

AGRICULTURAL
ECONOMICS
RESEARCH UNIT



Lincoln College

AN ANALYSIS OF
LANDS AND SURVEY
DEVELOPMENT PROJECTS
1945-69

by

H. J. PLUNKETT

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THE AGRICULTURAL ECONOMICS RESEARCH UNIT

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SURVEY DEVELOPMENT PROJECTS

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P R E F A C E

In New Zealand the Government has played a major role in land development for subdivision and settlement. This applies particularly to the period since the 1939-1945 War, for it was the need to provide farm units for returned Servicemen which triggered off this programme. While the objectives have not been entirely economic ones it is nevertheless important that the use of public funds in projects of this nature should be subjected periodically to economic scrutiny.

In this bulletin Mr Plunkett, who has had the full co-operation of the Lands and Survey Department, has analysed the accounts of a number of development blocks, using accepted investment criteria.

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Director,
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April 1972

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CHAPTER 1.

INTRODUCTION AND SUMMARY

Since the second world war Government has played an important role in developing unproductive land in New Zealand. The aim of this report is to examine why Government became so deeply involved in the development of such land and to examine the economic success of this activity.

Land development activities were expanded by the New Zealand Government after the second world war so that the pledge of supplying farms to returned servicemen could be fulfilled. It was realized that even with complete control of all land sales the supply of self-contained farms coming onto the market was insufficient to fulfil the demands of returned servicemen. The demand for farms was stimulated by favourable price movements and the generous terms of the offer. Government land development was given additional impetus in 1953 when land sales controls were relinquished. The abolition of land sales control saw a return to the free market for land and an end to the pre-emptive rights of returned servicemen to any land sold. Government, as a result, expanded its land development activities to supply the remaining returned servicemen with farms on the same favourable terms.

By 1960, Government had met the returned servicemen's demand for farms and instead of curtailing virgin land development it opened its newly created farms to civilian settlers on a 'one-man one-farm' basis. Such land development was continued to directly expand the overseas earning capacity of the country and to provide an avenue for young men in the farming industry to acquire farms of their own.

The theoretical framework used to evaluate the economic success of Government's land development activities is set out in Chapter 3. The objective of profit maximisation was assumed as this provides a yardstick by which the cost of pursuing any other objective could be measured. National and Departmental points of view are outlined in order to clearly define 'benefits' and 'costs'. Of the three economic criteria (i.e. Net Present Value, Internal Rate of Return and Benefit-Cost Ratio) usually advanced for such analyses, the Net Present Value or Benefit-Cost criterion was the main one used. It is the only criterion that always gives unambiguous results.

Sources of data available on Government's post-war land development and settlement activities are reviewed in Chapter 4. This chapter also sets out the procedures by which the data from land development blocks of the Department of Lands and Survey were analysed.

Results of this study are presented in Chapter 5. From the 1st of April, 1944, till the 31st March, 1969, the Government, acting through the Department of Lands and Survey, spent \$112 million to make 3½ million acres of land suitable for farming. Not all of this land development was analysed in this project as financial results were incomplete on some 2 million acres, and on a further 1¼ million acres, the land was acquired pre-war or in a partially developed state. Development of the remaining ¼ million acres of unproductive land into 568 farms is discussed in detail. On this ¼ million acres the financial books of account show that the Department of Lands and Survey made a \$1½ million loss.

Financial accounts do not always reflect the real cost and returns of resources used, however. The analysis presented reveals that the real loss the Department incurred on resources used, when valued

at actual prices (i.e. in the prices that occurred), was \$1.2 million, or \$2,000 per farm. The annual return on investment was only 1.8%. Thus if the opportunity cost of capital is taken as 4 per cent, the Department suffered a real loss at the rate of 2.2 per cent per dollar per annum.

It was further established that the Department did not pay the full opportunity cost of the national resources it used, e.g. Treasury supplied capital at low interest rates. It is estimated that the national loss on resources amounted to approximately \$2 million or \$3½ thousand per farm.

An analysis of the results in constant prices (i.e. 1957 and mean 1945 to 1969 prices) showed that the total loss on resources has been considerably reduced by the favourable price changes which occurred during the period of the study. It is estimated that if the favourable price changes had not occurred the loss would have been some \$1½ million or \$3 thousand per farm more.

On the land development blocks studied, 568 new farms were created. It is thought that the results are reasonably representative of the 590 farms already settled on the 2 million acres where land development is still continuing. It is thought that for the other 1617 new farms proposed on the 2 million acres under development a higher rate of subsidy will be required, because adverse price movements are expected for the future.

This loss to the nation is not regarded as excessive in view of the success in rehabilitating returned servicemen as farmers. However, the current policy question is whether or not the losses incurred by Government are too high a price to pay for a few young men to have farms of their own.

CHAPTER 2.

THE EVOLUTION OF LAND DEVELOPMENT BY GOVERNMENT IN NEW ZEALAND

In this chapter it is suggested that the failure of returned servicemen to rehabilitate by land settlement after the First World War lead to a government policy of land development before settlement. To examine this hypothesis a few brief introductory comments are made about land settlement policy during the colonial period before the First World War.

Secondly, there is a detailed discussion on the ambitious programme for rehabilitating returned servicemen as farmers after the First World War, as a similar policy was followed after the Second World War. After the First World War there was a high rate of failure among returned servicemen who were rehabilitated as farmers, and as a result, Government suffered severe financial losses. The causes of failure are examined. Thirdly, reasons are advanced on why Government first began land development in the depression period of the 1930s. Fourthly, reasons for the great expansion of Government land development activities in the period of rehabilitation after the Second World War are set out and causes of the relative success of returned servicemen rehabilitation are examined. Finally, Government land development policy since 1960 is examined.

2.1 The Colonial Period

Initially, in the colonisation of New Zealand, the Government acted as an agent that acquired the land from the native Maori inhabitants and then sold or leased it to European immigrants. As the population grew and markets for agricultural products expanded, the supply of good quality land for settlement became scarce. To boost the supply of good quality land for settlement, Government intervened in the land market from time to time and after 1894 acquired several large privately owned farms for subdivision to encourage closer settlement.

The demand for land was rationed by making Crown land available to settlers on a one-man one-farm basis.

2.2 First World War Rehabilitation

During the first World War Government began a scheme for the resettlement of returned servicemen as farmers. Returned servicemen were given preference to all land made available for settlement, and allowances of up to \$5,000 to buy and \$1,000 to develop land were granted. A further \$2,000 was made available under exceptional circumstances. In all, 4,110 returned servicemen were settled on 1,443,564 acres of Crown land¹.

In 1925, Jourdain commented the "no country in the world made greater efforts to settle the returned soldier on the land, and the advances to them by way of loan were much larger per capita than those granted by Governments of other countries [17, p.46]². As Condliffe observed "the Government turned loose in the rural estate market 22,792 new purchasers armed with £23,570,441 (i.e. \$47,140,882 of borrowed money. Little provision was made to control the advance in land values resulting from the increased demand. Both town and country lands were affected, and on both there were heavy losses. Up to the end of the financial year 1934-35, reduction in capital and mortgage values had totalled £2,892,991 (i.e. \$5,785,982)" [5, p.277]. This release of purchasing power to returned servicemen was reflected in the rapid turnover and exceptionally high prices paid for land. At the peak of the post-war land boom in 1921, Maclachlan has reported that, "4½ million acres were sold in almost 56,000 transactions for a consideration just under £82 (i.e. \$164) million." [23,p.49].

-
1. The details of Government settlement of returned servicemen after the First World War is summarised by Plunkett [29, Appendix A].
 2. Numbers refer to references listed on page 59.

The prices of agricultural products had risen almost continuously from 1895 to 1921 and this led to widespread expectations of further increased product prices. Speculation on this was capitalised into land values. The resultant high land values are reported to have led to financiers and creditors of farmers taking an increasing share of farm profits [Powles ed. 30, p.83]. The result was that, with the sharp drop in prices in 1922, many farmers were unable to absorb the subsequent reduction of income.

Many of the returned servicemen who had entered farming during the peak of the post-war land boom were unable to continue production. This high rate of failure caused Government to set up special boards of inquiry. The boards are reported to have viewed 4,332 of the 7,605 farms they were asked to inspect. They found that 50% of visited farms were successfully managed, 31% were temporarily unsuccessful and 19% were failures [Jourdain 17, p.49]. The Government, as a result of the report from the boards of inquiry, set up a Dominion Revaluation Board to reduce the cost of land and mortgages held by returned servicemen.³

5,347 returned servicemen applied for this type of relief, and by the 31st March, 1925, all but 63 who had either forfeited their rights or abandoned their properties were given relief. \$4 million was granted in reductions, out of a total capital of \$36 million (i.e. including capital value of crown leaseholds and advances). In 1929

3. See Discharged Soldiers Amendment Act 1923.

Government gave authority to make further capital reductions and by 1937, when the legislation was finally abandoned, a total of \$5.8 million had been written off.

By 1933, when Government virtually stopped opening land for settlement, only 2,727 of the 4,071 ex-servicemen who had acquired Crown land remained farming on the land they were allotted. It was reported that \$13.6 of the \$27 million provided by Government from accumulated reserves for returned servicemen settlement was lost [Powles ed. 30, p.38].

Sutch and McIntosh [30, p.38], attributed the failure of many returned servicemen to make a success of farming to the high price they paid for land immediately after the war. Maclachlan has suggested "it was the lack of basic knowledge, as much as the fall in product prices" that led to the failure in farming of returned servicemen [23, p.49].

Government made generous financial provisions for the settlement of returned servicemen as farmers, and this uncontrolled release of purchasing power shifted the demand for farm land upwards on a market that was already heavily inflated on the expectation of price increases. The realisation that falling agricultural product prices, and hence decreased profitability was to be the rule after the war, caused a downwards revision in the demand for land. As a result of their high capital commitments many returned servicemen were unable to continue farming. The number of failures and financial loss to Government was increased by the returned servicemen with a little or no farming ability who were able to try farming as a means of rehabilitation. Given this experience the rehabilitation of returned servicemen as farmers after the Second World War was far more successful. Factors which contributed to this success were, the favourable economic environment

for farming, the complete control of the economy, the application of means tests to returned servicemen seeking rehabilitation as farmers, and the introduction of farm training programmes.

2.3 The Depression of the 1930s

The tradition that had developed in farming of looking to future profits out of increases in land values was no longer supported in the late 1920s and early 1930s when land values fell in response to the declining profitability of farming. Product prices declined more rapidly than costs and this left the industry heavily over-capitalised. Farmers were left with capital charges that were too high in relation to the actual land productivity. To remedy the problem it was suggested in 1928 by Belshaw that "the prime essential is the slow liquidation of over-valuation and over-mortgaging of land." [1, pp.69-70]. In fact, Government, had made provision for reduction of its own capital charges to farmers throughout this period.⁴

To prevent dislocation of the farming industry during the depression of the early 1930s, the Government successively introduced measures to prevent private mortgagees foreclosing on mortgages. Machinery was set up whereby farmers could obtain adjustments to all their liabilities - eventually compulsorily.⁵

4. For examples, see The Land Act 1924, §60, the Land for Settlement Act 1926 S16 & S17, The Land Laws Amendment Act 1927 S18 & S21, and the Land for Settlement Amendment Act 1927 S5 & S6.

5. The following legislation was enacted to effect this; Mortgagors Relief Act 1931, Mortgagors and Tenants Relief Act and its Further Relief Amendment Act 1932-33, Mortgagors and Tenants Relief Act 1933, Mortgagors Relief Amendment Act, 1933, Rural Mortgagors Final Adjustment Act 1934-35 and Mortgagors and Lessees Rehabilitation Act 1936.

Government land development only began in 1929. The land Government made available to returned servicemen for farm settlement required considerable additional investment in improvements and livestock before a viable farm could be established. The failure of returned servicemen to establish viable farms, despite the generous financial provision they received, caused Government to review its policy of acting only as a distributor of land. Under the Land Laws Amendment Act 1929, Government added the power to promote farm settlement by land development to its powers as a distributor of land.

The policy of developing land before offering it for settlement was given impetus by the Small Farms Act 1932-33, and modified to one of developing part-time farms for the relief of unemployment. As a measure for the relief of unemployment the small farms scheme was largely a failure. At its peak in 1937 only 1,200 men were employed on land development schemes, whereas the total number of registered unemployed was 49,000. By 1939, the original concept of part-time farms had given way to the more realistic idea of self-supporting units and in all 373 new farmers were settled on 26,000 acres under the scheme.

The Government sought to prevent dislocation of the farming industry during the depression as any reduction of farm output would have further reduced the country's wealth and increased unemployment. This implied that despite the adverse economic conditions for farming, the country's comparative advantage in international trade lay with the production of agricultural products and any further reduction of trade would have increased the effects of depression.

2.4 Second World War Rehabilitation

When the Second World War started across-the-board control of economic activity was introduced. As part of this policy, the land market came under complete control. To effect this the Servicemen's Settlement and Land Sales Act 1943 was introduced. As stated in the preamble, the Act was "to provide for the acquisition of land for the settlement of Discharged Servicemen; and to provide for the control of Sales and Leases of Land, in order to facilitate the Settlement of Discharged Servicemen, and to prevent Undue Aggregation, and its use in Speculative, or Uneconomic Purposes." It was suggested at the time, that with the Act's introduction "the view doubtless being held by the Government (was) that these objectives (i.e. land sales control and returned servicemen rehabilitation) were closely linked with one another." [Wise 36, p.225]. The power of Government to take land for returned servicemen settlement under the Servicemen's Settlement and Land Sales Act was limited only by the right of an owner to retain an "Economic unit". Returned servicemen could be substituted for civilians in any sale of land and the price at every sale had to be approved.⁶

Special financial provisions were added to these generous preferences for returned servicemen. Loans were made available at low rates of interest and minimal margins for security. Once again it was stated that New Zealand was the most generous country in the world for the

6. Details of the number of applications for sale of land, the number of sales amended and the value of amendments made by the Land Settlement Board under the Servicemen's Settlement and Land Sales Act 1943, are summarised by Plunkett [29, Appendix B].

rehabilitation of returned servicemen as independent farmers [Condliffe 6, p.98]. Under these generous terms the number of returned servicemen that wanted rehabilitation as farmers far exceeded the number of farms offered for sale or made available from compulsory purchase and resettlement. To increase the supply of farms the Government turned once again to the development of virgin land. The 182,000 acres of land Government had on hand for development pre-war was described as "a valuable reserve on which to settle the first returned servicemen." [Maclachlan 23, p.50].⁷

To ration the demand for farms and to aid successful rehabilitation, the Rehabilitation Board introduced a system of grading returned servicemen upon farming experience. This system required returned servicemen to reach "Grade A" and put up a minimum deposit before they could enter a ballot for a Government farm.

Land sales control was removed in 1953, but Government developed farms were still available to returned servicemen on the same favourable terms of approved valuations, loans at low rates of interest and minimal margins for security. However, if returned servicemen bought directly on the rural estate market they had to pay the full market price. The post-war demand for Government to create farms for rehabilitation was intensified by the removal of land sales control.

By 1969, 13,800 graded "A" returned servicemen of the Second World and Korean Wars were rehabilitated as farmers. 12,600 of these returned

7. Details on the sources of land used for land development after Second World War are summarised by Plunkett [29, Appendix D].

servicemen availed themselves of the rehabilitation provisions. The Government, through the Department of Lands and Survey, had directly settled 3,500 of them.⁸

In the period of returned servicemen rehabilitation, Fitzharris has reported that with land development "the emphasis was on quick settlement and cost did not greatly influence this"[10, p.97]. It was to be expected that in some areas there would be initial expensive failures reported [Sommerville 33].

The post-war demand for farms for returned servicemen, already high as a result of the generous financial provisions and preferences, was raised even higher by favourable price movements.⁹ A substantial part (25%) of the demand was filled by Government creating new farms from hitherto unproductive land, as firstly with the low price of land under land sales control only a limited number of farms were forthcoming onto the market, and secondly the compulsory purchase powers were used cautiously in acquiring fully developed properties.

Settlement failures that were frequent after the First World War were largely avoided. The relative success of rehabilitation after the Second World War, as compared with the First World War, is attributed to the more favourable economic conditions for farming, the generous provision for rehabilitation, and the rigid control of the land market that all contributed to enhance the profitability of farming. Also, the application of means tests and conditions of the rehabilitation assistance scared off the opportunists from seeking this form of rehabilitation. It is thought that few would have begrudged the cost involved.

8. A summary of details on the rehabilitation of returned servicemen as farmers is given by Plunkett [29, Appendix E].

9. For details of the prices farmers faced see Philpott and Hussey [28] and Johnson [16].

2.5 Land Development Since 1960

Since the fulfilment of returned servicemen demand for farms in 1960, there has been no curtailment of Government's land development activities.¹⁰ The farms produced and financial provisions that accompany them have met with a ready demand from civilian settlers. This demand has been rationed by requiring applicants to meet certain means tests and balloting. The means tests require the applicants to have a certain minimum level of farming experience, to be able to put up a minimum deposit, to be young and not previously owned a farm.¹¹

The continual development of farms was justified by Government on the grounds that increased agricultural products helped to correct the country's recurrent balance of payment problems and provided overseas funds necessary for continued economic growth. From the welfare point of view Government argued that it should "give all young men with proven farming ability, but limited financial resources the chance to acquire their own farms" [26]. These arguments were endorsed by both Agricultural and National Development Conferences [7, p.238; 25, p.39]. It has been stated by the Lands and Survey Department that "Government policy in recent years has been that farm income during the development, together with the disposal prices of the farms settled, should cover the cost of development". [Maclachlan 23, p.53]. This has meant that since 1961 more attention has been paid to the cost rather than the rate of farm development. However, "break-even" financing has been difficult to achieve, as many blocks are reported to have been acquired for development on political and social,

10. For example see Appendix A where details of the annual development capital spent by the Department of Lands and Survey is listed.

11. A good account of current procedures is given by Lynsky [22].

14.

rather than economic grounds.¹²

12. Fitzharris J., Fields Director, Department of Lands and Surveys
pers. com.

CHAPTER 3

THEORETICAL ASPECTS OF THE STUDY

In this chapter a brief outline of the theoretical framework used to evaluate the economic success of the Government's land development operations is given.¹ The individual's departmental and national points of view are set out within a cost-benefit framework and correct interest rates to use as discount factors within this framework are suggested. The problem of choosing the most appropriate criteria for use in the evaluation has been widely discussed in the literature.² The Net Present Value and Internal Rate of Return criteria, that were used for this study, are set out and discussed.

3.1 Points of View and Interest Rates for Discounting

The market rate of interest is the market price that brings into equilibrium the amount of money people are willing to borrow with the amount people are willing to lend. The market however reports many prices or rates of interest, and before choosing a suitable price for evaluating land development it is necessary to identify the economic circumstances under which the decisions were made.

3.1.1 The individual's point of view.³

For an individual, with more money than is required to finance current consumption, the lending rate of interest provides the correct factors

¹ A more detailed account is given by the author elsewhere [40].

² The problems involved and discussions on limitations of the alternative criteria are given by; Boulding [2 & 3], Samuelson [31], Lutz [20], Hildreth [13], Lutz and Lutz [2], Hirshleifer [14], McKean [34], and Eckstein [9].

³ A more complete outline of this is given by Hirshleifer [14].

to use to discount the future costs and returns expected from investments. For an individual already borrowing money to finance current consumption the correct discount factors are given by the borrowing rate of interest. The lending and borrowing rates of interest do not usually coincide, as the margin between them generally finances the facilities provided by the market to buyers and sellers.

For an individual with more money than is required to finance consumption yet not enough to finance a specific investment, then neither the lending nor the borrowing rate is appropriate. The appropriate interest rate to use for discounting is some undefined rate, between borrowing and lending rates, which reflects the individual's time preference for consumption. If the land development had been undertaken by an individual his economic circumstances would have defined the appropriate rate for discounting.

3.1.2 The department's point of view

The land development operations of the Department of Lands and Survey are financed from Government funds. The Treasury charges the Department interest on the funds borrowed. (See Appendix B). This price for funds applies uniformly to all the funds borrowed until a budget maximum is reached. If the Department had never been restricted by a budget then the Treasury rate of interest would have been the correct price to use for discounting the costs and returns from land development. If a budget maximum had been a major constraint on the Department's land development then a capital rationing situation would have existed and some 'shadow price' would have been the correct price to use in discounting.

The post-war policy that the Department should (a) provide

farms for returned servicemen rehabilitation and (b) during the '60s provide farms for young men with limited financial means, are interpreted as objectives which regard profitability as subsidiary to the other objectives.⁴ In such situations the Treasury interest rate provides discount factors by which the Department can measure the overall cost of the land development policy. The design and operation of the Department's accounting system is such that it provides an approximate measure of this cost in 'current' prices at the closing date of the financial accounts of each block.⁵

During the period of returned servicemen settlement the Department considered "earlier settlement was more important than the financial results" [8,p.8]. In the last few years with civilian settlement, the Department have evolved a 'break-even' policy. Under this policy the Department has sought to achieve a financial balance on its land development operations by holding profitable development blocks a few years longer and using the profits to write-off losses incurred on other blocks. A 'break-even' in the financial accounts for land development has been difficult to achieve as many blocks chosen for development were selected for political and social, rather than economic, considerations.⁶ The recently deteriorating terms of trade for farming has aggravated this position.

3.1.3 The nation's point of view.

For the Nation to make comparison between the costs and returns that occur at different periods of time the free market rate of interest is the

4. Objectives which conflict, directly with profitability considerations have been termed 'third best' objectives. Turvey [34] provides an interesting article on the problems this presents for investment analysis.

5. Current in this context is taken to mean the prices that occurred, as opposed to constant prices which would imply the same prices applied in 1945 as in 1969.

6. Fitzharris, J. Fields Director, Department of Lands and Survey. Pers. comm.

correct rate to use in discounting. This rate of interest can be interpreted as the premium for additional current consumption foregone.

One factor which makes the market rate of interest suspect is that the market for funds is far from 'free.' Entry into banking is severely restricted and other financial institutions work under highly complicated regulatory provision. Some monopoly element exists, and this suggests that the margin between borrowing and lending may be wider than in a 'free' market. However, in determining market prices, the numbers and bargaining strength of the suppliers and buyers of funds is in no way influenced by the monopoly element that may exist.

Another factor is that many rates of interest are reported in the market. This is mainly due to the degree of risk expected. Losses occur more frequently with risky investments and lenders can only hedge against these losses by incorporating in the price an additional allowance for the risk expected. It would be incorrect for this study to choose a rate of interest than incorporated an allowance for risk in the price for funds as the anticipated risks have occurred and are incorporated in the results.

A further factor that influences the level of interest rates is the 'consistency of expectations' about the future.⁷ For example, if the purchasing power of money was expected to decrease at the rate of 3 per cent per annum then people will only be persuaded to enter agreements to exchange current money for future money if the reward for doing so rises by at least the expected 3 per cent. The effect of future price expectation upon market

7. A more detailed outline of the concept of a 'consistency of expectations' can be found in Boulding [4, p. 739].

prices has lead to the suggestion that for evaluation of public investment projects the underlying 'real' rate of interest should be used [Henderson, 12, p.63]. However, from the nation's point of view, all investment should be evaluated with the one discount rate.

Many suggestions have been put forward regarding the correct rate of interest to use . For this study the yield on long term government securities was chosen for the nation's point of view, as it provided an observable, risk free market price of a readily marketable long-term security.⁸

3.2 Investment Analysis Methods

To study the profitability of the Department's land development the net present value and internal rate of return methods of investment analysis were used. In the following outline of these methods, the notation suggested by Jensen [15,p.60] is used.

Let c_1, c_2, \dots, c_n = the costs incurred during the years 1, 2, ..., n.

b_1, b_2, \dots, b_n = the benefits incurred during the years 1, 2, ..., n.

V = the present value of all benefits

C = the present value of all costs

i = the appropriate discount rate

r = the internal rate of return

n = the last year in which the Department received a benefit
or was involved in a cost with development and settlement.

N.P.V. = net present value

8. A more detailed discussion on the authors choice of this rate is given elsewhere [29, chapt.3].

3.2.1 The net present value method.

This method of analysis incorporates a discount rate which reflects the price of investment funds. The 'benefits' and 'costs' of land development are valued to a common point of time and compared. The 'costs' are subtracted from the 'benefits' to give a net present value and if the net present value is positive it indicates that the investment was worthwhile. The size of the net present value indicates how worthwhile the project was in utilizing resources to maximise income.

If all benefits and costs are considered as occurring at the end of each year then the net present value method is presented formally as follows:

Present Value of Benefits = V

$$= \frac{b_1}{(1+i)^1} + \frac{b_2}{(1+i)^2} + \dots + \frac{b_n}{(1+i)^n}$$

$$\text{i.e. } V = \sum_{j=1}^n \frac{b_j}{(1+i)^j} \quad (1)$$

Present Value of Costs = C

$$= \frac{c_1}{(1+i)^1} + \frac{c_2}{(1+i)^2} + \dots + \frac{c_n}{(1+i)^n}$$

$$\text{i.e. } C = \sum_{j=1}^n \frac{c_j}{(1+i)^j} \quad (2)$$

Net Present Value

$$= \text{N.P.V.} = V - C$$

$$= \sum_{j=1}^n \frac{b_j}{(1+i)^j} - \sum_{j=1}^n \frac{c_j}{(1+i)^j}$$

$$\text{i.e. } V - C = \sum_{j=1}^n \frac{b_j - c_j}{(1+i)^j} \quad (3)$$

Thus $b_j - c_j$ indicates the size and direction of the net flow of cash, from a land development block of the Department itself, in the j^{th} year. Thus it is possible by measurement of the annual cash flow to, evaluate the investment.

More concisely,

$$\text{Let } b_j - c_j = k_j \quad (4)$$

$$\text{then N.P.V.} = \sum_{j=1}^n \frac{k_j}{(1+i)^j} \quad (5)$$

The decision criteria are,

(i) iff N.P.V. $> 0 \Rightarrow$ investment worthwhile

(ii) iff N.P.V. $< 0 \Rightarrow$ investment unprofitable

(iii) iff N.P.V. $= 0 \Rightarrow$ indifferent as regards the investment

for mutually exclusive projects,

(iv) iff N.P.V. (1) $>$ N.P.V. (2) \Rightarrow (1) is a better investment than (2)

3.2.2 The internal rate of return method

In this method a discount rate is derived that equates the present value of benefits with the present value of costs. The investment is considered worthwhile if the derived discount rate (i.e. the internal rate of return, r), is greater than the price of investment funds. The internal rate of return method may be presented formally as follows:

Present value of Benefits = V as defined in (1) above

Present value of Costs = C as defined in (2) above

Thus, when $V = C$, then $i = r$

or, when $V - C = 0$, then $i = r$

$$\text{Now, } V - C = \sum_{j=1}^n \frac{k_j}{(1+r)^j}$$

from equation (5) above.

Hence, to obtain the internal rate of return

$$\text{Solve } \sum_{j=1}^n \frac{k_j}{(1+r)^j} = 0 \text{ for } r \quad (6)$$

The decision criteria are,

- (i) iff $r > i \Rightarrow$ investment worthwhile
- (ii) iff $r < i \Rightarrow$ investment unprofitable
- (iii) iff $r = i \Rightarrow$ indifferent as regards the investment.

The first two of the decision criteria unfortunately do not always hold true, as with land development where the costs and returns are distributed over many years there may exist many possible discount rates at which the present value of benefits equals the present value of costs.⁹ To decide if an investment is worthwhile it is necessary to know the discount rates at which 'benefits' equal 'costs' and the net present values at slightly lower and higher discount rates.

The size of the internal rate of return, gives only a very poor indication on the desirability of a given investment, as the magnitude of the internal rate of return indicates how efficient an investment has been in transferring resources between near and future time periods and not how efficient it has been in maximising wealth. Ranking alternative investments by the internal rate of return criterion would only be appropriate if the largest possible stock of resources was wanted in the future. This weakness of the internal rate of return derives from the implicit assumption that the funds generated from the investment can be reinvested at the internal rate of return [Solomon, 32, p.16 and Karmel, 18, p.430].

9. The author discusses this problem in greater detail elsewhere [29, Chapt. 3].

The alleged advantage of the internal rate of return criterion, that it avoids the difficult problem of determining the appropriate discount rate for the decision environment, is illusory; an interest rate is applied subjectively in accepting or rejecting a project. Also it is the belief that objective analysis is better than subjective judgements that requires investment analysis in the first place and no useful purpose is served by trying to avoid determining the price of funds.

Internal rate of return figures are presented on grounds that these may be easier to comprehend and compare with the opportunity cost for funds, than a valuation of the total net income available from investment. The latter, however, is the correct approach.

In the calculation of results, the investments of the Department in land development were expressed in cash flow terms, and net present values were calculated by the formula shown in equation (5). The internal rates of return were calculated iteratively to the nearest .1 per cent, by first deriving the sign of the summed undiscounted cash flow, and on the basis of this sign proceeding in a positive or negative direction, until a solution rate of discount was found.

CHAPTER 4

METHODOLOGY

In this chapter the choice of the 61 land development blocks used for this study is outlined and discussed. Firstly, the sources of information about Government's land development operations are reviewed, and then the methods of selecting the blocks are given, finally the methods of analysing the data are set out.

4.1 Data Sources.

The only published information on the Government land development operations is contained in the Department of Lands and Survey's Annual Reports to Parliament. These reports contain brief descriptions of annual development and settlement results. These brief descriptions are supported by figures in the following tables that are appended to the reports:-¹.

- (i) L. & S. Table 6: Development and Settlement Operations
of Land Settlement Board.
- (ii) L. & S. Table 7: Settlement of Farm Units.
- (iii) L. & S. Table 8: Land Purchased for Settlement by
Negotiations and Possession taken
during the year ended 31 March.
- (iv) L. & S. Table 9: Properties acquired under Part 1 Land
Settlement Act 1952 during year ended
31 March.
- (v) L. & S. Table 10: Reviews of Charges.

1. In the script the letters L. & S. are added to indicate that a table from Annual Reports of the Department of Lands and Survey is referred to.

- (vi) I. & S. Table 11: Return of Farm Settlements Subdivided and allotted where all Assets have been Disposed of and the Final Profit or Loss has been Ascertained for the year ended 31 March.
- (vii) L. & S. Table 12: Accounts and Balance Sheet for Farm Settlement on which Farming Operations were conducted during year ended 30 June.
- (viii) L. & S. Table 13 C-1: Summary of Land Development Operations.
- (ix) L. & S. Table 19: Works and Trading Accounts - Land Settlement

The relevance of the information presented in the above nine tables is perhaps best illustrated by tracing, in a stepwise fashion, the effects on the tables of a block's development from purchase to settlement.

4.1.1. The purchase.

(i) When Land is purchased for development it is reported in L. & S. Table 8. The information is presented on a land district basis, with totals given for each land district of the land area purchased and the number of sellers involved.

(ii) If the provisions of the 1952 Land Settlement Promotion Act were invoked for the purchase, then the purchase would also be reported in L. & S. Table 9.

(iii) The above facts are summarised and presented under Acquisitions in L. & S. Table 6.

(iv) The purchase price is debited to Purchase of Land and Improvements Account in the Balance Sheet of L. & S. Table 12.

4.1.2 The department's farming and development operations.

(i) When land is purchased, it is constituted into blocks as basic units for administration and accounting. For each block the following statistics are recorded in L. & C. Table 13 C-1; its locality, date of purchase, area, area settled to date, number and types of farms settled, proposed utilisation of the remainder, livestock carried by classes, annual trading results and capital development costs.

(ii) Group Accounts of all the individual block's financial results are presented in L. & S. Table 12.

4.1.3 The Settlement

(i) In L. & S. Table 13 C-1 are presented for each land development block, the cumulative totals of the types of farms settled, the area settled and the disposal price. When a block is fully settled it is no longer reported in L. & S. Table 13 C-1.

(ii) In L. & S. Table 7 are reported the year and cumulative totals of the area and number of farms settled in each land district. In this Table a distinction is maintained between returned servicemen and civilian settlement.

(iii) A summary of L. & S. Table 7 is presented under Disposals in L. & S. Table 6.

(iv) The Farm Trading Account of L. & S. Table 12, is credited with the annual sales of livestock to the settlers and the Land Disposal Account is credited with the sales of farms.

(v) When each block of land has been completely settled, final disposal accounts are prepared, audited and the overall results presented in L. & S. Table 11.

(vi) Any post-settlement appeals for review of charges are reported in L. & S. Table 10 and the amount of any correction granted is recorded in L. & S. Table 11.

4.2 The Preliminary Selection of Land Development Blocks.

L. & S. Table 13C-1 provided the information from which the land development blocks of the Department were chosen for this study. A preliminary selection of the land development blocks, reported in L. & S. Table 13C-1, was undertaken to remove the blocks where land development was incomplete or began before the Second World War. The results of the preliminary selection are set out in Table 1

Table 1

<u>Preliminary Selection of Land Development Blocks</u> <u>from L. & S. Table 13C-1.</u>			
	No.	Total Area (acres)	Development Capital (\$)
(a) Total number of blocks recorded in L. & S. reports since 1940/41	920	3,468,534	98,569,471
<u>Less</u>			
(b) Blocks with no details of settlement and no longer reported.	89	151,107	1,500,530
	831	3,317,427	97,068,941
<u>Less</u>			
(c) Blocks still on hand (30/6/68)	185	1,981,858	62,002,905
	646	1,335,569	35,066,036
<u>Plus</u>			
(d) Blocks still on hand with farm settlement completed	5	20,974	1,109,793
	651	1,356,543	36,175,829
<u>Less</u>			
(e) Blocks purchased before 1945.	60	214,892	10,917,494
	591	1,141,651	25,258,335

Table 1 continued:

	No.	Total Area (acres)	Development Capital (\$)
Less			
(f) Blocks not settled as farms	3	1,866	29,686
Blocks available for final selection	<u>588</u>	<u>1,139,785</u>	<u>25,228,649</u>

It was possible, after a preliminary selection of the 920 land development blocks, to identify 588 blocks on which land development was started and completed since the Second World War. 89 blocks were eliminated because no details of their settlement were provided. These were either, areas of land bought, given a name and then later constituted into separate land development blocks, or areas of land bought before balance day and completely resettled within the following year. The 180 blocks still on hand were eliminated because data on the costs and returns of land development were incomplete. The blocks the Department is developing on an agency basis for the Department of Maori Affairs were not included in these figures as agency development started only in 1962 and, at the date of the study, no block had been fully developed. Finally, a further 60 blocks were eliminated because the land was purchased before 1945.

Of the 3½ million acres the Department has acquired since the war, 2½ million acres, was removed from further study at this stage.

On the 1 million acres of land, not eliminated by the preliminary selection, \$25 million of the total \$99 million of the development capital was spent. The blocks eliminated because land development was incomplete, was where the majority (61%) of the development capital was spent. Development capital is the term used by the Department to describe the money spent to

physically improve land and this meaning for development capital is retained throughout this study.

The development capital figures reported in Table 1 were derived from L. & S. Table 13C-1. The total amount of money the Department spent on development capital from 1945 to 1968 was \$105 million (see Appendix A).

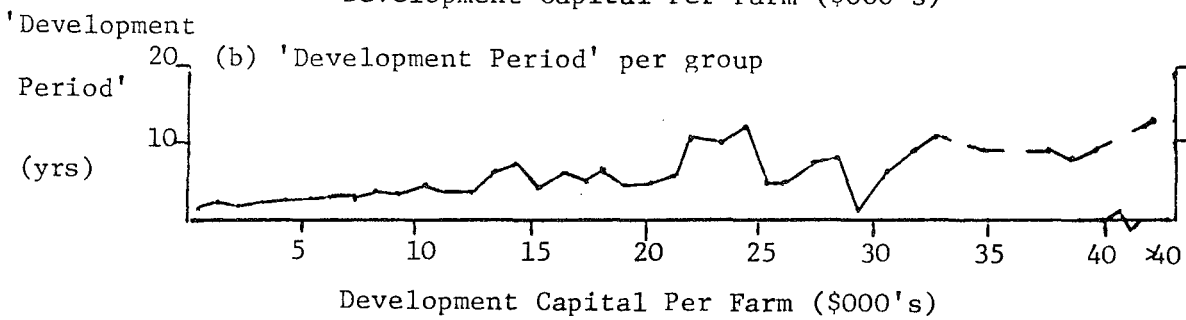
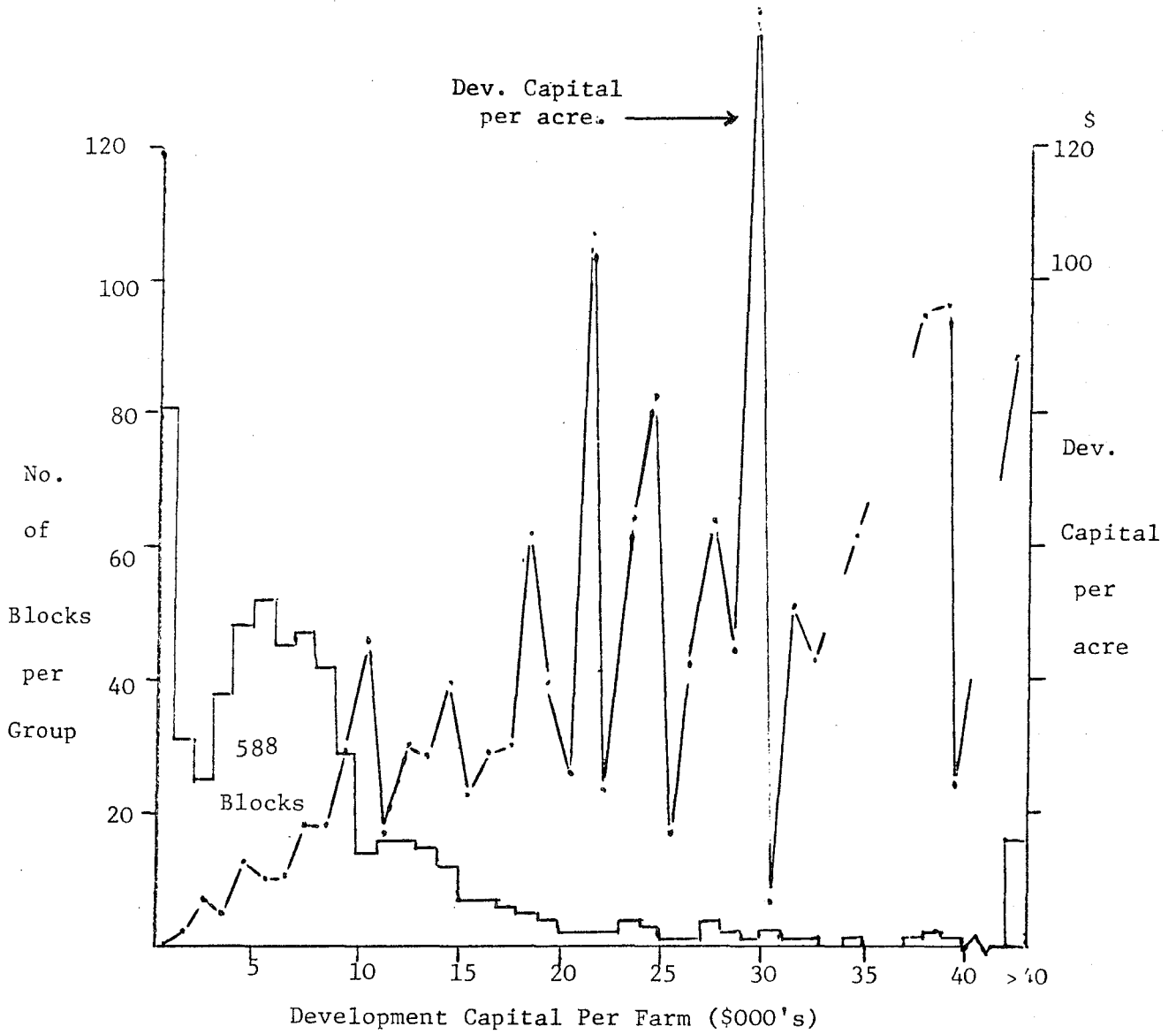
Additional criteria were necessary for the selection of land development blocks, as this study was concerned with reporting upon the economic success of developing unproductive land into farms and many of the blocks of land acquired by the Department were already partly or fully developed. Upon the developed land acquired, the Department re-organized the existing holdings and resettled it with returned servicemen.

4.3 Selection Method.

To identify blocks where only unproductive land was developed into farms the additional information, provided in L. & S. Table 13C-1, about the number of farms settled and the dates of initial purchase and settlement of the final farm was utilized. Firstly, the blocks were sorted into \$1,000 groups by the amount of development capital spent per farm. The results of this grouping are shown in Figure 1. Upon the majority of blocks less than \$10,000 per farm was spent on development capital. The subsidiary analysis of the grouped blocks by development capital per acre revealed there was some agreement between the amount of development capital spent per acre and per farm. However, between blocks of similar development capital per farm there was also wide differences in development capital per acre.

FIGURE I GROUPING BLOCKS BY DEVELOPMENT CAPITAL SPENT PER FARM

(a) No. of blocks and development capital/ac. per group (\$244)



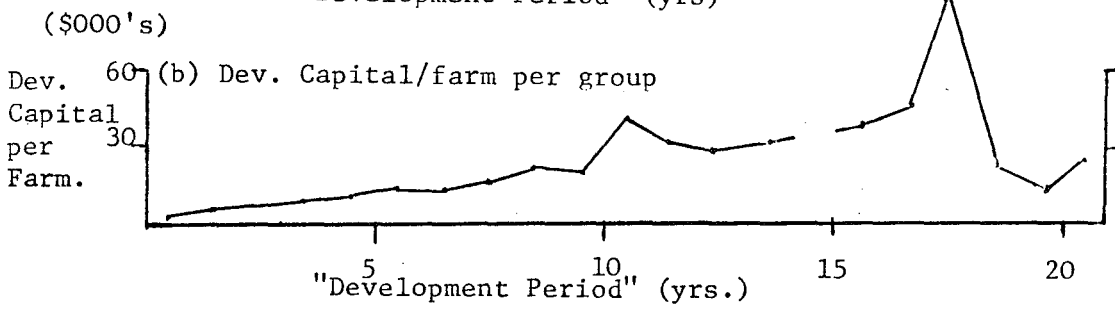
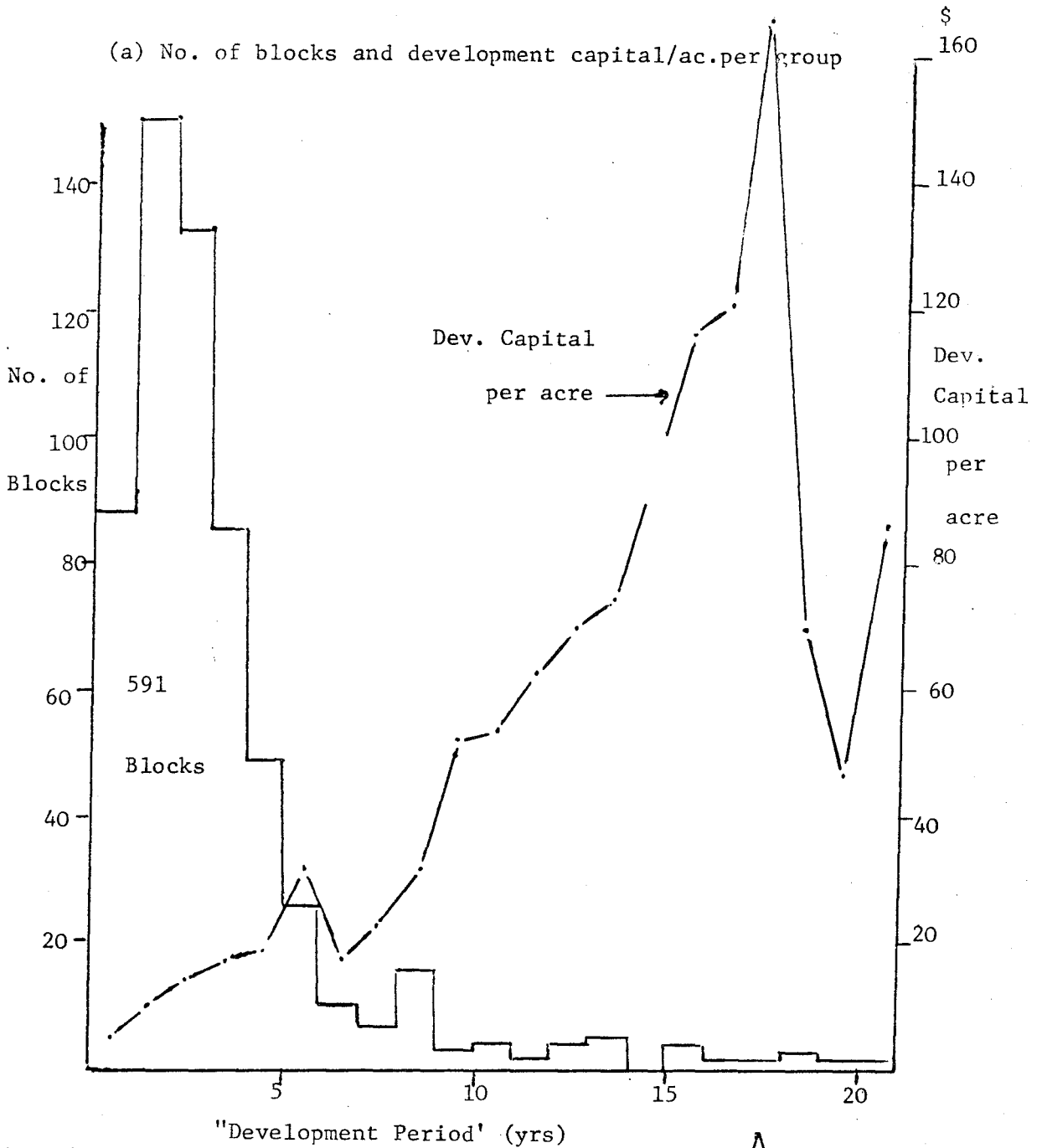
4.3.1 Selection of blocks on development capital spent per farm

The grouping of land development blocks on development capital spent per farm was tried as a method for selecting blocks where only unproductive land was developed into farms, because the development of unproductive land into farms requires the expenditure of more money on physical improvements than the resettlement of developed land. However, as illustrated in Figure 1, development capital per farm gave no apparent division between 'creation' and 'resettlement' blocks.² An additional weakness of using this method to select 'creation' blocks is that dairy farms normally require less development capital than sheep farms. To have applied the development capital per farm criterion correctly would have required fore-knowledge of the extra development capital requirement of sheep farms. Finally, sole reliance upon the development capital per farm criterion would have selected against low cost development. Expensive 'resettlement' blocks would have been included and low cost 'creation' blocks excluded.

The grouping of land development blocks by development capital spent per acre was not used as the cost per acre of physically improving unproductive land varied considerably with the nature of the land, (e.g. Taranaki bush compared with Canterbury tussock).

2. 'Creation' is used for convenience to refer to blocks where only unproductive land was developed into farms. 'Resettlement' is used for convenience to refer to all other blocks.

FIGURE 2 GROUPING BLOCKS BY 'DEVELOPMENT PERIOD'



4.3.2 Selection of blocks on 'development period.'

The grouping of blocks on 'development period' was tried as a method of selecting 'creation' blocks because the physical processes of clearing land, cultivating, grassing and consolidating pastures were considered to require more time than the subdivision activities typically involved with resettlement of developed land. However, as illustrated in Figure 2, the 'development period' gave no apparent division between 'creation' and 'resettlement' blocks. The selection of too low a 'development period' would have included resettlement blocks and confounded the results. The 'development period' criterion has an advantage in that it did not select against low cost development - only very rapid development.

4.3.3 The final selection of blocks.

It was apparent from the grouping of blocks on development capital per farm and 'development period' that no easy identification could be made of 'creation' blocks. The observation that many of the blocks were acquired with considerable areas of developed land meant that neither the development capital per farm nor the 'development period' criteria could accurately define 'creation' blocks as required for this study. For selection of the creation blocks, it was decided, firstly, to exclude blocks with a 'development period' of less than six years, as it was difficult to imagine new farms being created from unproductive land in any shorter period.

Then blocks on which less than \$10,000 per farm was spent for development capital were excluded, as it was difficult to imagine new farms being created from agriculturally unproductive land for less than this.

Finally, blocks on which only one farm was settled were excluded as they were likely to be atypical of the Department's land development operations. Table 2 summarises the results of the final selection of land development blocks for this study.

Table 2

<u>Final Selection of Land Development Blocks</u>			
	No.	Area Settled (acres)	Development Capital (\$)
Blocks available for final selection	588	1,053,116	25,228,649
<u>Less</u>			
(a) Blocks held for < 6 years	<u>501</u>	<u>753,723</u>	<u>10,176,130</u>
	87	299,393	15,052,519
<u>Less</u>			
(b) Blocks with < \$10,000 per farm spent on dev. capital	<u>17</u>	<u>50,907</u>	<u>689,784</u>
	70	248,486	14,362,735
<u>Less</u>			
(c) Blocks settled with < 2 farms	<u>9</u>	<u>15,816</u>	<u>201,180</u>
Case Study Blocks	<u>61</u>	<u>232,670</u>	<u>14,161,555</u>

61 of the 588 land development blocks the Department acquired and fully settled since 1944 were identified as 'creation' blocks for this study. On these 61 blocks \$14 million of the total \$25 million were spent to physically improve the land. This was \$14 million of the total \$105 million the Department has spent on development capital since 1944. The Department spent this sum on $\frac{1}{4}$ million acres of unproductive land to create a total of 568 new farms; 324 sheep farms, 229 dairy farms, 5 mixed sheep and dairy farms, 6 intensive and 4 other types of farms.

4.4 Method of Analysis for the "Creation" Blocks Selected

To derive the cash flows for a detailed economic analysis, it was necessary to refer to the annual financial accounts of each block.³

The method of adjusting the annual financial accounts is set out below for the Rosehill block.

4.4.1 The financial account of Rosehill for 1954/55

4.4.1.1 SHEEP ACCOUNT FOR YEAR ENDED 30 JUNE, 1955

<u>Stock on Hand at 30/6/55</u>	<u>Debit</u>	<u>Credit</u>
1,959 ewes at £ 1	2,959. 0. 0	
55 Wethers at 15/-	41. 5. 0	
1,175 Lambs & Hoggets at 10/-	587.10. 0	
<u>83 Rams at £ 3</u>	224. 0. 0	3,836.15. 0
4,272		
 <u>Sales</u>		
2,151 Ewes	7,901. 8.10	
76 Wethers	213.11. 4	
2,340 Lambs & Hoggets	7,934.17.11	
<u>26 Rams</u>	<u>454.13. 0</u>	16,504.11. 1
4,593		
	<u>Deaths</u>	<u>Missing</u>
Ewes	119	28
Wethers	1	-
Lambs & Hoggets	144	15
Rams	<u>23</u>	<u>-</u>
<u>320</u>	<u>287</u>	<u>43</u>
<u>9,195</u>		<u>20,341. 6. 1</u>

3. Permission to use the Department files was given by Mr. R.J. Maclachlan, Director-General of the Department of Lands and Survey.

<u>Stock on Hand 1/7/54</u>		<u>Debit</u>	<u>Credit</u>
4,038 Ewes at £1	4,038. 0. 0		
65 Wethers at 15/-	48. 0. 0		
1,305 Lambs & Hoggets at 10/-	652.10. 0		
5,510 102 Rams at £3	<u>306. 0. 0</u>	5,045. 5.10	
<u>Purchases</u>			
30 30 Rams		816. 5.10	
<u>Natural Increases</u>			
3,655 3,655 Lambs			
<u>9,195</u>	PROFIT to Farm Trading A/c.	<u>14,480. 0. 9</u>	
		<u>20,341. 6. 1</u>	<u>20,341. 6. 1</u>

4.4.1.2 DAIRY CATTLE ACCOUNT FOR YEAR ENDED 30 JUNE, 1955

<u>Stock on Hand at 30/6/55</u>			
5 cows at £6	30. 0. 0		30. 0. 0
<u>Sales</u> 1 Cow			5. 0. 0
<u>Change of Class to Run Cattle</u>			
2 Heifers			6. 0. 0
Deaths 1 Cow			
<u>Stock on Hand at 1/7/54</u>			
4 Cows at £6	30. 0. 0		
2 Heifers at £4	<u>8. 0. 0</u>	38. 0. 0	
<u>Purchases</u>			
2 Cows		50. 0. 0	
	LOSS to Farm Trading A/c		<u>47. 0. 0</u>
		<u>88. 0. 0</u>	<u>88. 0. 0</u>

4.4.1.3 RUN CATTLE ACCOUNT FOR YEAR ENDED 30 JUNE, 1955

<u>Stock on Hand at 30/6/55</u>	<u>Debit</u>	<u>Credit</u>
99 Cows at £4	396. 0. 0	
30 Yearling Heifers at £2	60. 0. 0	
16 2 and 3 yr. Heifers at £3	48. 0. 0	
1 3 yr. Steer at £4	4. 0. 0	
67 Calves at £1	67. 0. 0	
218 5 Bulls at £10	<u>50. 0. 0</u>	625. 0. 0
 <u>Sales</u>		
1 Yearling Heifer	17. 3. 4	
1 2 & 3 yr. Heifer	16. 5. 10	
30 Calves	429. 0. 0	
33 1 Bull	<u>39. 9. 11</u>	493. 19. 1
 <u>Deaths</u>		
3 Cows		
4 1 Yearling		
255		<u>1,118. 19. 1</u>
==		

<u>Stock on Hand at 1/7/54</u>		<u>Debit</u>	<u>Credit</u>
	44 Cows at £ 4	176. 0. 0	
	16 Yearling Heifers at £ 2	32. 0. 0	
	59 2 & 3 yr. Heifers at £ 3	177. 0. 0	
	1 2 yr. Steer at £ 2	2. 0. 0	
	36 Calves at £ 1	36. 0. 0	
162	<u>1 Bulls at £ 10</u>	<u>60. 0. 0</u>	483. 0. 0
<u>Change in Class from Dairy Cattle</u>			
2	2 Heifers		
<u>Natural Increases</u>			
91	91 Calves	PROFIT to Farm Trading A/c	
			<u>629.19. 1</u>
255			<u>1,118.19. 1</u> <u>1,118.19. 1</u>

4.4.1.4 HORSES ACCOUNT FOR YEAR ENDED 30 JUNE 1955

Stock on Hand at 30/6/55

2 Hacks	20. 0. 0	
1 Draught	5. 0. 0	25. 0. 0

Stock on Hand at 1/7/54

2 Hacks	22.10. 0	
1 Draught	5. 0. 0	27.10. 0
	LOSS to Farm Trading A/c	
		<u>2.10. 0</u>
		<u>27.10. 0</u> <u>27.10. 0</u>

4.4.1.5 CHATTELS ACCOUNT FOR YEAR ENDED 30 JUNE 1955

	<u>Debit</u>	<u>Credit</u>
Sales and Transfers out		37.10. 0
Depreciation - Seasonal		654.15. 8
Balance Brought Forward	7,203. 7. 5	
Purchases and Transfers In	177. 0. 7	
Balance Carried Forward		6,688. 2. 4
	<u>7,380. 8. 0</u>	<u>7,380. 8. 0</u>

4.4.1.6 FARM TRADING ACCOUNT FOR YEAR ENDED 30 JUNE 1955

Profits from Livestock Accounts

Sheep Account	14,480. 0. 9	
Run Cattle Account	<u>629.19. 1</u>	15,109.19.10
<u>Sales of Produce</u>		
Wool 55,257 lbs.	10,812.11. 6	
Browntop 10,659 lbs.	1,956. 9. 2	
Hay 1,140 bales	<u>131.16. 0</u>	12,900.16. 8
<u>Sundry Receipts</u>		
Rent from Houses	52. 0. 0	
Grazing	228.15. 0	
Skins and Hides	<u>96.12. 6</u>	<u>377. 7. 6</u>
		<u>28,388. 4. 0</u>

40.

<u>Losses from Livestock Accounts</u>		<u>Debit</u>	<u>Credit</u>
Dairy Account	47. 0. 0		
Horses	<u>2.10. 0</u>	49.10. 0	
 <u>Working Expenses</u>			
Farm Stores	115.13. 3		
Shearing & Crutching	1,121. 3. 8		
Harvesting	985.10. 8		
Manures & Lime	1,093.10. 3		
Repairs & Maintenance	559. 6. 9		
Incidental Expenses	73.15. 0		
Seeds	57. 5.10		
Wages	3,057. 1. 5		
Tractor Costs	725.11. 3		
Freight & Cartage	<u>187. 2. 4</u>	8,576. 0. 7	
Depreciation - Chattels		431. 4. 6	
GROSS PROFIT		<u>19,331. 8.11</u>	<u> </u>
		28,388. 4. 0	28,388. 4. 0
		<u> </u>	<u> </u>

4.4.1.7 PROFIT & LOSS ACCOUNT FOR YEAR ENDED 30 JUNE 1955

GROSS PROFIT from Farm Trading Account			19,331. 8.11
Interest on Block Expenditure		2,426. 0. 2	
NET PROFIT to Accumulated Profits & Loss		<u>16,905. 8. 9</u>	
		<u>19,331. 8.11</u>	<u>19,331. 8.11</u>
		<u> </u>	<u> </u>

4.4.1.8 ACCUMULATED PROFIT & LOSS ACCOUNT FOR YEAR ENDED 30 JUNE 1955

	<u>Debit</u>	<u>Credit</u>
NET PROFIT from Profit & Loss Account		16,905. 8. 9
BALANCE 30/6/55 Carried Forward		3,909. 6. 3
BALANCE 1/7/54	20,814.15. 0	
	<u>20,814.15. 0</u>	<u>20,814.15. 0</u>

4.4.1.9 BALANCE SHEET AS AT 30 JUNE 1955

Crown Lands Account

Cash Outstanding	53,689.17. 5
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Creditors

Seasonal Expenses	254.18.10
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Unrecovered interest on block expenditure	3,596.13. 8
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Purchase of Land and Improvements

Unimproved value	24,752. 0. 0
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Value of Improvements	20,375. 6. 0
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Incidental	194.19. 1	45,322. 5. 1
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Development Operations

	<u>For Year</u>	<u>To Date</u>	
Fencing	1,815.16. 4	4,415.18. 8	
Cultivation	406.11. 6	643.16. 8	
Pastures	3,106.17. 3	5,359. 7. 9	
Drainage	---	8. 5.10	
Buildings	2,271. 3. 0	3,257. 8.10	
Road & Bridges	---	32.10.11	
Shelter Belts	---	7.10. 0	
Water Supplies	<u>285.16.11</u>	<u>389. 3. 3</u>	14,114. 1.11
	7,886. 5. 0		59,436. 7. 0

Less Disposal Value of Areas Alienated

(920 acres)

Leasehold Rental Value	8,150. 0. 0	
Leasehold Rental Adjustment Value	<u>1,530. 0. 0</u>	
	9,680. 0. 0	
Improvements	<u>7,510. 0. 0</u>	<u>17,190. 0. 0</u>
		42,246. 0. 0
Chattels		6,688. 2. 4
Livestock		4,516.15. 0
Debtors - Livestock	1. 0. 6	
Seasonal	<u>20. 7. 0</u>	21. 7. 6
Consumable Stores on Hand		159.11.10
Accumulated Loss		<u>3,909. 6. 3</u>
		<u>57,541. 9. 4</u> <u>57,541. 9. 4</u>

4.4.2 Annual cash flow from Rosehill for 1955

The net flow of cash from the block was derived from the above and preceding accounts as follows:

Sales

Sheep	16,504.11. 1
Dairy	5. 0. 0
Run Cattle	493.19. 1
Chattels	37.10. 0
Produce	12,900.16. 8
Sundry Receipts	<u>377. 7. 6</u>
	30,318.14. 4

<u>Less Purchases</u>		
Sheep	816. 0. 4	
Dairy	50. 0. 0	
Chattels	177. 0. 7	
Working Expenses	<u>8,576. 0. 7</u>	<u>9,619. 1. 6</u>
Cash Surplus on Trading Activities		20,699.12.10
<u>Less Development Operations for 1955</u>		<u>-7,886. 5. 0</u>
<u>Purchase of Land</u>		
1955 Total Land Purchases	45,322. 5. 1	
<u>Less 1954 total Land Purchases</u>	<u>-45,322. 5. 1</u>	<u>12,813. 7.10</u>
<u>Plus Sales of Land</u>		
1955 Value of Area Alienated	17,190. 0. 0	
<u>Less 1954 Area Alienated</u>	<u>---</u>	<u>17,190. 0. 0</u>
1955 Cash Flow		<u>£ 30,003. 7.10</u>
		<u>or \$60,006.78</u>

This process was repeated for each block for each year until complete series of cash flows were derived. These cash flows series were then discounted at various rates of discount to derive the Net Present Values and the Internal Rate of Return figures presented in the results. The analysis was carried out on the Lincoln College I.B.M. 1130 computer with Fortran IV programmes developed by the author.

CHAPTER 5

THE ECONOMIC RETURNS ON LAND DEVELOPMENT 1945-69

In this chapter, the economic returns from land development are analysed in the actual prices that occurred (i.e. current prices) and also in real terms (i.e. 1957 and mean 1945-69 prices).

Actual prices were used in the analysis as the numerous development decisions were made when these prices were operative. The actual development would have been different had other prices prevailed. Constant prices were used in the analysis, as an economist in analysing profitability wishes to measure the effects of price changes on the total wealth created.

5.1 The Departmental Point of View

Before the detailed economic analysis was undertaken, the Department of Lands and Survey's financial accounts, for each block chosen for this study, were reviewed and the overall profit or loss the Department accounted to itself was obtained. The summarised results of this are set out in Table 3.

Table 3

Summary of the Overall Loss the Department Accounted to itself from the 61 Land Development Blocks	
Loss on Land and Improvement Accounts	-4,166,520
Profit on Seasonal and Livestock Accounts	<u>5,790,522</u>
Less	1,624,002
Interest charged by Treasury	<u>-3,193,925</u>
TOTAL LOSS ACCOUNTED BY DEPARTMENT	<u>-1,569,923</u>

1. For details of the individual blocks and land districts total profits and losses see Appendix C.

This summary of the financial accounts indicates that, in the period under study, the Department accounted to itself a \$1½ million loss on the \$14½ million of capital it spent on improvements to the unproductive land. It is impossible to determine from this result what portion of the loss was a result of adverse price changes and what portion a result of poor resources use. It is also impossible to determine how sensitive the results were to changes in the rate of interest charged by the Treasury.

The annual accounting results could not be used for such economic analyses of investment profitability, because the accounts, in accordance with accounting practice, report only annual profits and not annual investment flows. The annual investment flows were obtained by extracting from the financial accounts of each block the annual 'cash flows'². The cash flows were then analysed by the two evaluation methods outlined in Chapter 3, subsections 3.2.1 and 3.2.2 and the results are given in Table 4.

The net Present Values are shown in Table 4 at discount rates of 3, 4, 5 and 6 per cent as, in the period of this study, the Department's price for Treasury funds varied between 3.5% and 4.5% and the Nations's price for long-term risk free funds varied between 3.0% and 5.5%. Also shown in the table are internal rate of return and development capital figures for each land district and type of settlement.

At 4 per cent, the average price Treasury charged for funds, the Department incurred a total loss of \$1.2 million in its creation of 568 new farms on the 61 land development blocks. Alternatively, for each new farm created, \$2 thousand worth of subsidy was provided by the Department. The

2. The actual method used to obtain 'cash flows' is given in Chapter 4, subsection 4.4.

Table 4

Departmental Point of View
Summary of Capital Involved and Economic Returns to
Development by Districts and Farm Types^{3.}

<u>Land District</u>	<u>Internal Rate of Return</u>	<u>Development Capital Involved</u>	<u>Net Present Value of the Project to the beginning of Development at Various Discount Rates</u>			
			<u>3%</u>	<u>4%</u>	<u>5%</u>	<u>6%</u>
<u>Totals:</u>						
Auckland	-5.8	3,202,627	-1,084,705	-1,071,290	-1,049,966	-1,023,027
Te Kuiti	6.1	797,584	139,363	82,286	37,225	1,693
Rotorua	1.3	4,925,076	- 312,069	- 433,491	- 521,666	- 583,748
Gisborne	11.1	1,026,653	362,903	287,361	223,410	169,294
Hawkes Bay	2.3	2,071,783	- 60,106	- 127,477	- 178,562	- 216,599
Taranaki	4.3	115,853	5,923	1,179	- 2,427	- 5,125
Wellington	7.5	819,901	260,056	179,593	114,067	60,764
Canterbury	4.2	255,878	17,006	2,101	- 9,772	- 19,138
Otago	-0.6	230,958	- 27,240	- 31,431	- 34,615	- 36,975
Southland	1.8	1,010,689	- 45,862	- 72,242	- 90,743	- 103,260
Sheep Settlements	3.0	6,154,113	3,485	- 225,008	- 397,784	- 526,509
Dairy Settlements	-3.0	1,130,638	- 288,095	- 304,735	- 316,493	- 324,305
Mixed Settlements	1.3	7,172,249	- 460,120	- 653,670	- 798,772	- 905,307
<u>New Zealand Total</u>	1.8	14,457,000	- 744,730	-1,183,412	-1,513,048	-1,756,121

3. Net present values of the individual and grouped blocks at discount rates between 3 per cent and 6 per cent are shown in Appendix D.

\$1.2 million loss, shown above, was the total loss to the Department as valued at the beginning of land development (i.e. 1944). The \$1.6 million loss, shown above in Table 3 was the total loss accounted to the Department as at the dates it was written off. As shown by the internal rate of return above, the breakeven yield of interest was only 1.8 per cent which was far below both the Department's and the Nation's price for loanable funds. Subsidy at the rate of 2.2 per cent per dollar per annum was provided by the Department. It is evident from the results that in creation of new farms heavy losses occurred most frequently in the Auckland land district where only $\frac{1}{5}$ of the development capital was spent. As would be expected in a typical investment situation, the net present values shown at higher rates of discount reflected smaller profits and greater losses. The Auckland land district, however, provided an exception, where negative cash flows were so dominant in the cash flow, that discount factors with higher discount rates actually reduced the value of the losses.

5.2 The National Point of View

For the Department's point of view to be directly interpreted as the Nation's, is to assume that the Department accounted to each block the Nation's real costs and returns from all the resources it used.

Firstly, the rate of interest charged by Treasury was less than the Nation's market price of loanable funds for risk free investment. The Department's price for funds in the period of this study was on average 3.9 per cent and the Nation's 4.36 per cent⁴.

4. For details of the Treasury rates of interest charged and the yield of long term government securities see Appendix B.

Secondly, the administration of land development activities by the Department was not accounted to each land development block. If the Department had not been forced to produce new farms, then some of the resources it commanded for administration would have found other productive uses in society. The opportunity cost of these resources should be added to other land development costs. An accurate allocation was not possible within the confines of this study, as such a topic would have warranted a separate study. Parkes [27,p.28], has made such an allocation for the Hindon land development block at Otago. He placed this cost at just over \$3,000 per year for the block. It was proposed to settle 20 farms in 10 years on Hindon. Thus, the average farm cost for administration was \$150 per year for 10 years. The present value of a \$150 annuity for 10 years at 4 per cent is \$1,217 and at $4\frac{1}{2}$ per cent is \$1,187. By valuing the administration cost at \$1,000 per farm the additional cost to the nation, unaccounted for in the departmental point of view shown above, was just over $\$ \frac{1}{2}$ million.

Thirdly, the methods of distributing the cost of social overhead expenditure of the nation are related more to ability to pay than benefits derived from the services provided. As has been outlined by Fitzharris [10, p.97], the Department incurred only half the initial cost of no-exit roads and paid rates for the services of roads like all other farmers. The practical methods employed to finance road construction and maintenance and the type of service provided made it difficult to identify how much should have been directly attributed

to land development. It was certain that the methods of charging for the services of roads, incorporated in the departmental results, did not accurately reflect the resource use cost to the nation. The net benefits of improved access were capitalised to the Department along with the wealth created through land development, at farm settlement. The payment of half the costs of non-exit roads and rates were not regarded as equivalent to the additional roading costs the nation incurred through land development. The impression was that the Department received a subsidy from the rest of the community for the additional roading. Similar impressions were derived for the payment of electric power and telephone services.

Housing expenditure provided an example where confusion could arise, for as pointed out by Ward et al [35,p.137], it may be argued from the Nations' point of view that if houses were not constructed to settle men on farms, they would have to be constructed elsewhere in the community, and thus their cost should be ignored. However, from a practical point of view, it was impossible to eliminate housing in this study, as the settlement price of farms was received as a lump sum. The additional cost if any, that was counted to the Nation, through this procedure of including the construction cost and value at settlement was small, for the value of services provided by houses bears a close approximation to their cost.

Fourthly, from the nation's point of view, any sale or purchase of land merely represented a change of ownership from one member of society to another, with no change in the Nation's total wealth. As real wealth changes were involved to the buyers and sellers of land, the Departmental point of view shown above, has correctly included both sales and purchases of land.

Purchase and settlement prices, for the large number of land sales involved in the study, were considered directly related to the land's current productivity and this assumption was used to obtain the net benefits from development.⁵ This is obviously a very difficult assumption to defend for an individual case study, and previous workers in the field have based their estimates of terminal benefits on a capitalisation of a net income derived by budget methods.⁶ The budget method of determining development profitability is crucially dependent upon the physical and price coefficients incorporated in the terminal budgets and there was no information available to draw up such budgets for this study. The purchase and settlement prices of land were used as the measure of the Nation's capitalised returns before and after land development. Thus the measure of the worth to the Nation from development was obtained directly from the returns to the Department.

Finally, in the late 1950s and early 1960s it was frequently advanced that, as land development aided exports and helped correct the

5. Until the abolition of land sales control in 1953, the price of land at settlement was estimated as a direct capitalisation at an interest rate of $4\frac{1}{2}$ per cent of the assessed productive income at 1942 prices. Government acquired much of the land considered in this study before 1952 and hence under the provisions of land sales control. Recent study of the land market since 1953 by Johnson, R.W.M. [pers.comm] has confirmed the hypothesis of a direct relationship existing between current productive ability and price. This work indicated a capitalisation figure which is somewhat higher than the average rate of return on capital shown in the New Zealand Meat and Wool Boards' Economic Services reports [19].

6. There is a case study by Gow [11] that is an exception to this statement.

country's balance of payments, the real returns to the country were greater than the actual financial returns. This argument states that New Zealand's currency in this period was overvalued and points out that, if the correct exchange rate had operated, greater cash receipts would have enhanced the profitability of land development. No quantitative corrections were made to the department's results to account for this as there has been no studies on what agricultural prices would have been if the correct exchange rate had operated.

Land development has received subsidies from the rest of the community, in addition to those provided by the Department. In the summary of the Nation's economic returns from land development, shown in Table 5, an allowance is made for the subsidies provided, by the Department of Lands and Survey for administration and, by the Treasury in the rate of interest it charged the Department. No quantitative allowances were made for the subsidies involved with social overheads, or cash receipts enhancement there would have been with the correct exchange rate and set-off between the two was assumed.

Table 5National Point of ViewSummary of Economic Returns to Development

The Net Present Value of the Returns to the Department at the Nation's Discount Rate of 4½ per cent	\$ -1,350,000
N.P.V. of Administration Provided by the Department (see test)	<u>- 568,000</u>
TOTAL LOSS TO THE NATION	<u><u>\$-1,918,000</u></u>

i.e. approximately \$3½ thousand per farm or \$8 per acre.

The actual loss the Nation incurred with the 568 farms the Department developed on the 61 blocks chosen for this study was \$2 million. The loss to the Nation was \$1 million more than the loss the Department incurred. On average, each new farm created received a total subsidy of \$3½ thousand from the community. This was the value of the total subsidy provided as valued at the beginning of land development, (i.e. 1944).

If the value of the total subsidy provided was established at the median year of study (1957) and not the beginning, then its value would have been \$3¼ million or \$6 thousand per farm and not \$2 million or \$3½ thousand per farm as shown above.

5.3 Deflated Prices

To derive real wealth changes generated from resource organisation as opposed to wealth changes resulting from price changes, the results derived in actual prices were deflated to give the results in constant prices. The constant prices used were the median (i.e. 1957) and mean (i.e. average 1945-69) prices that occurred during the period of study. To achieve the deflation of actual prices incorporated in the results, four price indices were used: the price of farm improvements, the price of farm outputs, the price of farm inputs and the price of agricultural exports, (see Appendix E).

To complete the price deflation it was necessary also to make appropriate adjustment to the rate of discount. For deflation to 1957 prices, the price of loanable funds to the Department and the Nation were 3.5 per cent and 4.8 per cent respectively. For deflation to mean prices (i.e. av. 1945-69),

the price of loanable funds to the Department and Nation were 4.0 per cent and 4.4 per cent respectively.⁷ Table 6 summarises the results of land development profitability after price deflation

Table 6 Price Corrected Results
A Summary of Capital Involved and Economic Returns
to Development⁸

<u>(a) 1957 Prices</u>			
	Development Expenditure	I.R.R.	N.P.V. as at 1944
	\$	%	\$
Departmental Point of View (i.e. 3.5 per cent discount rate)	15,623,000	1.2 (i.e. \$3,100 per farm)	-1,750,000 (i.e. \$3,100 per farm)
Nations' Point of View (i.e. 4.8 per cent discount rate and \$1,000 per farm for administration)	-	-	-2,910,000 (i.e. \$5,000 per farm)
<u>(b) Mean 1945-69 Prices</u>			
	Development Expenditure	I.R.R.	N.P.V. as at 1944
	\$	%	\$
Departmental Point of View (i.e. 4.0 per cent discount rate)	14,966,000	-1.7 (i.e. \$6,400 per farm)	-3,620,000 (i.e. \$6,400 per farm)
Nations' Point of View (i.e. 4.4 per cent discount rate and \$1,000 per farm for administration)	-	-	-3,680,000 (i.e. \$6,500 per farm)
	I.R.R. = Internal rate of return		
	N.P.V. = Net present value		

7. For details of the price of loanable funds to the Department and Nation see Appendix B.

8. For details of price corrected results by districts at varying rates of discount see Appendix F.

In comparison with the current price results shown in Tables 4 and 5 it was apparent that with constant prices the total losses from development were increased. Thus, on average, the actual price changes that occurred have enhanced development profitability during the period of this study. In comparing the results in 1957 prices with those of the mean 1945-69 prices, it was apparent that 1957 was a more favourable year than most.

The actual benefit derived from price changes should be interpreted with care, for price corrected results are based upon the assumption that actual physical organisation and timing of events that occurred with creation of new farms would have been unaltered by different prices. The assumption that the physical development results would have been unaltered if different prices had occurred cannot be upheld when the large movement of prices and the long time period of the study is taken into account. However, it may be concluded that, on average, both the Department and Nation have benefited from the actual price changes that occurred from 1945 to 1969.

CHAPTER 6

CONCLUSIONS

This study was concerned with the Government's post-war economic success in developing unproductive land into farms. From the 1st April, 1944, until 31st March, 1969, the Government spent, through the Department of Lands and Surveys, \$112 million on physical improvements on $3\frac{1}{4}$ million acres of land. From a preliminary analysis of the 920 land development blocks owned by the Department since 1944 it was evident that not all the farms were created from unproductive land as on many blocks partly and fully developed land was acquired.

The study excluded many blocks of land because their development, and hence records of costs and returns, was incomplete. However, from selection, by length of time taken to fully develop and settle a block, and the cost of the physical improvements added per farm, it was possible to identify 61 blocks where new farms were created from unproductive or nearly unproductive land. On the 61 blocks identified, 568 new farms, covering some 250,000 acres, were developed at a cost of \$14 million for physical improvements to the land.

The books of account of the Department of Lands and Survey show that on the 61 blocks the Department suffered a financial loss of \$1 $\frac{1}{2}$ million. The economic analysis of the results revealed that, when present values were taken to the 30th June, 1944, in actual prices, the net cost to the Department was \$1.2 million or \$2,000 per farm. On the resources used this was an annual return of only 1.8 per cent. The Department provided a subsidy at the rate of 2.2 per cent per dollar per annum on the resources it used.

The cost to the nation was shown to be in excess of the Department's loss. This additional subsidy was estimated to be \$0.8 million or \$1,500 per farm. Thus, when valued at the beginning of post-war land development, the total subsidy was estimated to be \$2 million or \$3,500 per farm for the 568 farms. These results give a reasonable indication of the additional subsidy that has been provided on the other 590 new farms already developed and settled by the department on the 162 blocks it is currently developing.

The analysis of the results in constant prices revealed that the subsidy provided in the creation of new farms would have been even higher at the constant price levels taken. In more recent years, the price changes in agriculture have resulted in deteriorating terms of trade for farmers, and the Department is currently finding it difficult to achieve its 'breakeven' objective. It is clearly expressed in the National Development Conference projections that this trend, of deteriorating terms of trade, is expected to continue. For the future, it would appear that a far greater amount of subsidy will be required. To develop the further 1,617 farms proposed from the 162 blocks of land the Department still has on hand, it would appear that a subsidy well in excess of \$6 million will be required.

In the period of returned servicemen rehabilitation few would have begrudged the cost. However, the current policy question is whether or not the Government should continue subsidising the production of farms to allow a few young men to obtain farms of their own.

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APPENDIX A

DEVELOPMENT CAPITAL SPENT ON LAND DEVELOPMENT
BLOCKS FOR FINANCIAL YEARS ENDED 31 MARCH

	\$
1945	344,184
1946	815,856
1947	1,689,014
1948	1,491,858
1949	2,518,800
1950	4,367,208
1951	4,186,410
1952	4,435,126
1953	5,798,320
1954	5,546,404
1955	4,914,228
1956	5,355,820
1957	4,567,674
1958	4,663,108
1959	4,678,072
1960	4,302,132
1961	4,750,506
1962	4,994,952
1963	5,556,828
1964	5,481,632
1965	5,814,744
1966	6,203,358
1967	6,150,522
1968	6,791,037
1969	7,024,210
	<hr/>
TOTAL	\$112,442,003
	<hr/> <hr/>
Total 1945 to 1968	\$105,417,793
	<hr/> <hr/>

Source : N.J.S. Lee, Assistant Chief Accountant, Department of Lands and Survey, pers comm.

APPENDIX B

INTEREST RATES

Year	Av. yield Long Term Govt. Securities (Calendar years)	Interest Rate Dept. Charged by Treasury (year ended 30/6/)
19		
45	3.18	3.5
46	3.01	3.5
47	3.00	3.5
48	3.03	3.5
49	3.00	3.5
50	3.07	3.5
51	3.08	3.5
52	3.85	3.5
53	4.01	3.5
54	3.98	3.5
55	4.15	3.5
56	4.65	3.5
57	4.81	4.0
58	4.95	4.0
59	4.85	4.0
60	4.83	4.0
61	5.09	4.0
62	5.25	4.0
63	5.15	4.5
64	5.06	4.5
65	5.10	4.5
66	5.28	4.5
67	5.50	4.5
68	5.53	4.5
69	5.54	4.5
Mean	<u>4.36</u>	<u>3.9</u>

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APPENDIX C

DEPARTMENT OF LANDS AND SURVEY LAND DEVELOPMENT BLOCKS:

SUMMARY OF FINAL DISPOSAL ACCOUNTS

Blocks	Land & Improvements A/cs Profit or Loss (\$)	Seasonal Livestock A/cs Profit or Loss (\$)	Treasury Interest Charged (\$)	Overall Accounting Profit or Loss (\$)
<u>AUCKLAND</u>				
Kokopu	-84,903.52	905.79	-21,761.68	-105,759.41
Mauku	-12,882.00	-6,574.00	-10,150.00	-29,606.00
Katikati	-8,637.18	-4,161.90	-5,610.92	-18,410.00
Whangapoua	-67,668.03	-10,628.10	-15,394.29	-93,690.42
Awaroa	-29,055.32	-930.32	-8,313.31	-38,298.95
Riponui	-29,334.00	-4,800.00	-6,026.00	-40,160.00
Redcliffs	-49,253.88	-3,669.18	-19,663.13	-65,247.83
Kerikeri Inlet	-52,003.53	-11,212.01	-21,683.19	-62,474.71
Tauraroa	-29,529.70	79,653.61	-58,616.69	-8,492.78
Tikokopu	-71,657.70	18,373.88	-60,683.20	-113,967.02
Parau Bay	-137,428.22	30,002.78	-79,332.32	-186,757.76
Hakaru	-140,610.83	16,502.87	-103,856.93	-227,964.89
Kaira	-148,618.35	44,586.43	-112,261.60	-216,293.52
Taipa	-175,304.49	77,142.88	-103,211.32	-201,372.93
Puketoiwai	-78,598.27	11,326.91	-57,174.83	-124,446.19
Waipu	-206,194.40	13,208.72	-118,769.26	-311,754.94
	<u>-1,321,679.42</u>	<u>279,490.74</u>	<u>-802,508.67</u>	<u>-1,844,697.35</u>

62.

cont'd.

TE KUITI

Oparure	-29,486.00	80,576.00	-12,338.00	38,752.00
Onaio	-7,839.18	41,125.66	-6,433.63	26,852.85
Tuhua	4,377.93	19,943.59	-29,343.80	-5,022.28
Hirata	-33,314.11	22,720.03	-23,655.33	-34,249.41
Koromiko	-7,488.61	210,058.46	-70,823.94	131,745.91
Pamotu	11,290.10	114,314.05	-43,842.27	81,761.88
Newstead	-531.67	15,743.57	-42,709.01	-27,497.11
	<u>-62,991.54</u>	<u>504,481.36</u>	<u>-229,145.98</u>	<u>212,343.84</u>

ROTORUA

Mamuka	-18,692.00	526.00	-502.00	-18,668.00
Roydon Downs	-163,664.16	13,429.11	-193,612.10	-343,847.15
Ataimuri	-324,389.08	606,615.26	-280,124.63	2,101.55
Maraetai	-576,826.35	790,234.90	-574,559.76	-361,151.21
	<u>-1,083,571.59</u>	<u>1,410,805.27</u>	<u>-1,048,798.49</u>	<u>-721,564.81</u>

GISBORNE

Rere Falls	-33,499.47	81,406.84	-17,706.82	30,200.55
Hokoroa	-18,850.00	136,844.00	-7,698.00	110,296.00
Mahaki	-102,313.19	323,948.94	-44,588.34	177,047.41
Puha	-32,312.88	101,577.72	-23,148.31	46,116.53
Ahinanui	-43,985.70	88,296.21	-18,491.32	25,819.19
Hakanui	-57,546.00	107,044.00	-1,698.00	47,800.00
Rakaukaka	-3,590.00	156,886.00	-13,878.00	139,418.00
Mangapeka	-48,745.78	22,776.25	-22,421.37	-48,390.90
	<u>-340,843.02</u>	<u>1,018,779.96</u>	<u>-149,630.16</u>	<u>528,306.78</u>

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HAWKES BAY

Snaddon	-59,878.61	74,197.35	-24,906.68	-10,587.94
Rushden	-8,554.68	33,845.59	-16,252.13	9,038.78
Rotohiwi	-118,133.74	257,775.99	-63,526.51	76,115.74
Te Awa	-139,662.34	242,936.11	-63,950.62	39,323.15
Ridgemount	-176,687.47	94,758.09	-56,138.49	-138,067.87
Huiarangi	-115,248.83	201,525.36	-86,661.25	-384.72
Brookfields	-184,653.99	231,270.03	-146,001.18	-99,385.14
	<hr/>	<hr/>	<hr/>	<hr/>
	-802,819.66	1,136,308.52	-457,436.86	-123,948.00

TARANAKI

Opua	-10,735.33	20,282.24	-10,347.93	-801.02
Kiore	-34,272.00	50,146.00	-15,982.00	-108.00
	<hr/>	<hr/>	<hr/>	<hr/>
	-45,007.33	70,428.24	-26,329.93	-909.02

WELLINGTON

Newton Lees	-57,515.43	44,474.83	-27,262.88	-40,303.48
Ngai	-33,596.06	65,154.66	-25,713.16	5,345.44
Santoft	-91,137.98	430,847.23	-51,268.65	288,440.60
Parewanui	27,702.37	261,779.59	-72,017.50	217,464.46
	<hr/>	<hr/>	<hr/>	<hr/>
	-154,547.10	802,256.31	-176,262.19	471,447.02

64.

cont'd.

CANTERBURY

Cressy	-15,605.80	-14,889.50	-5,822.00	-36,317.30
Chatterton	-22,227.54	-3,685.33	-20,484.00	-46,396.87
Rosehill	27,223.32	110,690.68	-16,888.00	121,026.00
Hinds	16,415.77	7,336.23	-13,002.00	10,750.00
	<hr/>	<hr/>	<hr/>	<hr/>
	5,805.75	99,452.08	-56,196.00	49,061.83

OTAGO

Lochar	-45,615.23	-1,695.84	-28,752.61	-76,063.68
Spylaw	-15,694.49	67,990.48	-20,747.13	31,548.86
	<hr/>	<hr/>	<hr/>	<hr/>
	-61,309.72	66,294.64	-49,499.74	-44,514.82

SOUTHLAND

Maranui	9,174.63	51,583.37	-19,488.00	41,270.00
Wairoto	-6,860.68	57,606.68	-11,836.00	38,910.00
Peebly Hills	-21,184.42	15,312.42	-14,190.00	-20,062.00
Pakewao	23,568.30	96,679.70	-23,006.00	97,242.00
Otakau	-7,553.88	90,583.48	-39,717.92	43,311.68
Waituna	-233,540.00	46,387.17	-46,693.00	-233,845.83
Kapuka	-63,160.14	44,071.63	-43,185.68	-62,274.19
	<hr/>	<hr/>	<hr/>	<hr/>
	-299,556.19	402,224.45	-198,116.60	-95,443.34
<u>N.Z. TOTALS</u>	<hr/>	<hr/>	<hr/>	<hr/>
	-4,166,519.82	5,790,521.57	-3,193,924.62	-1,569,922.87

- Notes : (i) Where final disposal accounts had not been prepared by the Department they were constructed from the financial accounts and supporting data.
- (ii) Seasonal and livestock accounts were adjusted for the removal of Treasury interest charged.

APPENDIX D

DEPARTMENT OF LANDS AND SURVEY LAND DEVELOPMENT RESULTS
IN CURRENT PRICES

	I.R.R.	Development Capital \$	N.P.V. to the beginning of Development			
			3%	4%	5%	6%
<u>OTAGO</u>						
Lochar	-7.7	162,719.06	-54,936.20	-55,991.70	-56,717.14	-57,161.40
Spylaw	6.2	68,238.79	19,044.67	12,506.37	6,590.58	1,239.28
<u>CANTERBURY</u>						
Cressy	-24.9	53,750.34	-32,029.60	-31,651.56	-31,259.38	-30,855.79
Chatterton	-5.6	84,516.88	-42,272.08	-45,228.96	-47,891.86	-50,286.07
Rosehill	17.0	58,292.66	92,305.13	81,800.79	72,109.36	63,164.85
Hinds	5.8	59,318.12	9,083.63	5,597.26	2,440.25	-417.31
<u>SOUTHLAND</u>						
Maranui	8.4	70,347.32	31,791.97	24,662.25	18,132.69	12,153.23
Wairoto	11.2	32,173.33	32,907.35	27,214.18	22,103.37	17,512.32
Pebbly Hills	-3.9	112,691.66	-24,091.21	-25,682.18	-26,964.22	-27,977.73
Pukewao	12.4	82,811.67	74,004.78	61,876.75	51,064.42	41,422.75
Otakau	7.1	143,662.87	52,204.11	35,957.93	22,166.83	10,475.28
Waituna	-10.4	368,929.74	-200,119.65	-195,891.54	-191,170.10	-86,102.00
Kapuka	-1.9	200,072.04	-38,577.53	-43,843.70	-48,430.90	-52,415.02
<u>AUCKLAND</u>						
Kokopu	-12.6	278,201.07	-104,999.16	-106,851.04	-108,355.75	-109,544.92
Mauka	-7.4	88,597.22	-29,732.50	-31,122.59	-32,345.71	-33,417.43
Katikati	-5.2	50,239.71	-15,852.60	-16,909.12	-17,834.94	-18,643.19
Whangapoua	-14.7	177,666.01	-79,437.25	-79,840.72	-80,074.21	-80,157.76

cont'd.

I.R.R. = internal rate of return. N.P.V. = net present value

<u>AUCKLAND</u> cont'd.	I.R.R.	\$	3%	4%	5%	6%
Awaroa	-19.1	52,501.82	-30,149.95	-30,077.59	-29,968.03	-29,825.80
Riponui	-23.0	62,643.09	-36,552.80	-36,318.61	-36,056.86	-35,771.20
Redcliffs	-6.2	210,593.99	-61,463.69	-64,159.99	-66,384.54	-68,191.47
Kerikeri Inlet	-10.3	101,534.72	-51,380.11	-52,646.05	-53,716.13	-54,610.36
Tauraroa	2.9	105,577.39	-1,144.49	-13,919.28	-24,965.08	-34,508.46
Tikokopu	0.5	326,635.22	-37,579.66	-49,073.83	-58,819.19	-67,055.59
Parau Bay	-6.7	306,604.70	-128,545.36	-133,117.55	-136,799.80	-139,705.31
Hakaru	-6.9	335,784.35	-155,070.17	-157,878.70	-159,610.41	-160,441.73
Kaira	-4.4	357,356.45	-140,821.15	-147,777.13	-153,106.22	-157,055.67
Taipa	-5.7	284,933.79	-122,270.23	-126,812.07	-130,325.11	-132,962.08
Puketoiwai	-6.4	145,334.84	-76,575.18	-77,015.32	-76,883.63	-76,297.40
Waipu	-15.5	309,422.66	-186,313.21	-179,537.51	-172,931.62	-166,524.18

TE KUITI

Oparure	10.9	54,014.05	32,141.87	26,873.69	22,005.46	17,505.35
Onaio	12.6	23,814.81	23,530.57	20,032.20	16,839.22	13,923.36
Tuhua	3.2	121,127.14	951.82	-4,685.73	-9,702.01	-14,161.46
Hirata	1.5	76,372.73	-6,257.83	-10,057.94	-13,484.55	-16,573.13
Koromiko	8.3	205,950.20	86,877.13	65,594.26	46,942.47	30,604.32
Famotu	7.5	153,290.28	59,851.79	43,192.22	28,664.65	15,988.51
Newstead	0.4	163,014.84	-29,964.67	-37,782.91	-44,216.41	-49,514.99

ROTORUA

Mamuka	-6.5	43,817.94	-22,852.86	-23,877.53	-24,741.33	-25,642.29
Roydon Downs	-3.4	552,210.29	-208,827.44	-225,852.91	-240,237.32	-252,338.89
Ataimuri	3.5	1,389,129.24	28,079.51	-27,836.49	-74,360.84	-112,285.27
Maraetai	1.5	2,939,918.50	-158,256.54	-235,236.28	-294,712.17	-340,028.83

cont'd.

<u>GISBORNE</u>	I.R.R.	\$	3%	4%	5%	6%
Rere Falls	7.9	87,769.04	26,156.00	19,952.90	14,209.45	8,890.48
Hokoroa	31.7	56,879.60	101,013.69	93,642.12	86,743.74	80,284.66
Mahaki	10.9	314,473.20	149,431.34	124,581.35	101,738.96	80,729.09
Puha	8.9	87,825.03	38,820.24	30,470.56	22,945.97	16,166.03
Ahimanu	4.7	78,673.19	9,492.87	3,744.85	-1,465.65	-6,189.12
Hakanui	24.3	110,785.09	39,195.18	35,525.14	32,144.02	29,027.13
Rakaukaka	14.2	166,496.38	93,297.02	79,749.12	67,590.31	56,671.74
Mangapeka	-4.5	123,751.22	-36,411.89	-38,567.35	-40,321.08	-41,725.65

HAWKES BAY

Snaddon	2.1	86,084.21	-5,408.73	-11,229.17	-16,601.78	-21,560.99
Rushden	4.5	75,840.40	6,538.97	2,001.02	-2,027.30	-5,600.52
Rotohiwi	6.8	349,779.31	62,835.19	43,656.09	26,349.81	10,735.91
Te Awa	4.9	420,603.58	34,617.15	15,503.72	-1,384.29	-16,294.61
Ridgemount	-6.7	243,314.44	-95,424.12	-98,126.57	-100,145.98	-101,582.94
Huiarangi	3.3	423,682.21	5,022.73	-12,301.91	-26,756.17	-38,765.38
Brookfields	1.3	472,478.44	-48,312.17	-70,312.45	-88,548.13	-103,598.35

TARANAKI

Opua	3.9	55,560.09	1,986.35	-187.19	-2,219.31	-4,119.45
Kiore	4.5	60,292.48	6,087.83	1,917.74	-1,940.60	5,510.97

WELLINGTON

Newton Lees	-2.0	84,287.04	-26,817.24	-29,845.90	-32,361.03	-34,440.22
Ngai	2.3	176,613.50	-7,646.64	-17,265.92	-25,627.74	-32,903.90
Santoft	10.3	383,963.67	188,150.80	152,669.21	120,990.83	92,653.15
Parewanui	10.1	175,036.43	158,471.41	125,854.73	97,421.51	72,631.57

cont'd.

<u>LAND DISTRICT TOTALS</u>	I.R.R.	\$	3%	4%	5%	6%
AUCKLAND	-5.8	3,202,627.03	-1,084,705.12	-1,071,290.01	-1,049,966.05	-1,023,027.21
TE KUITI	6.1	797,584.05	139,363.32	82,286.26	37,224.73	1,693.29
ROTORUA	1.3	4,925,075.97	-312,069.01	-433,490.95	-521,665.99	-583,748.02
GISBORNE	11.1	1,026,652.75	362,903.09	287,361.12	223,410.45	169,293.65
HAWKES BAY	2.3	2,071,782.59	-60,106.29	-127,477.18	-178,561.74	-216,598.92
TARANAKI	4.3	115,852.57	5,923.10	1,178.63	-2,427.16	-5,124.54
WELLINGTON	7.5	819,900.64	260,056.36	179,592.89	114,066.97	60,764.17
CANTERBURY	4.2	255,878.00	17,005.99	2,100.52	-9,772.08	-19,138.36
OTAGO	-0.6	230,957.85	-27,239.59	-31,430.97	-34,614.61	-36,975.07
SOUTHLAND	1.8	1,010,688.63	-45,861.59	-72,242.42	-90,742.86	-103,259.91
SHEEP SETTLEMENTS	3.0	6,154,113.42	3,484.92	-225,007.60	-397,783.57	-526,508.70
DAIRY SETTLEMENTS	-3.0	1,130,638.04	-288,094.52	-304,734.62	-316,492.68	-324,304.90
MIXED SETTLEMENTS	1.3	7,172,248.62	-460,120.14	-653,669.87	-798,772.09	-905,307.33
NEW ZEALAND TOTAL	1.8	14,457,000.08	-744,729.73	-1,183,412.09	-1,513,048.35	-1,756,120.94

APPENDIX E

PRICE INDICES : FARM IMPROVEMENTS, FARM INPUTS,
FARM OUTPUTS AND AGRICULTURAL COMMODITIES EXPORTED

Year	Price Index of Farm Improvements	Price Index of Farm Inputs	Price Index of Farm Outputs	Export Price Index of Agricultural Commodities
1945	535	504	406	425
1946	568	536	409	451
1947	592	571	457	555
1948	621	615	546	667
1949	679	679	571	641
1950	690	689	678	742
1951	740	747	1,054	1,160
1952	870	875	789	866
1953	923	912	902	932
1954	919	923	940	985
1955	950	966	950	976
1956	977	990	916	1,000
1957	1,000	1,000	1,000	1,000
1958	1,037	1,048	901	836
1959	1,050	1,054	825	871
1960	1,068	1,067	900	964
1961	1,093	1,096	848	870
1962	1,108	1,113	808	852
1963	1,125	1,125	844	919
1964	1,136	1,132	953	1,046
1965	1,163	1,145	962	1,025
1966	1,226	1,191	976	1,019
1967	1,261	1,232	915	960
1968	1,293	1,263	937	928
1969	1,325	1,295	960	1,017
Mean	958	951	818	868

- Sources : 1. Philpott, B.P. & Hussey, D.D. Productivity and Income of New Zealand Agriculture 1921-67. Agricultural Economics Research Unit Research Report No. 59, Lincoln College, N.Z.
2. N.Z. Year Book, Govt. Printer, Wellington, N.Z. (annual series).

APPENDIX F

DEPARTMENT OF LANDS AND SURVEY : PRICE CORRECTED RESULTS

(a) Price Corrected Results (1957=100)

LAND DISTRICT	I.R.R. %	Development Expenditure \$	Net Present Values as at 30/6/44			
			3%	4%	5%	6%
Auckland	-5.3	3,593,732.21	-1,402,153.77	-1,402,612.05	-1,390,617.34	-1,369,386.47
Te Kuiti	3.8	872,072.32	56,212.49	-11,939.38	-65,323.45	-106,962.32
Rotorua	1.3	5,296,923.89	-391,275.33	-547,770.37	-662,658.67	-744,713.43
Gisborne	5.8	1,147,193.28	174,045.89	101,288.14	40,956.48	-8,918.42
Hawkes Bay	3.5	2,172,510.91	48,352.48	-48,745.27	-124,225.62	-182,246.39
Taranaki	9.5	112,121.64	32,513.54	23,882.82	16,987.18	11,500.43
Wellington	3.7	915,164.90	57,024.29	-24,838.37	-90,058.98	-141,722.51
Canterbury	5.8	269,011.87	44,407.87	25,218.39	9,713.36	-2,704.57
Otago	-2.6	250,840.20	-66,170.39	-70,326.59	-73,207.66	-75,000.15
Southland	2.5	993,781.84	-23,208.73	-60,929.88	-88,698.90	-108,700.17
New Zealand	1.2	15,623,353.06	-1,472,287.87	-2,018,500.35	-2,428,602.01	-2,730,230.87

(b) Price Corrected Results (1945-69=100)

	I.R.R.	Development Capital \$	Net Present Values as at 30/6/44			
			3%	4%	5%	6%
<u>LAND DISTRICT</u>						
Auckland	-7.7	3,442,547.61	-1,616,150.40	-1,577,340.05	-1,532,534.91	-1,483,837.44
Te Kuiti	1.5	835,385.14	-93,930.51	-137,004.41	-169,551.30	-193,817.72
Rotorua	-1.7	5,074,087.78	-968,492.88	-1,033,447.68	-1,071,761.98	-1,089,614.21
Gisborne	2.2	1,098,932.04	-45,769.14	-90,513.13	-126,137.38	-154,689.77
Hawkes Bay	0.2	2,081,115.63	-252,067.98	-302,734.44	-339,034.76	-363,937.37
Taranaki	5.8	107,404.80	11,883.19	6,584.57	2,478.12	-671.64
Wellington	1.2	876,664.85	-133,769.36	-186,864.73	-227,656.01	-258,524.21
Canterbury	2.2	257,694.82	-11,337.32	-22,863.66	-31,776.41	-38,547.41
Otago	-6.2	240,287.61	-95,664.44	-95,759.60	-95,130.31	-93,940.39
Southland	-0.9	951,974.47	-164,343.79	-179,487.62	-188,499.98	-192,910.86
New Zealand	-1.7	14,966,094.75	-3,371,307.53	-3,620,643.47	-3,780,805.54	-3,871,512.96

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