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AN ECONOMIC ADJUSTMENT STUDY OF
THE NELSON PIP FRUIT INDUSTRY

A thesis presented in partial fulfilment
of the requirements for the degree of
Master of Horticultural Science
in Horticultural Economics and Marketing at
Massey University.

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1978

PREFACE

The terms of reference for this research project were:

"To examine the nature of the economic problems confronting the Nelson Pip Fruit Industry and suggest policy measures by which the industry can adjust in order to facilitate an improvement in the welfare of pip fruit growers."

This thesis sets out the findings of the research and the conclusions that have been reached with respect to the terms of reference. The thesis is organized into three sections. In the first section the nature of the problem confronting Nelson pip fruit growers is examined. The second section discusses the structure and the results obtained from an inter-temporal linear programming analysis of orchard adjustment and finally, in the third section the conclusions and implications for rural policy are discussed.

Much of the data used during the course of this study is included in the appendices. However, because of the extensive amount of data required to specify the intertemporal model it was decided to exclude appendices containing data relating to the model. All such data is, however, freely available upon request from the author.

I would like to record my appreciation for the guidance and advice given to me by my supervisor Dr. A.N. Rae. Many of the ideas contained in this thesis were developed with him. During the latter part of this study Dr. Rae was overseas on sabbatical leave. I am particularly grateful for the dispatch with which he returned the draft copy of this thesis together with many invaluable comments.

The Economic Survey of the Nelson Pip Fruit Industry discussed in this study formed part of a national survey of the New Zealand Pip Fruit Industry, which was conducted by the author as part of another study. I am grateful to the New Zealand Fruit Growers Federation and the New Zealand Apple and Pear Board for permission to use the survey data. A complete set of survey data relating to the Nelson Province has been included in Appendix A for reference purposes.

This study was undertaken while acting as a member of the staff of the Department of Agricultural Economics and Farm Management. I am grateful for the time which was made available in order to complete the study. I am in debt to Professor R.W. Cartwright for his comments as well as the financial support that he and Professor A.R. Frampton were able to arrange. Dr. A.D. Meister read several drafts of the thesis and made many valuable comments. Special acknowledgement is also due to Professor R.J. Townsley for his sound advice and encouragement.

I would also like to thank the pip fruit producer who so willingly gave up many hours of his time to provide data for the linear programming model. Particular thanks are due to Mrs Rama McGee for the care and accuracy with which she deciphered and typed my handwritten script.

Finally I wish to thank my wife, Ruthie, for her encouragement throughout and assistance in proof reading. Were it not for her enthusiasm this study would never have been commenced.

The usual caveat applies in relation to all those mentioned above.

Peter P. Oppenheim.

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ABSTRACT

For many years the Nelson Province has been the major region involved in the production of New Zealand's export pip fruit crop. However, in recent years there has been a severe decline in the income of Nelson Pip Fruit Producers.

An economic survey of New Zealand pip fruit producers revealed that 44 percent of the growers producing on the infertile Moutere Hill soils near Nelson recorded negative net farm incomes in 1974/75. The failure of these orchardists to adjust to changing economic and technological conditions is reflected in orchards consisting of a large number of old trees with a high percentage of less preferred varieties.

In order to derive feasible adjustment strategies a ten year intertemporal linear programming model was constructed. This model was based on an orchard, representative of those experiencing adjustment problems. The model allowed for the adoption of new enterprises in addition to a variety of replanting, reworking, interplanting and tree removal activities.

The results obtained from experimentation with the model included optimal patterns of tree replacement and intertemporal cash flows. These results indicated that the financial position of Moutere Hill pip fruit producers would continue to deteriorate over the next decade with considerable borrowing being required to finance maintenance and/or developmental expenditure. Positive cash flows could be expected towards the end of the 1980's after which the benefits of orchard restructuring would continue to accrue.

While it was shown that considerable potential exists for increased incomes to be generated from Moutere Hill orchards it was recognized that the extent of the delay might necessitate a withdrawal from the industry of those growers who could not, or did not, wish to persevere with fruit growing. Accordingly, two new policies were suggested as possible measures which could supplement existing rural policy in order to alleviate problems of poverty on the Moutere Hills.

SECTION A

CHAPTER 1

STUDY BACKGROUND AND OBJECTIVES

1.1 Introduction

Pip fruit production rates, in terms of export earnings and the number of growers engaged in the industry, as New Zealand's largest horticultural industry. In 1975/76 the New Zealand Pip Fruit Industry produced 176 822 tonnes of apples and pears of which 71 600 tonnes were exported earning \$19.2 million (f.o.b.) in export receipts. Although this represents only a small percentage of New Zealand's total export earnings for 1975/76, it does represent a significant contribution to the welfare of the nation.

While pip fruit may be grown throughout New Zealand, 49.7 percent^{1/} of the total area planted to apples and pears is centred about Hastings and Nelson. For many years the Nelson Province has been the major region involved in the production of pip fruit, particularly for the export market. The production and export value of the Nelson apple crop, which accounts for 95 percent of the region's pip fruit production, is summarised in table 1.1.

In 1975/76, 205 orchardists in the Nelson Province produced more than 56 000 tonnes of apples and 2700 tonnes of pears. This represented 32.7 percent of the total New Zealand pip fruit crop and 23 percent of the value of that province's agricultural production.^{2/} The Nelson pip fruit industry may therefore be viewed as one of both national and regional importance.

^{1/} Report on the Official Survey, New Zealand Fruit Growing Industry 1973.

^{2/} M.A.F. Estimate of the Value of Production in Waimea and Golden Bay Counties, March 1975.

Table 1.1 Nelson Apple Exports (\$ million f.o.b.)

Year	Production		Exports		Value	
	N.Z. total ^(b) ('000 tonnes)	Nelson ^(b) (%)	N.Z. total ^(a) ('000 tonnes)	Nelson ^(b) (%)	N.Z. ^(a) (\$'m) f.o.b.	Nelson ^(c) (\$'m) f.o.b.
1969	106.9	47.6	54.6	45.6	8.9	4.06
1970	133.7	40.5	52.1	57.0	8.6	4.90
1971	120.7	45.0	58.1	50.0	10.4	5.20
1972	149.4	38.4	66.8	52.5	12.9	6.77
1973	143.1	37.4	66.3	47.9	12.8	6.13
1974	152.1	39.8	79.6	43.7	18.1	7.91
1975	159.4	38.0	71.6	49.5	19.2	9.50

Source: (a) 1969/70 - 1975/76 N.Z. Department of Statistics.

(b) M.A.F. Horticultural Statistics.

(c) Computed from the average N.Z. f.o.b. earnings/tonne.

In recent years, however, there has been a decline in the level of income of Nelson pip fruit producers. The following table compares the net income of pip fruit producers in Hawkes Bay with the three regions involved in pip fruit production in the Nelson Province for the years 1972/73 to 1974/75:

Table 1.2 Pip Fruit Growers Net Income^{a)} 1972/73 to 1974/75 (\$)

Year	Hawkes Bay	Nelson	Mapua	Motueka	New Zealand
1972/73	8 411	4787	5295	14 841	7536
1973/74	11 598	4383	4196	11 559	8292
1974/75	13 283	3153	3919	13 974	9172

a) Net Income = gross farm and off farm receipts less cash costs and depreciation.

Source: Rae, A.N. et al. [56]

In addition, extensive plantings of semi-intensive orchards and increased productivity in Hawkes Bay since 1965 have slowly eroded the prominent position the Nelson Province once occupied. As a result the quantity of pip fruit submitted to the Apple and Pear Board from the Nelson Province has fallen during the period 1970-76, from 48 percent to 44 percent of the Board's total receipts. Over the same period, the contribution from Hawkes Bay has increased from 30 to 41 percent.^{3/}

The deteriorating position of the Nelson Pip Fruit Industry is therefore a twofold problem. First, it is a problem of national importance as 50 percent of the nation's export income from pip fruit is derived from this province. Secondly, it is a problem of regional significance as the emergence of rural poverty in a sector of the agricultural community is likely to have a significant effect on other sectors in Nelson Province.

^{3/} The New Zealand Apple and Pear Marketing Board, 28th Annual Report 1976.

1.2 The Problem in Perspective

In recent years many changes have occurred in the pip fruit industry. There have been substantial changes in the technology used on orchards, bulk handling, better pest control and improved management practices. There have also been significant adjustments in the product mix of apple and pear varieties in the face of changing relative profitabilities. However, a significant number of pip fruit growers in Nelson have, for a variety of reasons, not responded to or have been unable to respond to, these changes. As the prosperity of any industry is dependent upon its ability to adjust to changes in the demand for its product (e.g. the product mix) or changes in the cost structure (e.g. the scale of operation), a failure to do so may mean that the resources engaged in the industry will fail to achieve satisfactory economic returns. It will be shown in this study that some sectors of the Nelson Pip Fruit Industry currently exhibit signs of failure to adjust to changing economic conditions.

The inability to adjust can show up both in the industry's income position (table 1.1) and in its financial structure (see table 1.2) - the importance of each reflects the intensity with which individual growers have been affected. Table 1.3 shows the change in the level of indebtedness of pip fruit growers in Hawkes Bay, Nelson and New Zealand (total) between the years 1972/73 and 1974/75.

Table 1.3 Percentage Changes in Grower's Indebtedness:^{a)} Base 1972/73

Year	Hawkes Bay	Nelson	Mapua	Motueka	New Zealand
1972/73 to 1973/74	+11	+32	+55	+13	+22
1973/74 to 1974/75	+22	+78	+56	+22	+31

a) Indebtedness = the combination of short and long term debt.

Source: Rae, A.N. et al. [56].

Since the income earned on the farm enterprise determines the debt repayment capacity, declining incomes increase the burden of any given debt repayment. Moreover, when profitability is declining and debts are

significant, any short term adverse factors, such as hail or drought, are more difficult to cope with. Where the safety margin between incomes and debt servicing is small and declining productivity significant, extreme financial difficulty may result. This is the situation at present for many producers of pip fruit on the Moutere Hills near Nelson.

In response to the deteriorating financial position, representatives of the industry presented a number of submissions to the New Zealand Government during 1974 and 1975 requesting financial assistance. As a result of these submissions the Government outlined the measures already available to growers but declined to introduce additional assistance. The measures outlined were:

- a two year interest-free seasonal finance loan of \$5000
- fertiliser subsidies and cartage rebates
- a pesticide rebate of 6 cents a bushel on fancy grade fruit
- overdraft and term loan facilities for seasonal finance, re-financing, and development expenditure through the Rural Bank.

Debt and income problems of the magnitude currently being experienced by Nelson growers are a sign of a longer term economic weakness in parts of the industry's structure. Any assistance therefore, to be effective and to lessen the likelihood of similar financial problems arising to the same extent in the future, must be associated with measures designed to facilitate structural change in the industry.

This study is directed towards an examination of the nature of the problem confronting the Nelson Pip Fruit Industry at the present time. It looks at ways in which the industry can adjust to changing economic conditions in order to facilitate an improvement in the welfare of growers.

1.3 The Approach Adopted

The aim of the study is to provide a set of recommendations which will materially improve the welfare of the low income sector of the Nelson pip fruit industry. The study consists of three sections. In Section A the current status of Nelson pip fruit growers is examined in order to arrive at a definition of the nature of the problem which they face.

In Section B a model of orchard production is constructed to allow adjustment strategies to be identified. In the final section the conclusions drawn from experimentation with the model are used as a basis upon which policy recommendations are made.

A variety of factors are likely to have an influence on, and be in part responsible for, the current status of the pip fruit grower. These factors are discussed in Chapter 2. This discussion also acts as a base upon which to consider the Nelson Pip Fruit Industry in more detail. Chapter 3 presents a detailed examination of the recent financial position of Nelson pip fruit producers. A further objective here is to isolate orchard practices likely to be associated with high and low income producers. The various factors likely to contribute towards the current financial position of the pip fruit producer are then discussed. Following this discussion, a number of previous studies are reviewed in Chapter 4 in order to assist in the selection of a suitable methodology with which to analyse the problems facing low income growers.

Section B deals with a description of the methods and results of a model of orchard adjustment. This model is based upon an orchard representative of those experiencing adjustment problems. The purpose of this model is to derive optimal, feasible, adjustment strategies. The model is described in Chapter 5, and the analysis and the results obtained from experimentation are presented in Chapters 6 & 7. In the final section the various measures currently available to assist pip fruit producers are examined in order to determine whether the conclusions derived from the empirical work could be implemented within the framework of existing rural policy. As much of New Zealand's agricultural policy is directed towards providing direct financial assistance and stabilization of farm incomes several new policy measures designed specifically for alleviating rural poverty in Nelson are discussed. The implications of these policy recommendations on the economy of the Nelson Province are then outlined in the concluding section of this study.
