- NEW ZEALAND PASTORAL AGRICULTURE RESEARCH INSTITUTE (AgResearch)(1995), *Annual Report 1995*, Hamilton.
- RESERVE BANK OF NEW ZEALAND (1996), *The impact of monetary policy on farming*, Wellington, 15pp.
- UPTON, S. (MINISTER FOR SCIENCE) (1995), 'Contracting in the science sector: an overview', *Public Sector* 18(4), 2-5.