

NEW ZEALAND ARABLE SECTOR:
FOREIGN EXCHANGE IMPLICATIONS

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PREFACE

The continuing balance of payments deficit is often regarded as the major constraint on economic growth in New Zealand. Various government policies to stimulate exports have been in existence for some time.

The arable sector of New Zealand farming is small in comparison to the large pastoral sector on which most policies have been focussed. Also, the arable sector is usually regarded as requiring a higher foreign exchange component in its inputs than the pastoral sector. Little attention has been given, however, to the net foreign exchange earnings of the arable sector compared with the pastoral sector.

This report identifies the foreign exchange inputs and outputs of the New Zealand arable sector. Much of the data used has been drawn from the Annual Economic Survey of wheatgrowing farms carried out by the A.E.R.U. for the Wheatgrowers Sub-section of Federated Farmers of New Zealand (Inc). It is hoped that the quantitative material contained in the report will be helpful in future agricultural policy formation.

This project was carried out by R.D. Lough, Senior Research Economist in the A.E.R.U. with assistance from Brown, Copeland & Co. Ltd., Consulting Economists, Christchurch.

P.D. Chudleigh
Director

ABBREVIATIONS USED IN THIS REPORT

C.I.F.	=	Cost, insurance, freight
F.E.	=	Foreign Exchange
F.O.B.	=	Free on Board
F.O.R.	=	Free on Rail
ha	=	Hectare
M.D.	=	Machine Dressed
N.A.	=	Not Available
s.u.	=	Stock Unit

CHAPTER 1

INTRODUCTION

In recent years, there has been an increasing emphasis in fiscal policy on structural changes in the New Zealand economy. This has been geared not only toward encouragement of industries which are internationally competitive, but also toward stimulating the sectors which generate foreign exchange, with particular emphasis on export commodities which have a high proportion of domestic value added. It is pertinent, therefore, to critically examine the agricultural sector in New Zealand, to determine the extent to which different forms of land use contribute to net earnings of foreign exchange.

The objective of the study reported here is to evaluate the extent to which New Zealand's arable sector contributes to the foreign exchange balance, either through direct generation of foreign exchange or through import substitution. Such information is important when assessing the implications of alternative policy options for the arable and pastoral sectors of New Zealand agriculture.

As background to the study, it is relevant to summarise the relative importance of agriculture to the New Zealand economy and trends in exports and imports. New Zealand's overseas exchange transactions for the period 1977 to 1982 are summarised in Table 1. During the period from 1977 to 1982 New Zealand's total merchandise export receipts doubled from NZ\$3120.9 million to NZ\$6707.8 million yet the deficit balance on the current account declined from NZ\$590.5 million in 1977 to NZ\$1140.5 million in 1982, due to a threefold increase in the deficit on invisible transactions from NZ\$633.3 million to NZ\$1808.7 million. The financing of this current account deficit has required substantial external borrowing. Despite this borrowing, official overseas reserves were allowed to fall from NZ\$938.5 million in 1978 to NZ\$759.7 million in 1981. Heavy external borrowing in 1982 reversed this decline. A NZ\$708.1 million increase in the balance on Capital Account between 1981 and 1982 saw official overseas reserves increase by \$67.9 million after allowing for I.M.F. transactions.

There is therefore considerable pressure on New Zealand's trade balances and a need to stimulate net export receipts. Data on the sources of gross export earnings are summarised in Table 2. Primary produce accounts for 80% of total receipts, and agriculture (including horticulture) 69% of receipts. In gross terms, therefore, agriculture is the dominant sector in generation of export earnings. Manufactured exports have been rising rapidly over recent years, averaging a growth of 20% annually since 1978, but their total contribution is still small relative to agriculture. In addition, it is important to consider the net contribution to export earnings of both

TABLE 1

Overseas Exchange Transactions

Years Ending March

NZ\$ million

	1977	1978	1979	1980	1981	1982
Total Exports	3120.9	3395.1	3849.5	4941.3	5866.6	6707.8
Total Imports	3078.1	3067.5	3189.8	4134.0	5098.1	6039.6
Balance on Trade Transactions	+42.8	+327.5	+660.1	+807.2	+768.5	+668.2
Balance on Invisible Transactions	-633.3	-837.3	-1086.5	-1289.0	-1484.0	-1808.7
Current Account Balance	-590.5	-509.7	-426.4	-481.8	-715.6	-1140.5
Balance Capital Account	+367.4	+738.6	+252.9	+447.7	+772.2	+1480.3
IMF Transactions	+117.8	-6.4	-27.7	-93.3	-133.0	-129.8
Valuation Change Overseas Reserves ^a	+141.1	+40.4	+21.5	+107.2	+52.5	-142.1
Change in Official Overseas Reserves	+35.8	+262.9	-179.7	-20.2	-23.9	+67.9
Official Overseas Reserves at end of period	720.6	983.6	803.9	783.6	759.7	827.6

Source: Reserve Bank Bulletin

^a Personal Communication, Economics Department Reserve Bank

TABLE 2
Receipts from Exports

	Year ended December				
	1978	1979	1980	1981	1982
<u>Primary Products:</u>					
					\$ million
Meat	977.1	1295.5	1481.4	1713.2	1610.9
Wool	667.4	850.6	995.7	979.5	951.1
<u>Milk Products:</u>	628.4	633.1	1022.1	1315.8	1454.5
<u>Other Animal Products:</u>	321.7	402.2	401.3	397.9	440.4
<u>Forest Products:</u>	292.5	389.2	588.6	590.3	599.3
<u>Other Primary Products:</u>	178.9	219.9	313.4	353.0	438.0
Sub-total	3066.0	3790.5	4802.5	5349.7	5494.2
<u>Manufactured Goods:</u>					
Processed Foodstuffs	55.0	65.1	84.9	90.5	116.4
Machinery & Electrical Equipment	88.3	118.7	156.3	183.1	183.4
Carpets and Other Textiles	63.9	81.4	112.5	121.5	124.7
Base Metals ^a and Manufactures of Metals ^b	197.8	238.3	316.2	330.6	360.6
Other Manufactured Goods	177.5	212.2	295.4	398.6	527.4 ^c
Sub-total	582.4	715.6	965.4	1124.3	1312.6
<u>Miscellaneous:</u>	22.6	44.7	52.0	44.6	48.8
TOTAL	3671.1	4550.8	5819.8	6518.6	6855.7

Source: Reserve Bank Bulletin, Vol. 46 (2), March 1983, p. 57

^a Main Export item is aluminium

^b Mainly basic steel products

^c Includes the sale of DC10 aircraft at around \$100 million.

4.

these sectors, taking into account the imports needed in the production process.

Data on the economic end use of New Zealand imports are given in Table 3. Aggregate import payments have been rising faster than export receipts, an average increase of 23% annually since 1978. The majority of these imports, (64% in 1981/82) are used as intermediate goods or components in the New Zealand manufacturing industry, the remainder being capital goods (13%) or consumer goods (22%). In particular, imports of "materials used in the production process" represent 42% of total imports and have been increasing at 25 per cent per year over the past four years.

One final comment relates to New Zealand's terms of trade which have fallen significantly since 1979 (see Table 4). While export prices have risen 62% over the period (December 1979 to December 1982), import prices have increased by 87%, which has decreased the terms of trade from an index of 86 to 74. This trend would increase the imported content of exports, and therefore adversely affect the foreign exchange balance. As government policy has been aimed at increasing net foreign exchange earnings, it is assumed that this policy should take into account the relative import contents of various commodities.

This report presents the findings of a study into the foreign exchange earnings of the arable sector in New Zealand. The F.O.B. value of arable sector products (or C.I.F. value of wheat) is assessed and from this the foreign exchange component of crop inputs is deducted. The major cropping enterprises are then compared with livestock production in the arable sector. In Chapter 2 the basic concept for assessing the foreign exchange (F.E.) of on farm production costs is discussed in detail while Chapter 3 describes the arable sector in New Zealand and assesses the volume and value of arable production as well as trends in land use patterns. Chapter 4 evaluates the foreign exchange requirement (imports) of the major crop and livestock enterprises in the arable sector while the gross foreign exchange earnings (exports) of these enterprises are assessed in Chapter 5. Chapter 6 compares the net foreign exchange earnings with the returns actually experienced by the grower and looks at the foreign exchange earnings of various land use options. Chapter 7 concludes the report.

TABLE 3
Economic End-Use Classification of Imports

	YEAR ENDED JUNE				
	1978	1979	1980	1981	1982
	----- \$ MILLION -----				
1. Finished Capital Goods	433.8	445.2	573.0	935.0	970.4
2. Components and Materials for Capital Goods	375.1	398.4	487.4	551.7	769.3
3. Finished Goods and Components	369.9	565.0	658.9	707.4	900.8
4. Consumer Goods	796.2	880.0	1128.1	1180.5	1641.6
5. Materials Used in the Production Process	1269.3	1528.8	2294.8	2623.4	3131.3
6. Stores Used only For Defence	32.4	23.1	30.4	25.6	49.8
TOTAL	3276.4	3840.5	5172.6	6023.6	7463.2

TABLE 4
New Zealand's Terms of Trade
(Dec. 1957 = 100)

Year ending June	Import Prices	Export Prices	Terms of Trade
1975	218	169	78
1976	288	208	72
1977	328	258	79
1978	347	270	78
1979	364	312	86
1980	462	379	82
1981	552	421	76
1982	629	482	77
Dec. 1982	680	505	74

Source: Monthly Abstract of Statistics, May 1983.

CHAPTER 2

BASIS FOR ASSESSING THE FOREIGN EXCHANGE COMPONENT OF ON-FARM PRODUCTION COSTS

This chapter evaluates the methods that can be used to assess the foreign exchange (import) component of on-farm production costs. Two basic options are available. Firstly, the foreign exchange component can be assessed using data submitted for the Export Performance Taxation Incentive scheme introduced in the 1979 Budget. Alternatively, the foreign exchange component can be determined from the 1971/72 one hundred and thirty (130) sector level input-output tables with a RAS update at the 25 sector level for 1976/77.

2.1 Export Performance Taxation Incentive (EPTI)

The 1979 Budget introduced a taxation system of incentives for exporters. This system encouraged the generation of net foreign exchange earnings, defined as the domestic value added of exports valued at F.O.B. Domestic value added is considered as export receipts, exclusive of all imported content and primary product inputs, but inclusive of all the increase in value attributed to New Zealand manufacturing and processing industry. Having assessed the domestic value added component of an input, the residual adjusted for primary inputs can be considered as the Foreign Exchange Component.

The introduction of the EPTI required individual exporters to estimate the domestic value added component within the production process, i.e. the direct value added component. In addition, the domestic value added component of material inputs, transport, and energy (indirect value added) plus the domestic value added of fixed capital consumption had to be determined.

The production processes associated with the commodity being assessed are isolated from the productive activity undertaken by the company. All costs (including packaging) incurred in getting the product to the condition in which it leaves the factory floor are included. Marketing, storage and distribution costs are not included. Domestic value added percentages for energy inputs, services and capital usage are determined from a schedule of domestic contents.

From the individual assessments made by exporters in conjunction with work undertaken by the Department of Trade and Industry, goods are classified into specific "Bands" relating to their domestic value added component. This classification of goods by domestic value added "Bands" is summarised in Table 5.

TABLE 5
Domestic Value Added Component

Band	Domestic Value Added	Mid-Point
A	80-100	85
B	70-80	75
C	60-70	65
D	50-60	55
E	40-50	45
F	20-40	30
G	0-20	10

Source: Department of Trade and Industry

Reference to the Export Performance Taxation Incentive Schedule of export goods as published by the Department of Trade and Industry enables the domestic value added and therefore the foreign exchange plus primary input component of the various input items in broad terms to be defined. The study team attempted to be more specific, narrow the broad "Bands" and update this information in order to separate the primary input and foreign exchange components. Personal approaches and a questionnaire were sent to some 17 manufacturers and suppliers of crop inputs, but the data requests were either rejected or ignored by all but three suppliers. Since it appeared impossible within the time frame of the project to refine the data available it was decided to reject this approach and rely upon the derivation of the foreign exchange component from inter-industry input-output tables.

2.2 Deriving Import Content from Input-Output Tables

Input-output tables depict the total sectoral transactions of the economy, both in terms of sources of inputs (primary and intermediate) and disposal of output (intermediate and final demand). They therefore give a complete picture of the input structure of each sector of the economy, and the inter-relationship between any particular sector and other sectors.

The most detailed input-output tables currently available for the New Zealand economy are at the 130 sector level for 1971/72, with a RAS update at the 25 sector level for 1976/77. Full tables for 1976/77 are expected to be published towards the end of 1983 (see Appendix III).

For the purposes of this study it is possible to use input-output tables to derive indicative estimates of the import content of any sector in the economy. It must be appreciated, however, that the methodology has certain limitations. Firstly, the data are only applicable to trading in a particular year. Secondly, the sectors represent aggregations of groups of establishments producing similar products, and therefore the data reflect sectoral averages and not individual establishments. Despite these limitations, the results are useful as a general guide to import dependence.

The transactions matrix of the input-output tables provides estimates of the direct imports required by each sector in terms of its total input structure. For the chemical fertiliser sector for instance, imports totalled \$29.6 million in 1971/72, or 50.5 per cent of total inputs of \$58.6 million (equal to sales output). Therefore, every dollar of sales at factory gate involved direct imports of 51 cents.

In addition, however, the purchases that one firm makes from another (intermediate transactions) may involve an import content, and it is important to also identify this indirect effect. For while a firm may not by itself be involved in significant imports, it may have a high import content in its product by virtue of purchase of intermediate inputs from other New Zealand firms which have a significant import component. As an example, the agricultural and pastoral machinery sector directly imported \$7.7 million in 1971/72, or 25 per cent of its total inputs (sales). However, the direct and indirect import component of the sales of this sector (called the cumulated primary input coefficient) is 0.344, reflecting that total imports accounted for 34 cents in every dollar of output in 1971/72.

The other important consideration when assessing import content from input-output table data is the treatment of fixed capital consumption (commonly termed depreciation, calculated in terms of current replacement cost). Since a significant proportion of gross fixed capital formation in New Zealand is imported, it is essential that the import content of fixed capital consumption is also calculated and added to the import content of other input items used during product manufacture.

The input-output tables contain a matrix of gross fixed capital formation by sector, which can be used to approximate the direct import content of capital in each sector - for instance, in 1971/72, gross fixed capital formation in the chemical fertiliser sector was \$1.6 million, of which \$0.2 million or 12.5 per cent was directly imported. Consumption of fixed capital in that year was \$2.6 million, so the direct import content of this is approximately \$0.33 million. Indirect import content can also be important in terms of capital formation. Direct plus indirect contents should be calculated in a similar manner to that outlined before.

In Table 6 details are provided of the relevant activities which are of interest in this study, the appropriate sectors under which the establishments are classified, and the sector numbers for both the 1971/72 and 1976/77 input-output tables. The aggregate (i.e. including consumption of fixed capital) coefficients for both direct and direct plus indirect import contents of these sectors are summarised in Tables 7 and 8.

It should be emphasised that inter-industry transactions as depicted by the input-output tables are in "approximate basic values", reflecting the values of an industry output at farm gate, factory door, forest skid. Commodity taxes or subsidies are netted out and reflected as one component of primary inputs, and mark-ups or margins for wholesale and retail trade and transport are reflected in their own

TABLE 6
Sector Classification

Commodity/ Activity	Sector Classification	Sector Number	
		1971/72 Table	1976/77 Table
Contracting) Seed Cleaning) Grain Drying)	Agricultural Services	4	1
Sacks	Paper bags and sacks	52	6
Weedicide/Pesticide	Chemical products n.e.c.	57	9
Fertiliser	Chemical fertiliser	58	9
Machinery	Agricultural and pastoral machinery	82	12
Trade	Wholesale and retail trade	104	16
Rail	Rail Transport	107	17
Road	Freight transport by road	109	17
Vehicle Repairs	Repair of motor vehicles and motor cycles	128	21

TABLE 7
Import Contents, 1971/72 Table

Sector Number	Direct Import Content	Direct & Indirect Import Content		
		Estimate 1	Revised Estimate ^a	
4	Agricultural Services	0.031	0.088	0.088
10	Meat Freezing & Preserving	0.013	0.110	0.110
52	Paper bags and sacks	0.046	0.166	0.150
57	Chemical products n.e.c.	0.240	0.321	0.296
58	Chemical fertilisers	0.511	0.560	0.560
65	Motor vehicle tyres and tubes	0.357	0.403	0.336
82	Agricultural and pastoral machinery	0.256	0.364	0.314
88	Motor Vehicle Assembly	0.561	0.601	0.501
104	Wholesale and retail trade	0.030	0.067	0.067
107	Rail transport	0.047	0.140	0.140
109	Freight transport by road	0.037	0.123	0.123
113	Storage and warehousing	0.062	0.109	0.109
128	Repair of motor vehicles	0.122	0.186	0.186

^a Includes an adjustment, where applicable, for wholesale and retail mark-ups.

TABLE 8
Import Contents, 1976/77 Table^a

Sector Number		Direct Import Content	Direct & Indirect Import ^c Content	
			Estimate 1	Revised Estimate ^b
1	Agriculture	0.066	0.180	0.180
6	Textile, apparel and leather	0.171	0.297	0.261
9	Chemicals, plastics and petroleum products	0.411	0.541	0.495
12	Metal products and machinery	0.205	0.336	0.291
16	Wholesale and retail trade, restaurants, hotels	0.052	0.140	0.140
17	Transport and storage	0.148	0.247	0.247
21	Social, personal and community services	0.151	0.218	0.218

^a Assumes import content of gross fixed capital formation as per 1971/72 Table is applicable to 1976/77 Table.

^b Includes an adjustment for wholesale and retail mark-ups.

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respective sectors. The calculated import contents (Tables 7 and 8) are therefore a percentage of basic value, and need adjustment if they are used to reflect proportions of producer's values or purchaser's value.

On the basis of data from the 1977/78 Census of Distribution on wholesale and retail margins, and with an estimated average direct plus indirect import content for the wholesale and retail trade sector of 6.7%, the figures of Tables 7 and 8 were therefore revised to reflect proportions of purchaser's values, but excluding allowances of commodity taxes and subsidies. These data are given as the "revised" figures in the right hand columns of Tables 7 and 8.

CHAPTER 3

THE ARABLE SECTOR

This chapter defines the place of the arable sector within New Zealand's primary sector. The volume and value of arable sector production are evaluated. Land use patterns of the major crops grown are assessed in order to determine the potential for increased production.

3.1 Volume and Value of Arable Production

The values of gross agricultural production for the years ending June 1977 to 1981 and the indices relating to change in volume of output from all New Zealand farms (1972 = 1000) are summarised in Table 9.

It is apparent that the volume of cereals and small seeds produced fell between 1977 and 1978. Subsequently production appears to have been stable from 1978 to 1981. In direct contrast to this trend, total agricultural production increased between 1977 and 1981 with sheep, lamb and wool production all showing similar trends.

Despite the stable levels of production for cereals and small seeds the gross value of this output increased in actual dollar terms. The increase, however, was not as great as in other primary industries and the gross value of crops and small seeds output as a percentage of gross agricultural output declined from 6.5 per cent in 1977 to 5.3 per cent in 1981.

3.2 Land Use

Land use as at June of each year is shown, by farm type, in Table 10.

While the volume of arable production stabilised between 1978 and 1981, it would appear that this production took place on a decreasing number of cropping properties. In 1977/78 4823 properties received 20.0 per cent or more of their gross farm profit from crop production. By 1979/80 this figure had fallen to 4258 properties.

The area of land in preparation for crop declined in 1979/80, a decline which corresponds with the decline in the total area of the major crops grown.

The decline in total crop acreage between 1977 and 1980 is largely confined to specific categories of crop production. Table 11 indicates that 39.0 per cent of the total reduction was attributed to the fall in vegetable and potato acreage (6300 ha decline), while a further 33.0 per cent can be attributed to a 5400 ha decrease in the area of maize. The

TABLE 9
Gross Agricultural Production : Volume and Value
 Year ended 30 June

	1977	1978	1979	1980	1981
<u>Volume Gross</u>					
<u>Agricultural Production</u>					
(1971-72 = 1000)					
Crops and Seeds	1248	1154	1128	1119	1127
Sheep and Lamb	934	945	929	1073	1138
Wool	1005	963	1049	1165	1250
Total Production	1025	992	1023	1090	1123
<u>Value Gross</u>					
<u>Agricultural Production</u>					
(\$'m)					
Crops and Seeds	157	165	168	180	215
Sheep and lambs	415	429	527	587	682
Wool	595	495	623	846	849
Gross Output	2414	2417	3013	3749	4066
Crops and Seeds % Gross Output	6.5	6.8	5.6	4.8	5.3

Source: Department of Statistics, Monthly Abstract of Statistics
 February, 1982

TABLE 10

Arable Sector Land Use

	Number of Holdings	Total Area ('000 ha)	Land in Preparation for Fruit, Grain Crops, Vegetables, Fodder Crops ('000 ha)	Area Grassland ('000 ha)	Other ('000 ha)
<u>1977-78</u>					
Arable	4,823	680	178	427	75
Sheep and Beef	25,993	12,277	171	6,380	5,726
Intensive Horticulture	4,518	92	48	31	13
Other	34,067	8,205	36	2,300	5,869
TOTAL	69,401	21,254	433	9,138	11,683
<u>1978-79</u>					
Arable	4,565	627	180	383	64
Sheep and Beef	27,057	12,114	182	6,526	5,406
Intensive Horticulture	4,613	88	43	28	17
Other	34,217	8,402	48	2,388	5,966
TOTAL	70,452	21,231	453	9,325	11,453
<u>1979-80</u>					
Arable	4,258	608	169	351	88
Sheep and Beef	28,408	12,445	183	6,841	5,421
Intensive Horticulture	4,738	83	43	27	13
Other	34,101	8,101	40	2,253	5,808
TOTAL	71,505	21,237	435	9,472	11,330

SOURCE: Department of Statistics, Agricultural Statistics 1980-81.

Arable = General Mixed Farming, Cropping, Sheep Farming with Crop, Cropping with Sheep, Cropping with Other
 Sheep and Beef = Sheep Farming, Sheep Farming with Beef, Mixed Livestock
 Intensive Horticulture = Market Gardening and Flowers, Orchards, Tobacco, Nurseries

TABLE 11
Crop Acreage (June Year) '000 ha

	1977-78	1978-79	1979-80	1980-81
Wheat	90.9	87.2	86.0	81.2
Oats	17.1	18.4	18.7	12.6
Barley	70.8	77.5	66.5	67.4
Peas	20.8	22.6	24.2	16.8
Sub-Total	199.6	205.7	195.4	178.0
Maize	24.8	22.3	19.4	N.A.
Vegetables				
(i) Processing	13.4	10.8	11.0	N.A.
(ii) Fresh Market	15.2	14.8	13.0	N.A.
Potatoes	9.3	7.5	7.6	N.A.
Intensive Horticulture	23.2	23.2	23.0	N.A.
TOTAL	285.5	284.3	269.4	N.A.

Source: Department of Statistics, Agricultural Statistics 1981-82

areas of wheat, barley, oats and peas changed in response to producers' anticipation of profits and climatic conditions but in total the area remained relatively constant compared with the other crop areas as did the area under intensive horticulture. It was only in 1980/81 that these crops showed a marked decline in acreage.

Data collected from properties in the Economic Survey of New Zealand Wheatgrowers (Table 12) would suggest that considerable potential exists for an intensification of crop production on existing arable properties.

Ultimately the degree of cropping intensity will be limited by the level of soil fertility and soil structure. Nevertheless, the figures in Table 12 suggest that while approximately one third of the properties in the arable sector crop less than 10.0 per cent of their land area, a further third crop between 50 and 60 per cent of their land area. This would indicate that considerable potential exists within the arable sector to expand crop production.

3.3 Arable Sector's Labour Requirement

The 1979 Labour Statistics show that 9467 people were employed on farm holdings which obtained at least 20.0 per cent of their gross income from crop production. This represents 6.2 per cent of the agricultural work force or 2.1 persons per farm. This figure is considerably greater than the 1.7 persons employed per sheep beef and/or dairy properties.

Further evidence that greater employment opportunities exist under crop production is given in the wage bill as determined from data collected in the Economic Survey of New Zealand Wheatgrowers Financial Analysis. This information for the period 1978/79 to 1980/81 is summarised in Table 13.

TABLE 12

Variation in Cropping Intensity Within the Arable Sector

	LOW CROP INTENSITY			HIGH CROP INTENSITY		
	1977-78	1978-79	1979-80	1977-78	1978-79	1979-80
Sample Percentage	29.3	46.0	39.8	30.7	32.0	23.5
Crop Income as % Gross Farm Income	14.7	12.1	15.0	71.2	77.5	64.6
<u>Physical Production</u> Per 100 Hectares						
Stock Units (s.u.)	1348	991	1162	682	390	363
Wheat Area (ha)	5.3	4.2	6.1	16.9	22.6	21.9
Barley Area (ha)	1.6	1.4	2.2	7.6	11.3	7.2
Pea Area (ha)	0.3	0.2	0.4	8.0	11.2	14.5
Small Seeds (ha)	-	0.5	1.9	7.3	11.2	15.9
Other Crops (ha)	1.2	0.8	1.1	4.5	4.9	3.2
Cereal and Pea Area As % Total Area	7.2	5.8	8.7	32.5	45.1	43.6
Small Seeds as % Total Area	-	0.5	1.9	7.3	11.2	15.9

Source: Economic Survey of New Zealand Wheatgrowers Financial Analysis 1977-78, 1978-79 and 1979-80 - Physical Farm Characteristics.

TABLE 13

Labour Wages: Arable Farms (\$/ha)

Farm Type	1978/79	1979/80	1980/81
Livestock Properties ^a	28	19	40
Intensive Crop Properties ^b	34	37	53

Source: Economic Survey of New Zealand Wheatgrowers, Financial Analysis 1978-79, 1979-80 and 1980-81

^a Less than 5% gross farm profit from crop

^b Greater than 50% gross farm profit from crop

CHAPTER 4

FOREIGN EXCHANGE REQUIREMENT OF THE MAJOR CROPS AND LIVESTOCK ENTERPRISES IN THE ARABLE SECTOR

This chapter evaluates the foreign exchange component of on-farm production costs for wheat, barley, peas, ryegrass and white clover for the 1978/79, 1979/80 and 1980/81 seasons. In addition the foreign exchange component of distribution costs to mills for wheat and F.O.B. for the other crops in their unprocessed forms are assessed. For the purpose of this exercise it has been assumed that the header sample for barley is suitable for export without further dressing charges, while peas, ryegrass and white clover have all been assumed to be dressed at commercial rates in order to meet export specifications. For comparative purposes the foreign exchange requirement for a self-replacing livestock enterprise is also assessed. The unit cost information used to determine the foreign exchange component of on-farm production costs has been obtained from the A.E.R.U. Economic Survey of New Zealand Wheatgrowers, the Lincoln College Farm Budget Manual, and the Federated Farmers' Handbook.

4.1 Crop Enterprise Analysis

The foreign exchange requirements of the various cropping enterprises are detailed in Appendix I and summarised below in Table 14.

It is evident that crop production costs vary significantly between enterprises. Wheat and barley sold off the header, requiring no dressing charges, have 1980-81 production costs ranging from \$310-\$340 per hectare with a foreign exchange component of 32-35.0 per cent. This results in a 1980-81 foreign exchange requirement per hectare F.O.R. or F.O.B. of \$100 to \$120 per hectare.

Crops such as peas, grass seed and clover which require dressing and cleaning costs in order to meet export specifications in the unprocessed state and which experience high seed costs in the case of peas, high fertiliser costs in the case of grass seed and high agricultural chemical costs in the case of clover, all have 1980-81 production costs ranging from \$480 to \$530 per hectare. The foreign exchange components of these crop inputs are similar to wheat and barley with the result that the foreign exchange requirement is assessed at \$138 per hectare for clover, \$152 per hectare for peas and \$169 per hectare for grass seed.

Wheat incurs additional internal distribution costs between F.O.R. and mill. In 1980/81 these costs were assessed at \$165 per hectare with a foreign exchange component of \$26 per hectare resulting in an ex-mill foreign exchange requirement for wheat of \$145 per hectare.

TABLE 14

Foreign Exchange Requirement for Crops \$/ha

	Total Cost to F.O.R. or F.O.B. \$/ha	F.E. Percentage of Total Direct Costs (%)	F.E. Requirement at F.O.R. or F.O.B. \$/ha	F.E. component of internal distribution	Total F.E. Requirement \$/ha
<u>Wheat</u>					
1978-79	211	33.0	70	17	87
1979-80	247	33.6	83	21	104
1980-81	339	35.1	119	26	145
<u>Barley</u>					
1978-79	194	31.2	61	-	61
1979-80	234	31.7	74	-	74
1980-81	311	32.7	101	-	101
<u>Peas</u>					
1978-79	337	28.2	95	-	95
1979-80	406	28.2	115	-	115
1980-81	524	29.1	152	-	152
<u>Grass Seed</u>					
1978-79	285	32.9	94	-	94
1979-80	381	35.0	133	-	133
1980-81	486	34.7	169	-	169
<u>Clover</u>					
1978-79	256	27.7	71	-	71
1979-80	372	28.4	106	-	106
1980-81	490	28.2	138	-	138

4.2 Relative Importance of the Foreign Exchange Requirement of Various Crop Inputs

The overall importance of the various foreign exchange components of the inputs used in the arable sector is assessed by weighting the 1980/81 foreign exchange requirement of each input associated with the five major enterprises by the relative area of each enterprise (see Table 18). Results of this analysis are summarised in Table 15.

Costs associated with mechanisation of crop production, i.e. fuel, oil, repairs, maintenance and depreciation represent nearly 43.0 per cent of the total F.O.B. (F.O.R. wheat) foreign exchange requirements of the arable sector. Agricultural chemicals and fertiliser represent a further 28.2 per cent of the foreign exchange requirements.

4.3 Livestock Enterprise Analysis

Appendix II details the foreign exchange requirement of a self contained sheep enterprise within the arable sector. These results are summarised in Table 16.

As has been the case in cropping enterprises there has been a significant increase in the foreign exchange requirement per stock unit as the cost of production increases. Table 17 relates this cost increase to the actual stocking rate of sheep properties within the arable sector.

The foreign exchange requirement of a sheep enterprise per unit area within the arable sector is significantly less than the foreign exchange requirement of a cropping enterprise undertaken on a similar soil type, and under the same climatic conditions.

TABLE 15

Relative Importance of Different Inputs

	Weighted Foreign Exchange Requirement (\$/ha)	% Total Foreign Exchange (%)
Fuel and Oil	27.49	22.3
Repairs and Maintenance	7.75	6.3
Seed	13.43	10.9
Agricultural Chemicals	11.27	9.2
Fertiliser	23.45	19.0
Contracting	6.76	5.5
Grain Drying	1.24	1.0
Dressing and Insurance	6.02	4.9
Bags	0.08	0.1
Irrigation	0.62	0.5
Transport	7.47	6.1
Depreciation	17.55	14.2
TOTAL COST TO F.O.B. (F.O.R. wheat)	<u>123.13</u>	<u>100.0</u>

TABLE 16

Foreign Exchange Requirement for Livestock (\$/s.u.)

	Total Cost to Grower	F.E. Percentage of total direct Cost (%)	F.E. Requirement to farm gate	F.E. component farm gate to F.O.B.	Total F.E. Requirement to F.O.B.
<u>Sheep</u>					
1978-79	3.91	24.6	0.96	0.50	1.46
1979-80	4.82	23.2	1.12	0.64	1.76
1980-81	5.92	24.0	1.42	0.83	2.25

TABLE 17

Foreign Exchange Requirement per Hectare of Livestock

	s.u./hectare	F.E. requirement to F.O.B. per s.u. (\$/s.u.)	Total F.E. requirement per hectare (\$/ha)
<u>Sheep</u>			
1978-79	11.8	1.46	17.
1979-80	12.3	1.76	22.
1980-81	13.1	2.25	29.

CHAPTER 5

GROSS FOREIGN EXCHANGE GENERATED BY THE MAJOR CROP AND LIVESTOCK ENTERPRISES IN THE ARABLE SECTOR

This chapter assesses the per hectare production of the various cropping enterprises and the foreign exchange value F.O.B. or C.I.F. of the five major arable sector crops: wheat, barley, peas, ryegrass and white clover. For comparative purposes the foreign exchange value F.O.B. of sheep products is determined. From these data the gross foreign exchange generated per hectare is determined.

This analysis assumes that total New Zealand production is valued on either an F.O.B. or C.I.F. basis depending on whether the commodity is exported or imported. It is acknowledged that the domestic consumption of New Zealand's arable sector exports could be valued on a C.I.F. basis and the surplus available for export on a F.O.B. basis. While this approach would undoubtedly increase the net foreign exchange generated by a particular cropping enterprise, difficulty in assessing the C.I.F. value of commodities New Zealand exports resulted in the former approach being adopted.

5.1 Crop Production

Crop production per hectare for the five major crops grown in the arable sector is summarised in Table 18.

The decline in the area of wheat, barley and peas has been offset by an increase in per hectare production with the result that total production of these crops increased between 1978 and 1981. During the period 1978-1980 small seed production appears to have been relatively constant. In 1981 however, grass seed production fell while clover production increased. No great significance should be attached to these apparent trends in total production. Rather, these figures can be regarded as setting the broad range of arable sector production.

5.2 Value of Arable Sector Crops

Export Statistics for the period 1979-80 to 1981-82 are summarised in Table 19 in order to determine the F.O.B. value of the major arable sector exports. It is important to note that this exercise assumes that the production year lags one year behind the export year.

Despite increased crop production of both barley and peas, the surplus of these crops available for export has fallen; the F.O.B. price per tonne has increased reflecting

TABLE 18
Crop Production

Production Year	1978-79			1979-80			1980-81		
	Area (ha)	Production (tonnes)	Tonnes/ha	Area (ha)	Production (tonnes)	Tonnes/ha	Area (ha)	Production (tonnes)	Tonnes/ha
Wheat	87,156	295,028	3.39	85,952	305,768	3.56	81,243	325,723	4.01
Barley	77,518	263,580	3.40	66,461	228,347	3.44	67,383	271,446	4.03
Oats	18,352	58,248	3.17	18,660	62,039	3.32	12,572	45,096	3.59
Peas	22,632	63,407	2.80	24,222	69,252	2.86	16,833	54,379	3.23
Grass Seed (MD) ^a	22,465	15,164	0.675	23,223	15,676	0.675	21,423	14,461	0.675
Clover (MD) ^a	19,465	6,813	0.35	19,120	6,692	0.35	21,902	7,666	0.35

Source: Department of Statistics, Agricultural Production Statistics

^a Area assessed on the basis of 0.675t/ha for grass seed and 0.35t/ha for white clover of machine dressed (MD) seed.

TABLE 19

F.O.B. Value of Arable Sector Exports

Production Year Export Year	1978-79		1979-80		1980-81		1981-82	
	Volume (t)	Total Value (\$m)	\$/tonne	Volume (t)	Total Value (\$m)	\$/tonne	Volume (t)	Total Value (\$m)
Barley	84,645	11.50	136	51,559	8.77	170	22,523	4.06
Oats	N.A.	N.A.	N.A.	137	0.03	219	N.A.	N.A.
Peas for Sowing	15,114	4.60	304	10,208	3.70	362	8,550	3.93
Grass Seed	5,220	5.11	979	1,504	1.65	1100	2,533	2.92
Clover Seed	5,064	8.87	1752	2,971	6.95	2340	4,325	11.68

Source: Department of Statistics Export Statistics,
Agricultural Production Statistics

trends in the world price for these commodities. The volume of small seeds exported has also declined. This decline has resulted in only a marginal increase in the price of grass seed exports but a significant increase in the export price of clover seed.

New Zealand as a net importer of wheat requires wheat to be valued at the C.I.F. value of Australian A.S.W. (Australian Standard White) grade and prime hard wheat landed at North Island mills. The import cost as stated in the New Zealand Wheat Board Annual Report is summarised in Table 20.

There appears to be a steady increase in the landed value per tonne of Australian wheat while the actual volume of wheat imported depends on the volume and quality of the domestic crop.

5.3 Gross Foreign Exchange Earnings Per Hectare of Crop

The gross foreign exchange earnings per hectare of crop grown is summarised in Table 21.

It is apparent that the gross foreign exchange value per hectare of crop grown has increased significantly over the period 1978-79 to 1980-81. It is also clear that considerable differences exist between cropping enterprises. While this difference may alter in actual dollar terms over the period, the foreign exchange value of pea production has been higher than the other cropping enterprises.

5.4 F.O.B. Value of Sheep Products

Based upon a one year time lag between production and sale the F.O.B. value of sheep products is detailed in Appendix II and summarised in Table 22 on a per stock unit and per hectare basis.

The summary emphasises the significant improvement in the value of sheep products that occurred after 1979. This improvement, along with specific Government encouragement, saw an intensification of livestock production on arable land with the result that, although the rate of growth of the F.O.B. value of sheep products slowed during the 1981 season, total foreign exchange value of sheep products per hectare increased to \$461.

TABLE 20
Value (C.I.F.) of Wheat Imports (January Year)

Production Year	1978-79	1979-80	1980-81
Import Year	1980	1981	1982
Wheat Imports (tonnes '000)	52.9	53.3	43.4
\$/tonne ex Mill	214.39	251.25	271.53

Source: N.Z. Wheat Board Annual Reports, 1978-79 to 1980-81.

TABLE 21
Gross Foreign Exchange Earnings Per Hectare of Crop

Production Year	Total Production (tonnes '000)	C.I.F./F.O.B. Value \$/tonne	Total C.I.F./F.O.B. value (\$m)	C.I.F./F.O.B. value (\$ per ha)
<u>Wheat</u>				
1978-79	295.0	214	63.1	727
1979-80	305.8	251	76.6	894
1980-81	325.7	272	88.6	1089
<u>Barley</u>				
1978-79	263.6	136	35.8	462
1979-80	228.3	170	38.8	585
1980-81	271.4	180	48.9	727
<u>Peas</u>				
1978-79	63.4	305	19.3	854
1979-80	69.3	362	25.1	1035
1980-81	54.4	459	25.0	1486
<u>Grass Seed</u>				
1978-79	15.1	979	14.8	661
1979-80	15.8	1100	17.4	743
1980-81	14.5	1152	16.7	778
<u>Clover</u>				
1978-79	6.8	1752	11.9	613
1979-80	6.7	2340	15.7	819
1980-81	7.7	2741	21.1	959

TABLE 22
F.O.B. Value of Sheep Products
 Year Ending June (\$/su)

	1979	1980	1981
Value meat (\$/su)	12.52	16.86	18.96
Value wool (\$/su)	12.21	16.58	16.22
Total Value F.O.B. ^a (\$/su)	24.73	33.44	35.18
Carrying Capacity Arable Land ^b (s.u./ha)	11.8	12.3	13.1
Total Foreign Exchange Generated per ha arable land (\$/ha)	292.00	411.00	461.00

^a Appendix II

^b A.E.R.U. National Wheatgrowers Survey - 1979-81.

CHAPTER 6

NET FOREIGN EXCHANGE EARNING CAPACITY OF ARABLE SECTOR ENTERPRISES

This chapter evaluates the relative net foreign exchange earning ability and the return to the grower (expressed as a Gross Margin, i.e. Gross Return less variable costs and depreciation) of the five major crops in the arable sector and compares them with a self contained sheep enterprise. An all sheep policy is compared with a low and high intensity cropping system in order to assess the relative merits of various cropping policies and their ability to generate foreign exchange.

6.1 Net Foreign Exchange Enterprise Comparison

The following analysis commences with the gross foreign exchange generated by the five major arable sector crops (Table 21) and by a sheep enterprise undertaken on arable land (Table 22). The foreign exchange requirements for crop (Table 16) and sheep (Table 17) are deducted from these gross figures, and the net foreign exchange generated per enterprise compared (Table 23).

Despite the greater foreign exchange requirements of a cropping enterprise, the level of production and F.O.B. or C.I.F. value is such that the net foreign exchange generated by all cropping enterprises per unit of land exceeds the sheep enterprise.

6.2 Gross Margin Analysis

The following results (detailed figures for which are presented in Appendix I Table IA-IE for crop and Appendix II Tables IIA-IID for sheep) compare the return to the grower (gross margin) for the five major arable sector crops and a self-contained sheep enterprise (Table 24).

This comparison, which includes both the imported and primary input content plus the domestic value added content of costs and prices, shows that the returns to a sheep enterprise are competitive with those for a range of cropping enterprises.

This conclusion is supported by an evaluation of sheep and wheat enterprises in the 1980/81 National Wheatgrowers Survey Enterprise Analysis which shows that assuming a gross margin of \$20 per stock unit, thirty per cent of wheatgrowers were generating greater profit margins from their sheep enterprises than from wheat. If the return per stock unit increased to \$25 per stock unit then nearly half of the

TABLE 23

Net Foreign Exchange Enterprise Analysis (\$/ha)

Enterprise	Gross Foreign Exchange Generated	Total Foreign Exchange Requirement		Net Foreign Exchange Generated
		F.O.B. ^a	Internal Distribution and/or Processing	
<u>Wheat</u>				
1978-79	727	70	17	640
1979-80	894	83	21	790
1980-81	1089	119	26	944
<u>Barley</u>				
1978-79	462	61		401
1979-80	585	74		511
1980-81	727	101		626
<u>Peas</u>				
1978-79	854	95		759
1979-80	1035	115		920
1980-81	1486	152		1334
<u>Grass Seed</u>				
1978-79	661	94		567
1979-80	743	133		610
1980-81	778	169		609
<u>Clover</u>				
1978-79	613	71		542
1979-80	819	106		713
1980-81	959	138		821
<u>Sheep</u>				
1978-79	292	11	6	275
1979-80	411	14	8	389
1980-81	461	19	10	432

^a To F.O.R. for wheat

TABLE 24

Gross Margin Comparison \$/ha

Enterprise	Production per ha	On Farm Unit Value	Gross Return	Production cost incl. Depreciation	Gross Margin per ha
		\$/ha	\$/ha	\$/ha	\$/ha
<u>Wheat</u>					
1978-79	3.4t	133	449	211	238
1979-80	3.6t	146	521	247	274
1980-81	4.0t	194	780	339	441
<u>Barley</u>					
1978-79	3.4t	95	321	194	127
1979-80	3.4t	99	341	234	107
1980-81	4.0t	122	490	311	179
<u>Peas</u>					
1978-79	2.8t	140	392	337	55
1979-80	2.9t	185	529	406	123
1980-81	3.2t	200	646	524	122
<u>Grass Seed</u>					
1978-79	0.675t	630	425	285	140
1979-80	0.675t	810	547	381	166
1980-81	0.675t	1000	675	486	189
<u>Clover</u>					
1978-79	0.35t	1400	490	256	234
1979-80	0.35t	1600	560	372	188
1980-81	0.35t	2300	805	490	315
<u>Sheep</u>					
1978-79	11.8 s.u.	14	166	46	120
1979-80	12.3 s.u.	23	280	59	221
1980-81	13.1 s.u.	22	282	78	204

wheatgrowers were making higher returns from their sheep than from their wheat enterprises.

This analysis highlights the competitive nature of the sheep enterprise compared with crop production. It explains the greater interest in livestock production by arable producers faced with increasing capital investment in plant and machinery.

6.3 Return to the Grower and Foreign Exchange Generation Compared

Table 25 relates the return to the grower (gross margin) to the net foreign exchange generated.

To the producer a wheat crop is the most profitable enterprise. With improved returns to the growers since 1979 the sheep enterprise ranks next, especially when undertaken in conjunction with the production of small seeds. Peas and barley appear to be the least profitable, to the grower, of the enterprises considered.

This is not the case when net foreign exchange earnings are considered. Although the least profitable to the grower, peas generate the highest per hectare foreign exchange earnings of all the enterprises considered, followed by wheat. Livestock is clearly the least profitable enterprise per hectare of arable land.

6.4 Land Use and Generation of Net Foreign Exchange

Good husbandry dictates that continuous cropping of arable land is not in the best interest of sustained agricultural production. Despite relatively similar soil types and environmental conditions arable producers therefore vary land use patterns in order to maintain soil fertility while attempting to optimise their returns. Based upon data collected from the wheatgrowers survey (including growers no longer producing wheat) during the 1980-81 season the following table (Table 26) shows three general types of land use applicable to arable land.

The ability of these three land use policies to generate foreign exchange is summarised in Table 27. The evaluation assumes that the foreign exchange component of overhead costs is similar for all land uses.

The physical constraints inherent in any intensive cropping programme do not limit the ability to generate additional foreign exchange as cropping intensity increases. The intensive cropping land use option generated nearly 59.0 per cent more net foreign exchange than the all sheep land use option on similar soil types.

TABLE 25

Gross Margin and Foreign Exchange Comparison (\$/ha)

Enterprise	Gross Margin ^a	Ranking \$/ha/year	Net Foreign Exchange ^b	Ranking \$/ha/year
<u>Wheat</u>	(\$)		(\$)	
1978-79	238	1	640	2
1979-80	274	1	790	2
1980-81	441	1	944	2
<u>Barley</u>				
1978-79	127	4	401	5
1979-80	107	6	511	5
1980-81	179	5	626	4
<u>Peas</u>				
1978-79	55	6	759	1
1979-80	123	5	920	1
1980-81	122	6	1334	1
<u>Grass Seed</u>				
1978-79	140	3	567	3
1979-80	166	4	610	4
1980-81	189	4	609	5
<u>Clover</u>				
1978-79	234	2	542	4
1979-80	188	3	713	3
1980-81	315	2	821	3
<u>Sheep</u>				
1978-79	120	5	275	6
1979-80	221	2	389	6
1980-81	204	3	432	6

^a Table 24 - Gross Margin Comparison

^b Table 23 - Net Foreign Exchange Enterprise Analysis

TABLE 26
Land Use Policies 1980-81

Group	All Sheep	Sheep and Crop	Intensive Crop
	1	3	4
Total Area (ha)	100.0	100.0	100.0
Stock Units	1325	1096	743
Wheat Area (ha)	-	12.2	21.2
Barley Area (a)	-	3.8	11.2
Pea Area (ha)	-	1.0	6.4
Small Seeds (ha)	-	2.7	13.8
Other Crops (ha)	-	1.3	4.0

Source: Economic Survey of New Zealand Wheatgrowers, Financial Analysis, 1980-81.

TABLE 27
Land Use and Foreign Exchange Generation

	NET FOREIGN EXCHANGE GENERATION			
	\$/ha ^c	All Sheep (\$/farm)	Sheep and Crop (\$/farm)	Intensive Crop (\$/farm)
Livestock	35 ^d	46,613	38,557	26,103
Wheat	944	-	11,516	20,012
Barley	626	-	2,379	7,011
Peas	1,334	-	1,334	8,537
Small Seeds	715 ^a	-	1,930	9,867
Other Crops	626 ^b	-	814	2,504
TOTAL		46,613	56,530	74,034
% Increase over All Sheep Policy		-	21.3	58.8

^a Average Grass Seed and White Clover net foreign exchange

^b Barley equivalent

^c Source: Table 23 - Net Foreign Exchange Enterprise Analysis (\$/ha, 1980-81)

^d Per stock unit not per hectare

CHAPTER 7

CONCLUSIONS

The objective of this study was to quantify the net foreign exchange earnings of the major crop and livestock enterprises associated with New Zealand's arable sector. The study shows that New Zealand's current account balance on external trade has fallen sharply over the last three years, resulting from a decline in the balance of visible trade (exports minus imports) and a rapidly rising deficit on invisible transactions. This trend has meant an increasing emphasis in Government policy toward encouraging those sectors and enterprises within the economy which generate foreign exchange, with particular emphasis on net foreign exchange generation.

While the value of exports of manufactured goods has risen markedly over the past five years (averaging a growth rate of 20% annually), primary products still account for 80% of export receipts. Exports from agriculture (including horticulture) make up 69% of total exports.

Even though agriculture dominates the export market, it is particularly useful to estimate the net foreign exchange earnings from different types of land use, since this information is essential if alternative agricultural policy options are to be meaningfully discussed.

The analysis contained in this report relies heavily on data collated in the New Zealand 1971/72 input-output tables. While there will undoubtedly have been some technical changes in sectoral production functions over the subsequent decade, the general tenor of the following results is believed to be realistic and the general conclusions reached are expected to be robust under a range of assumptions. The results are summarised in Table 28.

The major conclusions from the investigations are:-

(1) It is clear that per unit of land area, cropping enterprises produce between one and a half to three times the foreign exchange earnings of a self-contained pastoral farming enterprise. Sustained agricultural production however, requires intensive cropping systems to have a balance of cropping and livestock enterprises. Taking this into account it is apparent that intensive cropping systems produce nearly 59.0 per cent more net foreign exchange earnings than a pastoral system run under similar conditions (see Table 27).

TABLE 28

Foreign Exchange Earnings and Import: Export Earning Ratios

	Gross Foreign Exchange Earnings \$/ha	Total Foreign Exchange Requirements \$/ha	Net Foreign Exchange Generated \$/ha	Import: Export Earnings Ratio ^a
<u>Wheat</u>				
1978-79	727	87	640	1 : 8.7
1979-80	894	104	790	1 : 8.6
1980-81	1089	145	944	1 : 7.5
<u>Barley</u>				
1978-79	462	61	401	1 : 7.5
1979-80	585	74	511	1 : 7.9
1980-81	727	101	626	1 : 7.2
<u>Peas</u>				
1978-79	854	95	759	1 : 9.0
1979-80	1035	115	920	1 : 9.0
1980-81	1486	152	1334	1 : 9.8
<u>Grass Seed</u>				
1978-79	661	94	567	1 : 7.0
1979-80	743	133	610	1 : 5.6
1980-81	778	169	609	1 : 4.6
<u>Clover</u>				
1978-79	613	71	542	1 : 8.6
1979-80	819	106	713	1 : 7.7
1980-81	959	138	821	1 : 7.0
<u>Sheep</u>				
1978-79	292	17	275	1 : 17.2
1979-80	411	22	389	1 : 18.7
1980-81	461	29	432	1 : 15.9

^a Defined as Import requirement per dollar of foreign exchange generated.

(2) The import-export earnings ratio of pastoral farming systems is lower than that of cropping. However, the availability of imports is not, by itself, a binding constraint. Rather the policy objective is to increase the balance of exports less imports, and therefore the foreign exchange earnings ratios of alternative land use options are not as relevant as the absolute net earnings of the options, per unit of land area.

(3) It would be expected that the comparative advantage in the generation of net foreign exchange of the arable over the pastoral sectors would remain or even increase with the substitution of cropping for sheep production systems, since:

(a) The overhead costs of crop production per unit area would decrease.

(b) Export earnings from increased cereal product volumes traded would generate equivalent returns because New Zealand production constitutes an insignificant proportion of world trade. Because New Zealand is a major supplier of pastoral sector products (e.g. meat and wool) traded on the world market the marginal export return from pastoral products is likely to be less than the average return.

(c) Should wheat production increase to the point that New Zealand becomes a net exporter of wheat then the minimum net foreign exchange earnings from wheat would equate to the net foreign exchange earnings from a feed wheat substitute namely barley - an enterprise which generates fifty per cent more foreign exchange than an equivalent livestock enterprise.

(4) Present Government policy has influenced arable sector producers to maintain and even increase livestock production. As the influence of these policies decline the inherent flexibility of the arable sector will result in increased crop production as producers react to the real market situation. Associated with this expansion will be the generation of greater direct on farm employment opportunities.

APPENDIX I

CROP GROSS MARGIN AND FOREIGN EXCHANGE ANALYSIS

A. GROSS MARGIN ANALYSIS

The costs of various crop inputs have been assessed for the three production years 1978/79, 1979/80 and 1980/81. The following assumptions have been made.

(a) The fuel, oil, repairs, maintenance, contracting and depreciation costs per hectare are based upon the data collected in the National Wheatgrowers Survey for the respective years and include an allowance for fuel and oil used for irrigation.

(b) Fuel, oil, repairs, maintenance, contracting and depreciation per hectare are similar for all crops other than white clover which has been allocated the full depreciation charge but only the fuel, oil, repairs and maintenance associated with the harvesting of this crop.

(c) Repairs and maintenance have been assessed on the basis that one third of the total cost to the producer is labour (with no foreign exchange component) and the balance is parts.

(d) Electricity and water charges associated with irrigation have been attributed to all crops with the exception of wheat.

(e) Inward transport costs of crop inputs are similar for all crops and based upon data collected in the National Wheatgrowers Survey.

(f) Crop transport for wheat to F.O.R. is determined from the National Wheatgrowers Survey. Barley and peas incur an additional 50.0 per cent to cover transport costs to F.O.B. Transport costs for small seeds have been obtained from the Lincoln College Farm Budget Manual.

(g) Seed, fertiliser and agricultural chemicals are specific to the various crop enterprises. The wheat cost data come from the National Wheatgrowers Survey while data for other crops are derived from the Lincoln College Farm Budget Manual.

In the case of wheat the cost of taking the crop from F.O.R. to the mill is determined as follows.

(a) Commissions are determined as per the New Zealand Wheat Board Annual Reports.

(b) The percentage of the S.I. crop transported to N.I. mills, and the relative cost of this transshipment, is determined from New Zealand Wheat Board annual reports and expressed on a per hectare basis.

(c) The total cost of shifting S.I. wheat to N.I. is determined and deducted from the total freight cost of New Zealand wheat as per the New Zealand Wheat Board Annual Financial Statement. This residual is then expressed per tonne of S.I. wheat to S.I. mills in order to determine the cost from F.O.R. to local mills.

(d) These costs are then added to the total F.O.R. costs for wheat to give a total ex-mill cost per hectare.

Having determined the F.O.R. and ex-mill costs for a hectare of wheat, and the F.O.B. costs per hectare for the other crops, the Gross Return per hectare is determined as follows.

(a) Yield per hectare for wheat, barley and peas is determined from the Department of Statistics Agricultural Statistics data (Table 18).

(b) No such data exist for small seeds which have been assessed for each year as follows based on National Wheatgrowers Survey information

Grass Seed	0.675t/ha
Clover	0.35t/ha

(c) The value of wheat F.O.R. is determined from the New Zealand Wheat Board Annual Report and therefore allows for varietal premiums and discounts as well as storage increments.

(d) The grower value of the other crops is assessed as follows:

(i) Barley (in order to allow for feed barley) = 90% malting price

(ii) Peas (in order to allow for field peas) = 80% garden pea price

(iii) Grass Seed and clover seed values from the Lincoln College Farm Budget Manual.

The Gross Return per hectare less total costs per hectare to F.O.R. or F.O.B. is therefore, the net return per hectare to the grower (gross margin per hectare).

B. FOREIGN EXCHANGE COMPONENT ANALYSIS

The foreign exchange components for the major categories of crop inputs have been discussed in Chapter 2 and can be summarised as follows.

COST CATEGORY	Sector Number	% Foreign Exchange
Repairs & Maintenance	128	27.9 ^a
Fertiliser	58	56.0
Agricultural Chemicals	57	29.6
Depreciation	82	31.4

^a Relates to parts only; the equivalent of 18.6% total cost including labour.

These foreign exchange components by cost categories are considered to have been constant between crops over the period 1977/78 to 1980/81.

The foreign exchange components for those costs not covered in Chapter 2 have been assessed on the following basis.

(a) Study estimates based upon increasing prices for petroleum produce suggest that fuel and oil has a foreign exchange component of 85.0 per cent. This estimate indicated that the road transport foreign exchange component should also be revised from the 12.3 per cent stated in Table 7. The revised figure used in this analysis is 20.0 per cent.

(b) Seed - The foreign exchange component of total cost including depreciation is assessed at 35.0 per cent.

(c) Contracting and Seed Dressing - Based upon data supplied by the New Zealand Contractors Federation the following assessment has been made.

FOREIGN EXCHANGE COMPONENT OF CONTRACTUAL INPUT COSTS

Input	% Total Cost	F.E. Component	Weighted F.E. Component
Fuel	13.1	85.0	11.1
Repairs & Maintenance	8.9	27.9	2.5
Depreciation	12.3	31.4	3.9
Labour (including repairs and maintenance labour)	23.1	-	-
Overheads	15.1	-	-
Interest	18.1	-	-
Total Costs	<u>90.6</u>	<u> </u>	<u>17.5</u>
Profit	9.4		-
	<u>100.0</u>		<u>17.5</u>

(d) Grain Drying - Verbal discussions with grain drying organisations suggested the following assessment of their cost structure.

Input	% Total Cost	F.E. Component	Weighted F.E. Component
Labour	50.0	-	-
Fuel and Oil	30.0	85.0	25.5
Overheads	20.0	-	-
	<u>100.0</u>		<u>25.5</u>

(e) Bags - No information was available on the foreign exchange component of jute bags. for the purpose of this exercise a figure twice that used for paper bags and sacks (Chapter 2, Table 7) has been used.

(f) Study estimates suggest that freight and port charges past the farm gate including road, rail and sea transport plus storage and warehousing has a foreign exchange component of 18%.

The foreign exchange components of the various crop input categories are totalled in order to determine the total foreign exchange requirement per hectare of the respective enterprises.

The Gross Foreign Exchange value is taken as the unprocessed value of that crop either C.I.F. or F.O.B.

(a) Wheat - Since New Zealand is a net importer of wheat, the C.I.F. value of Australian A.S.W. and prime hard grade wheat delivered N.I. mills as quoted in the New Zealand Wheat Board Annual Report is used to value New Zealand produced wheat (Table 20).

(b) Barley, Peas, Small Seeds - Since New Zealand is a net exporter of these crops, the F.O.B. value per tonne of the unprocessed crop is assessed from the Department of Statistics Export Statistics for the respective years (Table 19).

Per hectare production of these crops (detailed in Table 18) is then related to the C.I.F. or F.O.B. value of the respective crops to enable the Gross Foreign Exchange generated per hectare to be assessed. The Foreign Exchange requirement is then deducted in order to determine the Net Foreign exchange generated per hectare.

TABLE IA
Wheat
 1978/79 - 1980/81

	Total Cost (\$/ha)			F.E. Component	F.E. Component (\$/ha)		
	78-79	79-80	80-81		78-79	79-80	80-81
Fuel & Oil	13.24	16.58	34.32	85.0	11.25	14.09	29.17
Repairs & Maintenance							
- Parts	11.45	9.21	27.78	27.9	3.19	2.57	7.75
- Labour	5.73	4.61	13.93				
Seed	32.82	34.16	43.64	35.0	11.49	11.96	15.27
Fertiliser							
- Sowing	13.74	18.31	32.07	56.0	7.69	10.25	17.96
- Topdressing	6.22	6.66	11.26		3.48	3.73	6.31
Ag. Chemicals							
- Weedicide	10.25	13.92	17.77		3.03	4.12	5.26
- Insecticide	0.93	0.38	0.68	29.6	0.28	0.11	0.20
- Fungicide	1.14	2.31	7.34		0.34	0.68	2.17
Transport							
- Crop Inputs	4.29	3.94	5.09		0.86	0.79	1.02
- Crop to F.O.R.	14.13	20.04	30.44	20.0	2.83	4.01	6.09
Contracting	25.93	29.34	38.60	17.5	4.54	5.13	6.76
Grain Drying	11.42	14.66	12.51	25.5	2.91	3.74	3.19
Irrigation Costs	0.28	0.06	3.14	6.0	0.02	-	0.19
Bags	0.55	0.65	0.65	30.0	0.17	0.20	0.20
Crop Insurance	2.73	3.21	3.55	-	-	-	-
Total Direct Costs	154.85	178.04	282.77		52.08	61.38	101.54
F.E. % Direct Cost					33.60	34.50	35.80
Depreciation	55.99	69.20	55.89	31.4	17.58	21.73	17.55
Total Cost to F.O.R.	210.84	247.24	338.66		69.66	83.11	119.09
F.E. % Total Cost to F.O.R.	-	-	-	-	33.00	33.60	35.10
Commissions	8.14	8.54	20.17	-	-	-	-
F.O.R. to Local Mill	16.03	16.33	18.03	18.0	2.89	2.94	3.25
Freight & Port Charges to N.I.	80.15	98.91	127.33	18.0	14.43	17.80	22.92

TABLE IA contd

	Total Cost (\$/ha)			F.E. Component	F.E. Component (\$/ha)		
	78-79	79-80	80-81		78-79	79-80	80-81
Total Cost to Mill	315.16	371.02	504.19		86.98	103.85	145.26
F.E. % Total Cost Mill	-	-	-		27.60	28.00	28.70
Gross Return per Ha	449.28	521.18	779.62		726.78	894.45	1088.84
Net Return per Ha							
(i) Grower	238.44	273.94	440.96		-	-	-
(ii) F.E. ex Mill	-	-	-		639.80	790.60	943.58
<u>Production Parameters</u>							
t/ha	3.39	3.56	4.01				
% Total Crop Purchased in S.I. Delivered N.I.	47.40	45.40	46.80				
Crop Value to (\$/t):							
(i) Grower	132.53	146.40	194.42				
(ii) C.I.F.					214.39	251.25	271.53

TABLE IB
Barley
 1978/79 - 1980/81

	Total Cost (\$/ha)			F.E. Component	F.E. Component (\$/ha)		
	78-79	79-80	80-81		78-79	79-80	80-81
Fuel & Oil	13.24	16.58	34.32	85.0	11.25	14.09	29.17
Repairs & Maintenance							
- Parts	11.45	9.21	27.78	27.9	3.19	2.57	7.75
- Labour	5.73	4.61	13.93				
Seed	23.40	28.60	32.50	35.0	8.19	10.01	11.38
Fertiliser	10.76	16.40	20.50	56.0	6.03	9.18	11.48
Ag. Chemicals	14.26	13.86	21.20	29.6	4.22	4.10	6.28
Transport							
- Crop Inputs	4.29	3.94	5.09	20.0	0.86	0.79	1.02
- Crop to F.O.B.	21.26	29.05	45.89		4.25	5.81	9.18
Contracting	25.93	29.34	38.60	17.5	4.54	5.13	6.76
Irrigation Costs	7.70	13.00	15.00	6.0	0.46	0.78	0.90
Total Direct Costs	138.02	164.59	254.81		42.99	52.46	83.92
F.E. % Total Direct Costs					31.10	31.90	32.90
Depreciation	55.99	69.20	55.89	31.4	17.58	21.73	17.55
Total Costs to F.O.B.	194.01	233.79	310.70		60.57	74.19	101.47
F.E. % Total Costs F.O.B.					31.20	31.70	32.70
Gross Return per Ha	321.30	340.56	489.65		462.13	585.21	727.05
Net Return per Ha							
(i) Grower	127.29	106.77	178.95		-	-	-
(ii) F.O.B.	-	-	-		401.56	511.02	625.58
<u>Production Parameters</u>							
Yield t/ha	3.40	3.44	4.03				
Crop Value \$/t							
(i) Grower	94.50	99.00	121.50		-	-	-
(ii) F.O.B.	-	-	-		135.92	170.12	180.41

TABLE IC
Peas
 1978/79 - 1980/81

	Total Cost (\$/ha)			F.E. Component	F.E. Component (\$/ha)		
	78-79	79-80	80-81		78-79	79-80	80-81
Fuel & Oil	13.24	16.58	34.32	85.0	11.25	14.09	29.17
Repairs & Maintenance							
- Parts	11.45	9.21	27.78	27.90	3.19	2.57	7.75
- Labour	5.73	4.61	13.93	-	-	-	-
Seed	62.50	60.00	72.50	35.0	21.88	21.00	25.38
Fertiliser	14.29	25.09	33.40	56.0	8.00	14.05	18.70
Ag. Chemicals	23.57	25.68	33.50	29.6	6.98	7.60	9.92
Transport							
- Crop Inputs	4.29	3.94	5.09	20.0	0.86	0.79	1.02
- Crop to F.O.B.	21.26	29.05	45.89		4.25	5.81	9.18
Contracting	25.93	29.34	38.60	17.5	4.54	5.13	6.76
Irrigation Costs	7.70	13.00	15.00	6.0	0.46	0.78	0.90
Dressing Charges	90.77	120.56	147.74	17.5	15.88	21.10	25.85
Total Direct Costs	280.73	337.06	467.75		77.29	92.92	134.63
F.E. % Total Direct Costs	-	-	-		27.50	27.60	28.90
Depreciation	55.99	69.20	55.89	31.4	17.58	21.73	17.55
Total Costs to Grower	336.72	406.26	523.64		94.87	114.65	152.18
F.E. % Total Cost F.O.B.					28.20	28.20	29.10
Gross Return per Ha	392.00	529.10	646.00		854.00	1035.32	1485.80
Net Return per Ha							
(i) Grower	55.28	122.84	122.36		-	-	-
(ii) F.O.B.	-	-	-		759.13	920.67	1333.62
<u>Production Parameters</u>							
Yield t/ha (MD)	2.80	2.86	3.23				
Crop Value (\$/t)							
(i) Grower	140	185	200		-	-	-
(ii) F.O.B. ^a	-	-	-		305	362	460

^a F.O.B. value taken as value of peas exported for sowing. All other peas exported have a degree of local value added other than dressing prior to export.

TABLE ID
Grass Seed
 1978/79 - 1980/81

	Total Cost (\$/ha)			F.E. Component	F.E. Component (\$/ha)		
	78-79	79-80	80-81		78-79	79-80	80-81
Fuel & Oil	13.24	16.58	34.32	%	11.25	14.09	29.17
Repairs & Maintenance							
- Parts	11.45	9.21	27.78	27.9	3.19	2.57	7.75
- Labour	5.73	4.61	13.93	-	-	-	-
Seed	15.40	32.20	40.20	35.0	5.39	11.27	14.07
Fertiliser	60.55	102.06	113.81	56.0	33.91	57.15	63.73
Ag. Chemicals	14.26	13.86	21.20	29.6	4.22	4.10	6.28
Transport							
- Crop Inputs	4.29	3.94	5.09	20.0	0.86	0.79	1.02
- Crop to F.O.B.	4.97	9.72	13.12		0.99	1.99	2.62
Contracting	25.93	29.34	38.60	17.5	4.54	5.13	6.76
Dressing and Harvesting Charges	65.82	77.00	106.70	17.5	11.52	13.48	18.67
Irrigation Costs	7.70	13.00	15.00	6.0	0.46	0.78	0.90
Total Direct Costs	229.34	311.52	429.75		76.33	111.35	150.97
F.E. % of Total Direct Costs					33.30	35.70	35.10
Depreciation	55.99	69.20	55.89	31.4	17.58	21.73	17.55
Total Cost to Grower	285.33	380.72	485.64		93.91	133.08	168.52
F.E. % Total Costs F.O.B.					32.90	35.00	34.70
Gross Return per Ha	425.25	546.75	675.00		660.83	742.50	777.60
Net Return per Ha							
(i) Grower	139.92	166.03	189.36	-	-	-	-
(ii) F.O.B.	-	-	-		566.92	609.42	609.08
<u>Production Parameters</u>							
Yield t/ha (MD)	0.675	0.675	0.675				
Crop Value (\$/t)							
(i) Grower	630	810	1000		-	-	-
(ii) F.O.B.	-	-	-		979	1100	1152

TABLE IE
Clover
 1978/79 - 1980/81

	Total Cost (\$/ha)			F.E. Component %	F.E. Component (\$/ha)		
	78-79	79-80	80-81		78-79	79-80	80-81
Fuel & Oil Harvesting and Mowing Only	9.22	10.98	15.52	85.0	7.84	9.33	13.19
Repairs & Maintenance							
- Parts	11.45	9.21	27.78	27.9	3.19	2.57	7.75
- Labour	5.73	4.61	13.93	-	-	-	-
Seed	6.80	6.90	9.00	35.0	2.38	2.42	3.15
Fertiliser	20.35	30.69	38.10	56.0	11.40	17.19	21.34
Ag. Chemicals	30.63	96.97	155.40	29.6	9.07	28.70	46.00
Transport							
- Crop Inputs	4.29	3.94	5.09	20.0	0.86	0.79	1.02
- Crop to F.O.B.	2.03	3.78	5.50		0.40	0.76	1.10
Contracting	25.93	29.34	38.60	17.5	4.54	5.13	6.76
Dressing & Harvesting Charges	75.32	93.72	110.50	17.5	13.18	16.40	19.34
Irrigation Costs	7.70	13.00	15.00	6.0	0.46	0.78	0.90
Total Direct Costs	199.45	303.14	434.42		53.32	84.07	120.55
F.E. % Total Direct Costs					26.70	27.70	27.80
Depreciation	55.99	69.20	55.89	31.4	17.58	21.73	17.55
Total Cost to Grower	255.44	372.34	490.31		70.90	105.80	138.10
F.E. % Total Costs F.O.B.					27.80	28.40	28.20
Gross Return per Ha	490.00	560.00	805.00		613.20	819.00	959.35
Net Return per Ha							
(i) Grower	234.56	187.66	314.69		-	-	-
(ii) F.O.B.	-	-	-		542.30	713.20	821.25
<u>Production Parameters</u>							
Yield t/ha (MD)	0.35	0.35	0.35				
Crop Value (\$/t)							
(i) Grower	1400	1600	2300		-	-	-
(ii) F.O.B.	-	-	-		1752	2340	2741

APPENDIX II

LIVESTOCK GROSS MARGIN AND FOREIGN EXCHANGE ANALYSIS

A. GROSS MARGIN ANALYSIS

For the purpose of this exercise it is assumed, that the arable sector is a self sufficient livestock identity breeding, within the arable sector, its own replacements and fattening all its surplus stock. Based on this assumption the costs per stock unit for a self sufficient ewe flock are presented for the three production years 1978/79, 1979/80 and 1980/81. These data are based on information gathered from the Lincoln College Farm Budget Manual and the National Wheatgrowers Survey.

These costs are deducted from the gross return per stock unit resulting in the net return per stock unit to the grower. The carrying capacity for livestock properties within the arable sector is determined from the National Wheatgrowers Survey which, when related to the return per stock unit, allows the return per hectare to be assessed.

B. FOREIGN EXCHANGE ANALYSIS

In order to assess the net foreign exchange generated from sheep production the costs between the farm gate and F.O.B. have to be assessed and their foreign exchange component determined (Table IIB). The foreign exchange component per head slaughtered is then adjusted by the national off-take expressed per stock unit. This foreign exchange component past the farm gate is then added to the on farm foreign exchange component (Table IIA) in order to obtain the total foreign exchange component of a sheep enterprise.

The total foreign exchange requirement is then deducted from the foreign exchange value of sheep products (as assessed in Tables IIC and IID) in order to determine the net foreign exchange generated.

TABLE IIA
 Sheep
 1978/79 - 1980/81

	Total Cost (\$/s.u.)			F.E. Component	F.E. Component		
	78-79	79-80	80-81		78-79	79-80	80-81
				%			
Shearing & Crutching	0.55	0.70	0.88	8.8	0.05	0.06	0.08
Animal Health	0.57	0.78	0.96	29.6	0.17	0.23	0.28
Ram Costs	0.25	0.40	0.38	10.0	0.03	0.04	0.04
Wool Shed Expenses	0.10	0.23	0.19		0.05	0.14	0.11
Cartage	0.37	0.62	0.66	20.0	0.07	0.12	0.13
Selling Charges	0.20	0.30	0.37	-	-	-	-
Total Direct Costs	2.04	3.13	3.44		0.37	0.59	0.64
Depreciation ^a	1.87	1.69	2.48	31.4	0.59	0.53	0.78
Total Cost to Grower (A)	3.91	4.82	5.92		0.96	1.12	1.42
F.E. % Total Cost to Grower					24.60	23.20	24.00
Gross Return to Grower per s.u. ^d							
- Livestock	6.94	11.65	10.98				
- Wool	7.15	11.10	10.57				
Gross Return per s.u.(B)	14.09	22.75	21.55				
Net Return per s.u. to Grower (A-B)	10.18	17.93	15.63				
Costs Farmgate to F.O.B. ^b							
- Killing Charges	3.82	4.85	6.58		0.45	0.58	0.77
- Wool Handling Charges	0.70	0.83	0.88		0.05	0.06	0.06
Total Cost past Farmgate (C)	4.52	5.68	7.46		0.50	0.64	0.83
Total Cost to F.O.B.(A+C)	8.43	10.50	13.38		1.46	1.76	2.25
F.E. % Total Cost					17.30	16.80	16.80
F.O.B. Value Sheep Products ^c							
- Meat					12.52	16.86	18.96
- Wool					12.21	16.58	16.22
Total (D)					24.73	33.44	35.18
Net F.E. per s.u.(D-A+C)					23.27	31.68	32.93
s.u./hectare ^a	11.80	12.30	13.10		11.80	12.30	13.10
Net Return per ha							
(i) To Grower	120.12	220.54	204.75		-	-	-
(ii) F.O.B.	-	-	-		274.59	389.66	431.38

Sources: ^a Economic Survey of New Zealand Wheatgrowers, 1978-79, 1979-80, 1980-81
^b See Table IIB
^c See Table IIC, IID
^d Lincoln College Farm Budget Manual

TABLE IIB
Killing Charges Farm Gate to F.O.B.

	Total Cost			F.E. Component	F.E. per head		
	78-79	79-80	80-81		78-79	79-80	80-81
<u>Transport/head</u>							
(i) To works	0.41	0.51	0.60	20.0	0.09	0.11	0.13
(ii) Works to F.O.B. ^c	0.14	0.17	0.20	18.0	0.03	0.04	0.04
Killing Charges	6.28	7.41	9.48	11.0	0.69	0.82	1.04
Total Cost ^a	6.83	8.09	10.28		0.81	0.97	1.21
F.E. % Total Cost					11.70	12.00	11.80
Total s.u. (m)	59.4	60.0	64.6				
Sheep Slaughtered ^b (m head)	33.4	36.2	41.4				
Offtake per s.u. (head)	0.56	0.60	0.64				
Cost per s.u. (\$/s.u.)	3.82	4.85	6.58		0.45	0.58	0.77
<u>Wool Handling Charges: Store to F.O.B.</u>							
Insurance Levy/kg	0.07	0.08	0.08	-	-	-	-
Brokers Charges/kg	0.06	0.06	0.07	11.0	0.01	0.01	0.01
Total Cost ^a	0.13	0.14	0.15		0.01	0.01	0.01
kg per s.u. ^a	5.4	6.0	5.9		5.40	6.00	5.90
Total Cost per s.u.	0.70	0.83	0.88		0.05	0.06	0.06

Sources:

^a N.Z. Agricultural Statistics 1980

^b Reserve Bank Bulletin April 1983

^c One Third to Works Cost Based on Marketing Cost for N.Z. Meat Exports 1970-71 to 1975-76. P.D. Chudleigh, M. Clemes, L. Woods, AERU Research Report No.96.

TABLE IIC
Meat Production

	1978 ^a	1979 ^a	1980 ^a	1981
<u>Livestock Numbers ('000)</u>				
Ewes	44,515	46,108	47,914	
Others	18,648	17,415	20,851	
Total s.u.	59,433	60,040	64,594	
<u>Total Meat Production (t'000)</u>				
Sept Year				
Mutton		162.8	168.5	200.5
Lamb		351.1	391.2	425.7
Total		513.9	559.7	626.2
<u>N.Z. Consumption In Stock on Hand (t'000)</u>				
Mutton		22.9	81.0	108.9
Lamb		30.5	73.0	23.9
Total		53.4	154.0	124.8
kg/s.u. Preceding Year		0.9	2.4	
<u>N.Z. Mutton and Lamb Exports (t'000) June Year</u>				
Mutton		139.9	87.5	91.6
Lamb		320.6	318.2	401.8
Total		460.5	405.7	493.4
kg/s.u. Preceding Year		7.8	6.8	7.6
<u>Value Meat Exports (\$000 F.O.B.) June Year</u>				
Mutton		109,987	97,704	108,074
Lamb		418,547	486,188	746,140
Sheepskins & pelts ^b		138,400	149,800	110,800
Total		666,934	733,692	965,014
Total per Export tonne		1,448.3	1,808.5	1,955.9
<u>Value Total Meat Production</u>				
Total per Export tonne (\$ F.O.B./t)				
		1,448.3	1,808.5	1,955.9
Total Production (t'000)				
		513.9	559.7	626.2
Total Value Meat Production (\$'000 F.O.B.)				
		744,281	1,012,217	1,224,750
Total Value per s.u. (\$ F.O.B.)				
Preceding Year		12.52	16.86	18.96

Source:

^a Monthly Abstracts Statistics

^b Reserve Bank Bulletin June 1982.

TABLE IID
Wool Production

	1978 ^a	1979 ^a	1980 ^a	1981
<u>Livestock Numbers ('000)</u>				
Ewes	44,515	46,108	47,914	
Other	18,648	17,415	20,851	
Total s.u.	59,433	60,040	64,594	
<u>New Zealand Wool Production</u> (t'000 greasy equivalent) ^b				
Total Production		320.6	356.5	380.7
Total Exports		301.9	333.7	324.4
N.Z. Mill Purchases kg/s.u.		24.4	20.8	21.8
N.Z. Stockpile kg/s.u.		-5.7	+2.0	+34.5
<u>Value Wool Exports (\$'000 F.O.B.)</u>				
Total Value Wool Exports		683,322	930,760	892,602
Total Value per tonne Wool Export (\$ F.O.B.)		2,263.4	2,792.2	2,751.6
<u>Value Total Wool Production</u>				
Total Value per Tonne Wool Export (\$ F.O.B.)		2,263.4	2,792.2	2,751.6
Total Production (t'000)		320.6	356.5	380.7
Total Value Wool Production (\$'000 F.O.B.)		725,646	995,419	1,047,514
Total Value per s.u. (\$ F.O.B.) Preceding Year		12.21	16.58	16.22

Source:

^a Monthly Abstracts

^b Reserve Bank Bulletin July 1982

APPENDIX III

INTER-INDUSTRY INPUT-OUTPUT REVISION

One of the disadvantages in the use of input-output tables for this type of analysis is the fact that they are usually dated - the current published tables for New Zealand relate to the 1971/72 year. To the extent that production relationships tend to change over time, therefore, data from the tables need to be interpreted with care.

Subsequent to the detailed analysis contained in this report, draft printouts of data for the 1976/77 input-output tables became available from the Department of Statistics. The import content figures from each source are tabulated in Table IIIA. Most sectors demonstrate a reasonable degree of consistency between the two periods, although generally import contents have risen reflecting, amongst other things, the higher real prices for petroleum fuels following the 1973 oil shock. The four sectors which show significant upward movement are Agricultural Services (4), Chemical Fertilisers (58/56), Freight Transport by Road (109/107) and Repair of Motor Vehicles (128/126). In particular, the import content of fertiliser has risen from 56% to over 70% between 1971/72 and 1976/77.

In aggregate, however, application of these revised figures would be expected to confirm the general conclusions of the analysis undertaken.

TABLE IIIA

Comparison of Import Content Factors, 1971-72 and 1976-77

Sector Number ^a	Name	1971-72 Tables		1976-77 Tables	
		Direct Import Content	Direct & Indirect Import Content ^b	Direct Import Content	Direct & Indirect Import Content ^b
1/1	Agriculture	0.036	0.132	0.028	0.167
4/4	Agricultural Services	0.031	0.088	0.070	0.256
10/10	Meat Freezing and Preserving	0.009	0.110	0.027	0.141
52/50	Pack bags and sacks	0.046	0.166	0.022	0.185
57/55	Chemical products n.e.c.	0.240	0.321	0.254	0.355
58/56	Chemical fertiliser	0.511	0.560	0.651	0.703
65/63	Motor Vehicles, Tyres and Tubes	0.357	0.403	0.264	0.333
82/80	Agr. & Pastoral Machinery	0.256	0.364	0.193	0.329
88/86	Motor Vehicle Assembly	0.561	0.601	0.562	0.598
104/102	W & R Trade	0.030	0.067	0.034	0.110
107/105	Rail Transport	0.047	0.140	0.010	0.187
109/107	Freight Transported by Road	0.037	0.123	0.053	0.216
113/111	Storage and Warehousing	0.062	0.109	0.010	0.102
128/126	Repair of Motor Vehicles	0.122	0.186	0.189	0.311

^a Sector numbers; 1971-72 Table/ 1976-77 Table

^b Includes the import content of consumption of fixed capital

Source:

Derived from Department of Statistics, 1980. Inter-Industry Study of the New Zealand Economy 1971-72, Wellington, Department of Statistics, 1983.

"Inter-Industry Study of the New Zealand Economy, 1975-76". Computer printout of draft tabulations, May 1983.

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