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THE IMPACT ON FARMERS OF CHANGES IN RURAL SERVICING INFRASTRUCTURE

A Thesis presented in
Partial fulfilment of the Requirements
for the
Degree of Master of Agricultural Economics
at Massey University

Murray George Rabel

1991

TABLE OF CONTENTS

			Page
LIST OF TABLES			i
LIST OF FIGURES			iii
ACKNOWLEDGEMENTS			iv
ABSTRACT			v
CHAPTER	1	INTRODUCTION	1
	1.1	Objectives	1
	1.2	Outline of the Thesis	4
CHAPTER	2	REGULATORY REFORM IN RURAL SERVICES	6
	2.1	Introduction	6
	2.2	The Rationale for Government Involvement in the Provision of Rural Services	6
	2.3	New Zealand Government Policy on Rural Services	8
	2.4	Changes in Rural Services	9
	2.5	Previous Studies on Changes in Rural Services and their Related Impacts	29
CHAPTER	3	THE VALUE OF UNPRICED GOODS AND SERVICES	35
	3.1	Introduction	35
	3.2	Market Failure and the need for Non-Market Evaluation	35
	3.3	Selection of the contingent Valuation Method for the Study	39
	3.3.1	The Development of Non-Market Valuation Techniques	39
	3.3.2	Strengths and Weaknesses	41
	3.3.3	The Accuracy of Contingent Valuation	47
	3.3.4	Contingent Valuation Application ro Rural Services	49
	3.4	Measuring Demand for Rural Services - Hedonic Pricing Method	49

CHAPTER	4	METHODOLOGY	56
	4.1	Introduction	56
	4.2	Rural Services Survey	57
	4.2.1	The Rural Services Questionnaire	60
	4.2.2	Non-Government Services Survey	61
	4.2.3	The Mangamahu Survey	63
	4.2.4	Personal Interviews	63
	4.3	Survey Implementation	63
	4.3.1	Response Rate to the Non-Government Services Survey	64
	4.3.2	Response Rate to the Hill Country Farmers Survey	66
	4.4	Techniques Used to Place a Monetary Value on Changes in Rural Services	66
CHAPTER	5	HOW NON-GOVERNMENT SERVICES RESPONDED	68
	5.1	Introduction	68
	5.2	Changes in Non-Government Rural Services and Employment	68
	5.3	Impact on Raetihi and Ohakune	74
	5.4	The Rural Services Survey and Comparable Studies	78
	5.5	The Rural Services Survey, Results and Discussion	80
	5.6	Summary	87
CHAPTER	6	RE-SURVEYING THE MANGAMAHU VALLEY AND THE APPLICATION OF CONTINGENT VALUATION	89
	6.1	Introduction	89
	6.2	The Results of the Survey	89
	6.2.1	Farm Numbers and Farm Characteristics	89
	6.2.2	Land Use Changes	94
	6.2.3	Rural Services	95
	6.2.4	Availability of Rural Services	100
	6.3	Summary of Results	102
	6.4	Contingent Valuation Survey Result	103
	6.4.1	Empirical Results	103
	6.4.2	Comments	104
	6.4.3	Conclusion	105

CHAPTER	7	RESULTS OF THE SURVEY OF HILL COUNTRY FARMERS	107
	7.1	Introduction	107
	7.2	General Characteristics of Farms Surveyed	107
	7.2.1	Land Use	109
	7.2.2	Property Value	111
	7.2.3	Farm Population Changes	113
	7.3	Education	114
	7.4	Transport and Fuel	117
	7.5	Roading Services	119
	7.6	Catchment Services	120
	7.7	Advisory Services	123
	7.8	Communication Services	125
	7.9	Weed and Pest Control	126
	7.10	Loss of Services	127
	7.11	Changes in the on-farm cost of Rural Services	132
	7.12	Farm Expenditure	138
CHAPTER	8	DISCUSSION AND CONCLUSIONS	139
	8.1	Introduction	139
	8.2	Discussion of the Findings	139
	8.2.1	Previous Studies	139
	8.2.2	Off-Farm Impact	140
	8.2.3	On-Farm Impact	143
	8.2.4	The Attitude of the Farmers and Local Community to Changes in Rural Services	149
	8.3	Trends in the Changes in Rural Services and the Implications for Farmers and Local Community of a Continuation of these Trends	154
	8.4	Conclusion	156
	8.5	Recommendations	159

BIBLIOGRAPHY

APPENDIX

(a)	Rural Service Questionnaire
(b)	Non-Government Questionnaire
(c)	Personal Interview Questionnaire
(d)	Covering Letters
(e)	Reminder Letters
(f)	The Concepts of WTP and WTA

LIST OF TABLES

Table No.		*Page*
2.1	Central Government Expenditure on Weed and Pest Control	11
2.2	Possible Changes to Electricity Costs	15
2.3	Average Change in Monthly Telephone Costs	17
2.4	Number of Postal Facilities in New Zealand	19
2.5	School Rolls in Wanganui, King Country and Waitotara	25
2.6	Summary of Changes to Rural Services and Related Impacts	26
3.1	Alternative Reference Operating Conditions	48
3.2	Regression Results of the Housing Price Model Dependent Variable: Log of Price Sold+	52
4.1	Number of Significant Farms by County and Farm Type	58
4.2	Source of Incomplete Returns	65
4.3	Reason for Returns Incompleted	65
5.1	Changes in Rural Servicing Infrastructure in Raetihi	75
5.2	Changes in Rural Servicing Infrastructure in Ohakune	76
5.3	Businessess that Indicated They are no Longer Trading and Reasons Why	81
5.4	The Impact on the Profits of Rural Services Due to Economic Liberalisation	82
5.5	Important Strategies Adopted in Adjusting to Economic Liberalisation	84
5.6	Agricultural Services Gross Profits	86
5.7	Sales Attributable to Farmers	86
6.1	Age of Farmers Surveyed	91
6.2	Future Owner of Farm When Present Owner Retires	92
6.3	Number of Farm Workers Residing on the Property	93
6.4	Changes in Land Use 1978 - 1990	94
6.5	Reasons for Changed Investment in Erosion Control	96
6.6	Number of Trees Planted from 1985 to 1990	96
6.7	Farmers' Current Use of Advisory Services	98
6.8	Estimated Willingness to Pay for an Extra Ambulance Officer	104
6.9	Correlation Analysis of How Location Influences WTP	105
7.1	Summary of General Farm Characteristics	108
7.2	Average Number of Stock Units Wintered on Farms Surveyed	110
7.3	Changes in Property Value	112
7.4	Changes in Farm Population	113
7.5	CHaracteristics of Rural Schooling	114
7.6	Reasons Why Children Board	115
7.7	"Changes" In The Quality of Schooling Over the Last Five Years	116
7.8	Availability of Farm Transport Operators	117
7.9	Farm Transport Operators Current Performance as Compared with Five Years Ago	118

7.10	Reasons for Reduced/Changed On-farm Works Programme	120
7.11	Farmers Indicating They Had Changed Their On-farm Works Programme	120
7.12	Applications for Catchment Work	121
7.13	Changes in the Importance of sources of Advice over the Last Five Years	124
7.14	On-farm Impact of Changes Since the Introduction of Telecom in 1987	125
7.15	Change in the Location of Services and the Opportunity Cost	128
7.16	Location of Farmers Servicing Requirements Which Has Remained Unchanged Over the Period 1985 to 1990	131
7.17	Comparison of On-Farm Rural Service Costs	147
7.18	Summary of Net Changes in Farm Expenditure from 1984 to 1989	135
7.19	Changes in the Cost of Government Services from 1984 to 1989	136
7.20	Farm Income and Expenditure Per Farm ($) For N.I. Hard Hill Country Farmers	137
7.21	Items Purchased Over the Last Five Years	138
8.1	Services Lost from Raetihi and Ohakune Since 1987	141
8.2	Farm Expenditure Changes per Farm from 1984/85 to 1988/89	146
8.3	Changes in the Location of Services	148

LIST OF FIGURES

Figure No.		*Page*
2.1	Possible Zones for Electricity Supply Charges	14
3.1	Demand Curve for a Public Good	38
3.2	Aggregate Bid Schedule	41
3.3	Marginal Cost of Rural Service	50
4.1	Map of the Study Area	59
5.1	Total Agricultural Services Available	70
5.2	Total Persons Employed By Agricultural Services	71
5.3	Changes in Firm Numbers and Persons Employed for Different Categories of Services	72
6.1	Map of the Mangamahu Valley	90
7.1	Application For Catchment Work	122
8.1	The New Environment for the Provision of Rural Services	158

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ABSTRACT

This study provides an overview of changes in rural servicing infrastructure over the period 1985 to 1990. The changes in infrastructure stem from 1984, when the then government changed economic policy to a dominant goal of economic efficiency. With this goal in mind government intervention in the provision and pricing of rural services has been rationalised with the transfer of many responsibilities to the private sector and the introduction of user-pays as a system of funding service provision. Concurrent with the changes in conduct and funding and in line with the goal of efficiency, government has endeavoured to minimise transaction costs, hence improving the environment in which rural services are traded.

This thesis identifies trends in the changes in rural services and studies the implications for farmers and local community of a continuation of these trends. The direct and indirect impacts of changes in rural services is assessed in both qualitative and quantitative terms where possible, at both the farmer and the community level. To this end measurement of qualitative impacts was attempted using the non-market valuation technique, contingent valuation. In addition to assessment of on-farm impacts, off-farm impacts are investigated using business directory data and by analysing changes in non-government services using a structure/conduct/performance framework.

To obtain the information required, three survey's were undertaken. One of a large group of hill country farmers in the Wanganui area, one of non-government services and a personal survey of farmers in the Mangamahu Valley. Business directory data which provides information on the number of servicing units and persons engaged in those services is used to assess the impact of changes in rural servicing infrastructure and government policy on the two communities of Raetihi and Ohakune.

The thesis concludes by showing that demand for rural services has declined, as has the supply of services. This decline was occurring prior to 1984 and has been accelerated by changes in rural service infrastructure since 1984. The decline in the demand for services and rationalisations has meant the loss of some services, but all are still available even if it means greater cost and travel. Most farmers have accepted changes as a gain in efficiency.

CHAPTER 1

INTRODUCTION

1.1 Objectives

Government assistance to the New Zealand agricultural sector has undergone major reform over the years 1984 to 1990. Historically government was involved in agriculture through assistance programmes designed to: promote the development of marginal lands, boost total agricultural output and hence increase foreign exchange earnings, to compensate agriculture for the adverse cost effects of protection offered to labour, manufacturing and financial industries, and to arrest deteriorating terms of trade. The result of these policies has been a steady deterioration of New Zealand's relative standard of living.

In 1984 the Labour Government accelerated programmes of economic liberalisation started in the mid 1970's. The objective of these programmes was to maximize economic growth through enhanced economic efficiency, thus improving New Zealand's standard of living. These policies have seen government assistance to agriculture removed or at least drastically reduced. Most of this assistance was in the form of direct transfers such as price, input and tax subsidies. However, more assistance has been provided in indirect forms through the subsidised pricing and provision of services. Although much has been documented on changes in direct price support to agriculture, the area of governments involvement in the indirect provision and pricing of rural services has not received much attention in literature.

One reason this area of research is neglected is because the impact of changes in rural services is difficult to quantify. Given that there is this difficulty in quantifing the impacts does not mean its force is less powerful in terms of its direct and indirect impacts on the individual farmer and at the local community level. Being a student of agricultural economics, this thesis takes a slightly

different approach to the approach taken by rural sociologists and geographers in assessing changes. To this end a major part of this thesis is devoted to trying to quantify the impacts of change in rural services as well as obtaining the traditional qualitative data.

Research is needed to assess the distributional impacts of this major change in government policy. By assessing changes in rural services, market failure due to the impacts and consequences of policy changes can be identified. This thesis provides a broad picture of changes in rural servicing infrastructure over the period 1985 to 1990. Changes in government involvement in the supply of rural services and the rationale behind the changes are documented. The impact of changes in public funding, and hence the demand for rural services is assessed at the farm and community levels. Finally investigated are the impacts of changes in government's role in setting the legal and regulatory frameworks and economic climate in which rural services are provided.

The overall objective of this thesis is to identify the impact on farmers and local communities of changes in rural servicing infrastructure and government policy. Specific objectives are:

1. Review the literature as to any previous similar studies undertaken.

2. Identify and determine the impact in dollar terms (where possible), at both the individual farmer and local community level, of the effects of the changes in the rural economy over the period 1985 to 1990, as it pertains to rural services (e.g. government charges, transport services, changes in services provided by Government and their cost, etc.), government agencies (e.g. Post Office, Telecom, Electricorp, etc.), and government departments (e.g. Ministry of Agriculture and Fisheries).

3. Determine the attitude of the farmers and local community to these impacts and changes.

4. Identify trends in the changes in these rural services and study implications for farmers and local community of a continuation of these trends.

5. Recommend to the Policy Unit any policy initiatives that could be considered in the national interest.

To achieve these objectives, hill country farmers in the Wanganui, Waitotara and Waimarino areas were surveyed in October 1990. The postal questionnaire was designed to assess the on-farm impact of changes in rural services, lost services and farmers' opinions on change. In addition to the farmer survey a separate survey dealt with non-government businesses actually involved in the provision of rural services. This data was complemented by business directory data obtained from the Department of Statistics, which provided information on business units and persons engaged in rural services from 1987 to 1990 in the area studied. The business data was modified to assess the impact of changes in rural servicing infrastructure and government policy on the two communities of Raetihi and Ohakune.

Besides identifying the changes that have occurred in rural servicing infrastructure, it was also considered important to measure, where possible, the impacts of these changes. In some situations this can be done by calculating the extra cost involved in obtaining the service. However in many cases the loss (or reductions) can only be expressed qualitatively in terms of reduction in choice, increased risk, loss of peace of mind etc. Hence qualitative changes can have important consequences for the welfare of those affected. To this end measurement of some of these qualitative impacts was attempted, using non-market valuation techniques, the contingent valuation approach and the hedonic pricing approach. The first approach was built into the personal interviews in the form of willingness to pay questions for services lost. The hypothesis underlying the second approach is that property values are affected by rural services.

In assessing the farm impact of changes in rural services no distinction is made between the family unit and the farm as a business. Recent investigations by Le Heron and Roche (pers. comm Le Heron, 1990) indicate the impact is different at the two levels. The social consequences of economic efficency can cause conflict between the family and business sides of farming.

The impact of government reform in the provision of services was limited to reviewing education, weed and pest control, catchment services, transport, communications, road services, fuel and advisory services. The rationale behind the omission of irrigation is because the area studied did not have a government irrigation scheme. Reform in meat inspection was omitted because all farmers surveyed were unaware of the exact cost of user-pays for meat inspection, as it was deducted from the cheque for the meat slaughtered at the freezing works. While changes in financial services have had a major effect on farmers, much has already been documented on their impact and farmers' reactions to higher interest rates. Changes in research and development have a slow flow-on effect to farmers, hence the on-farm impact would not have been felt at the time of this study.

1.2 Outline of the Thesis

Chapter Two describes government involvement in the provision of rural services and identifies changes that have occurred over the period 1985 to 1990. The chapter concludes with a literature review of previous New Zealand studies on changes in rural services.

Chapter Three introduces the concept of non-market evaluation. The Contingent Valuation Method (CVM) is then described in detail with various sections covering the important properties and elements of the technique. A discussion on why the hedonic's application proved to be infeasible concludes the chapter.

Chapter Four presents the methodology used to quantify the loss of rural services, and to identify the impact on farmers and local community of changes in rural servicing infrastructure and government policy.

Chapter Five examines the impact of changes in rural servicing infrastructure at the community and business levels. Business directory data provides information on changes in the number of activity units and persons employed by rural services. The same data is then used to show the impact on the two rural communities of Raetihi and Ohakune. The results of a survey of non-government services are then presented to conclude the evaluation of the impact at community and business levels.

Chapter Six expands on the previous chapter in presenting the results of re-surveying the Mangamahu Valley and the application of Contingent Valuation. By comparing the results of this survey to a similar survey conducted in the valley in 1978 some interesting trends are identified.

Chapter Seven presents the result of the postal survey of hill country farmers. The attitudes of the farmers to changes in rural services is identified and where possible the data has been quantified to determine the dollar impact at the farm level.

Chapter Eight concludes the study with a discussion of the trends in changes in rural services and the implications for farmers and local community of a continuation of these trends. A discussion of the objectives set and how they have been met is presented. The chapter concludes by identifying areas in need of future research and recommending policy initiatives that could be considered in the national interest.

CHAPTER 2

REGULATORY REFORM IN RURAL SERVICES

2.1 Introduction

Over the last decade government's role in the rural area has experienced radical reform. The situation has changed from one where government was involved in all areas of rural life through production incentives, programmes to promote the development of marginal land, regulations, the subsidised pricing and provision of rural services etc., to one where most of that involvement has been removed. This chapter discusses the reasons for this change and the impact of the changes on the provision and pricing of rural services.

In the first part of this chapter the rationale for government involvement in the provision and pricing of rural services is reviewed. This is followed by a discussion of the current government's policy regarding rural services and identified are some of the changes in government services supplied over time (particularly the years 1985-1990).

This chapter concludes with a brief overview of mainly New Zealand studies that have analysed the changes that have occurred in rural services, and the impacts these changes have had (and are still having) on farmers and rural communities.

2.2 The Rationale for Government Involvement in the Provision of Rural Services.

The maintenance and enhancement of the rural infrastructure was seen as a prerequisite to boosting agricultural output and hence to be able to increase pastoral exports and increase New Zealand's standard of living, as well as the traditional equity argument.

Assistance came in many forms. For the purposes of this study the assistance of interest was where government was directly involved in the supply of services to the rural area, where government provided grants or subsidies, and where policies of cross subsidisation by government owned supply authorities were present.

As a consequence of this assistance, a transfer of resources occurred into the rural areas and more remote regions. The cost of the transfer of resources to rural areas is not known. Evidence from Kolsen (1983) and Moore (1989) suggests that cross-subsidies constitute a significant resource transfer.

The rationale for government intervention historically has been based on compensatory and market failure arguments. Compensatory, where government intervention was needed to compensate for import/industry protection policies and market failure where the competitive market failed to provide goods and services that were in the national interest. Intervention pre 1984 was predominantly in the funding (demand) and conduct (supply) of rural services. With the 1984 change of policy (see Section 2.4) to a dominant goal of economic efficiency, the conduct by government has been reduced with the transfer of responsibilities to the private sector. Where beneficiaries have been identified, funding of services has been obtained through user-pays and appropriate taxes/levies. These policy changes have seen a move of previously supplied government services to private firms or to SOE's (State Owned Enterprises). The traditional preserves of public enterprise, in transport, communication, energy, quality control, research and development, education and finance have gone or are being phased out. The Government has required the remaining state enterprises to be more efficient by requiring the enterprises to make profits in an unprotected and unsubsidised environment. With the changes have also come a change in terms of pricing (or costing) which is more closely aligned with marginal cost pricing. This in turn has reversed the above mentioned resource transfers.

2.3 New Zealand Government Policy on Rural Services.

Current policy on rural services is outlined by the following quote from "National's Policy on Agriculture" (In National's election manifesto).

Services for Rural Communities

All New Zealanders, whether they live in an urban or rural environment, need to have adequate access to basic services such as education, health facilities, electricity, communication, banking, police and roading.

Education

We recognise that access to education is a vital concern to people living in rural areas. National will:

- Ensure that school bus services are available to rural schools.
- Give school boards the opportunity to operate school bus services.
- Give Boards of Trustees more autonomy and investigate vesting school houses in the Board of Trustees to help attract teachers.
- Continue boarding bursaries.
- Reinstate the governments contribution to teachers' salaries for independent schools.

Health Services

Nationals Health Policy, which will allow public hospitals to compete for private insurance health care, will work to the advantage of smaller hospitals with lower operating costs.

Electrical Power

A National government will ensure that:

- Rural reticulation scheme continues.
- Consumers, both rural and urban, continue to receive their power supply at a reasonable price.

Communications

National recognises that the availability of any access to mail and telephone services at reasonable price is vital." (National's Policy on Agriculture, 1990).

Current policy can be compared to 1984-1990 policies changes which is summarised below. On the face of it current policy indicates no major change in 1984-1990 policy changes.

2.4 Changes in Rural Services.

This discussion identifies changes in government policy in the provision of rural services to farms from 1984. The discussion and identification of changes in rural services is limited to the following areas: Weed and Pest Control, Catchment Boards, Electricity, Communications, Trasportation, Fuel, Roading Services, Advisory Services and Education.

WEED AND PEST CONTROL

"Reform in local government which took effect from November 1989 has required local government to concentrate on fulfilling the needs and desires of communities, to identify and ensure the provision of a range of services deemed necessary, and for a mechanism to deliver on behalf of central government, such national public goods most efficiently provided by local government." (Reynolds, 1990)

Resulting from the reform was the transfer to local government of more responsibility for water and soil issues, water rights and routine local weed and pest management services.

The government abolished both the Noxious Plants Council and the Agricultural Pests Destruction Council and incorporated the routine local component of this work within local government responsibilities. The power to control both weeds and pests of local significance was placed at a regional level to allow such policies to be included in the regional planning process and with the necessary linkage to water and soil management issues to ensure consistency.

Weed and Pest Control

The control of weeds and pests of national importance requires import controls, emergency response procedures and the 'grey' areas, of what weeds warrant control government funding and/or involvement. Farmers were concerned about the effectiveness of this linkage structure, and rural services committees have been established to address this and other issues relating to the rural sector at regional government level.

Concurrent with the change in responsibility is a change in funding. Pre policy reform government regarded assistance to weed and pest control as a means of achieving the goal of increased agricultural output. The assistance was in the form of subsidies for inputs, chemicals, and direct grants to local noxious plant

authorities to carry out surveillance and control work. Following a review of weed and pest authorities 1984 the government has decided to phase out its contribution to weed and pest control. Central Government intervention is now deemed justifiable only where a clear indication of national benefits can be shown.

Central Government recognises a responsibility for land protection and has funded extremely rabbit prone areas. Other money is provided for pest control via the disease control component of the MAF vote. This relates mainly to opossum control to control TB.

The result of policy changes is a reduction in the funding of weed and pest control by Central Government. (See table 2.1)

Table 2.1 Central government Expenditure on Weed and Pest Control. ('000s)

Year Ending	Noxious Plants	Pest Control
1985	9,500	12,200
1986	3,800	11,600
1987	4,300	10,600
1988	3,100	9,000
1989[1]	2,900	8,300

[1]Estimate
(Source: Estimates of the Expenditure, 1988).

Catchment Boards

In 1989 soil and water management responsibility was transferred from catchment authorities to regional government. This follows the government's announcement in July 1987 that it would transfer greater decision-making power

to catchment boards. This gave them increased control and responsibility towards the funding of projects and the ability to rate for catchment control and to recover costs from beneficiaries of water rights. The Ministry of Works and Development and the National Water and Soil Conservation Authority were abolished in 1988. Their services and functions were transferred to individual catchment boards and the Ministry for the Environment. The rationale behind this decision was to reduce the cost to the taxpayer and increase the shared costs borne by the regional ratepayers and individual beneficiaries.

Catchment boards' responsibility for flood and drainage control, issuance and management of water rights and management of rural and urban water supplies, goes back to 1941. These services have been funded by the taxpayer, with many catchments receiving 50% or more subsidy. This funding has declined with the changes introduced since 1984. Central Government has eliminated project-specific funding and is now supplying more neutral block grants to boards to apply funds to areas of highest return. Central Government is moving away from a direct funding and provisions role, to one of maintaining an environment in which local boards can operate.

Individual boards have responded to the transfer of responsibilities and funding cuts by rationalising staff and costs; to the extent that in some cases local rates have not risen substantially in real terms (Moore, 1989). In the quest for efficiency, demand for catchment services has declined in the areas of soil conservation and local spending on river control works, although this trend is reversing. The social cost divergence from private cost may warrant Central Government funding in this area. Recent policy changes require benefits of conservation work to be considered in a broader framework than agricultural production criteria's use in the past.

ELECTRICITY

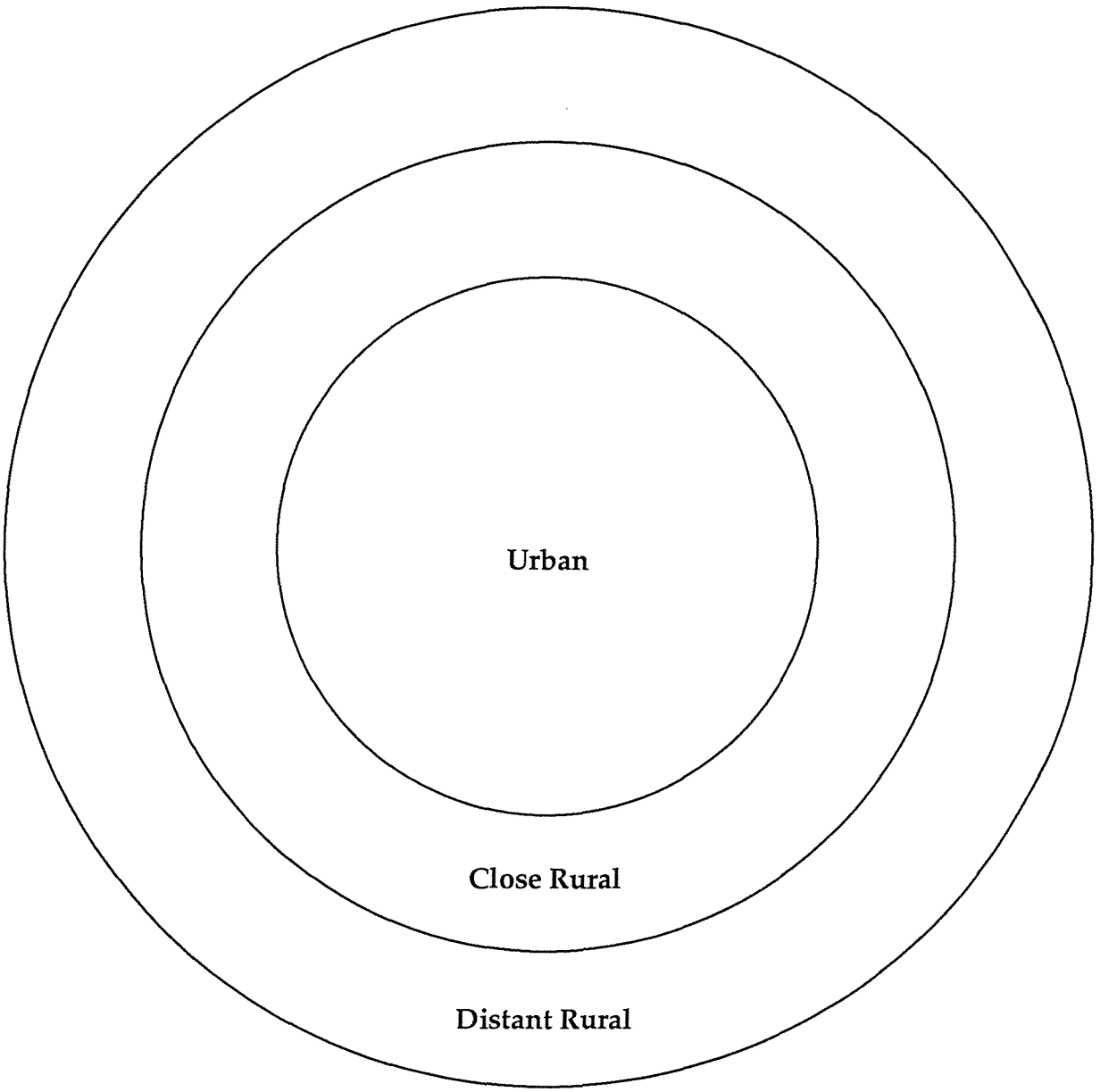
Electricity is supplied in a three tiered system. Electricorp New Zealand, a SOE is responsible for generation, which is distributed at a wholesale level by Transpower, a subsidiary of Electricorp. Supply authorities then re-distribute power to individual users.

The rationale behind the commercialisation of electricity in 1989 was to bring down the price of electricity to more closely match the costs of generation. By allowing competition, Electricorp will have to change the policy of uniform regional pricing regardless of location along the national grid or distance from power sources. Some competition is already present, e.g. a Taupo company has already been allowed to generate electricity from geothermal energy and there is already talk of farmers with the capacity to generate electricity being encouraged by Electricorp who will buy surplus quantities generated. This competition will force supply authorities to remove some or all of cross subsidies to rural and/or farming customers.

Subsidies to rural electricity users come from the costs of the supply (reticulation) network being spread among all users. The costs of maintaining electricity supply to more remote areas have been subsidised by the Rural Electricity Reticulation Council (RERC), which is funded by a levy on electricity consumption. Current indications are RERC funding will continue but come from general tax revenue rather than the present levy on electricity consumers. Maintenance of the RERC will prevent excessive cost increases to remote customers when power lines require replacement.

A likely scenario for price changes is that supply (reticulation and maintenance) charges to users will depend on the density of customers (Moore, 1990). This may translate into charging zones, with three areas - urban, close rural and distant rural (see Figure 2.1).

Figure 2.1 Possible Zones for Electricity Supply Charges.



Possible Changes: Close Rural 50 - 100% increase

Distant Rural 100 - 150% increase

Such a zoning system would mean increased supply charges as the distance from high population density increases. With the matching of supply charges to actual cost, the unit cost of electricity consumed will fall. The net effect for farms will be that farms close to urban centres with large electricity consumption will face lower electricity costs, while remote farms with low consumption may find electricity costs rise. The table below presents very tentative estimates of changes in electricity charges made by Moore (1990). These figures are based on representative farm costs in the Wairarapa, and indicate the possible cost impacts should likely price policy changes become real.

Table 2.2 Possible Changes to Electricity Costs:(1)
(Supply and Consumption Charges Per Farm)

		Change to:		Base Data (1988/89)	
		Sheep/Beef	Dairy	Sheep	Dairy
Supply Charges(2)					
	%	+200%	+150%		
	$	660	500	$328	328
Consumption Charges					
	%	-35%	-35%		
Home	$	-300	-300	$840	840
Farm	$	-100	-760	$277	2,132
Net Change					
	%	+18%	-17%		
	$	260	-560	$1,445	$3,300

(1) Based on discussions with an Electricity Supply Authority Official. Figures give an indication of changes and should not be taken as those that may actually occur.

(2) Assumes one household and one farm connection. The Dairy farm is assumed within 20 km of town, the sheep/beef more distant.

(Source: Moore, 1990)

To give a further indication of the possible impacts of full deregulation of the electricity network, a report by the Ministry of Energy found that if the true costs of electricity supply were equated with charges, average urban electricity bills would decline by $13 per annum while rural costs could rise by an average of $1,700 per annum. Given that RERC may be funded through general tax, equity considerations seem likely to prevail in maintaining fair and affordable access to reticulated electricity.

To summarise, it is likely more distant farms will face an increase in electricity charges. One can only speculate as to the likely increase, recent talks float figures of 50% to 200%. To compensate, some farms may benefit by being able to generate and sell electricity. If current electricity charges increase by a substantial amount we may see farmer cooperatives forming to supply their own electricity or alternative forms of on-farm power generation may be introduced.

COMMUNICATIONS

Telephone Services

As part of reform policy, telephone services provided by the New Zealand Post Office, were separated to form a SOE, Telecom. Many services provided by Telecom were open to general competition. In preparation for competition

Telecom has rationalised its pricing policies by raising rental to reflect the cost of supplying telephone services to geographic locations. Inland toll charges have been reduced, along with a reduction in the number and size of toll free exchanges. These changes removed the two major cross-subsidies, firstly a uniform rental charge and secondly, rental subsidised by tolls.

The consequences of pricing changes to rural users are mixed, i.e. rentals will rise and tolls will fall. To assess the direct impact of pricing changes Telecom and MAF surveyed farms measuring monthly telephone expenditure before and after the reforms were implemented.

Table 2.3 Average Change in Monthly Telephone Costs.

	Rental	Tolls	Total
All Farms	10.5%	- 26.6%	- 18.4%
Sheep/Beef/Mixed*			
Dairy*	10.5%	- 26.6%	- 20.4%
Dairy**	10.5%	- 26.6%	- 14.3%
Dairy[1]			
Northland	8.8%	- 29.0%	- 20.9%
Waikato[2]	10.7%	- 13.1%	0.7%
Taranaki	9.1%	- 30.3%	- 18.0%
Morrinsville[2]	15.9%	- 23.1%	- 6.6%
S/B/M[2]			
King Country	15.9%	- 24.5%	- 15.9%
Wairarapa	9.1%	- 27.1%	- 21.2%
Canterbury	8.3%	- 28.3%	- 16.9%
Southland	8.3%	- 24.5%	- 16.9%

(1) NB: Given the small sample size, the regional data can only be taken as representative.

(2) NB: A large proportion of national dairy farms are in the Waikato. Since the Hamilton area has a large toll free calling area farms in this area have not benefited as much from reduction in tolls.

* MAF sample of 38 dairy and 41 sheep/beef farms.

** Livestock Improvement survey sample of 320.

(Source: Moore 1990)

The result has been an 18.3% decrease in telephone charges per month, 20.4% for sheep/beef farms and 14.3% for dairy. This equates to a mean cost saving of around $110 to sheep/beef farms and around $90 for dairy farms per year, assuming constant usage. The survey of farmers tests this assumption, and shows consumption to be increasing, hence the saving may be even greater.

The results of the study by Moore (1990) show the changes to be positive. In addition Telecom is maintained a degree of "fairness" to rural customers by indicating that it would not raise rural telephone charges above prices charged for similar urban services.

With the formation of the SOE Telecom, now sold to the private sector, the objective of cross-subsidy designed to encourage widespread ownership of the telephone by maintaining an artificially low connection cost has been made redundant. The connection fee now is standard for all customers except, if the cost of the connection exceeded $2,000. In this situation the phone user is required to pay 30% of the cost above $2,000. The 70% remaining is paid by Telecom. Formerly, this service would have been subsidised by other phone users and/or taxpayers.

The sale of Telecom to overseas interests has had no obvious impact on price and service. It seems likely however, that the new owners expect Telecom to do well given the very high price paid for the SOE, indicating possible future marginal cost pricing and price rises.

Postal Services

Based on the Mason-Morris report, New Zealand Post Office formed a separate postal service as an independant entity on a commercial basis. In that report it was recommended that some 600 Post Offices were uneconomic as there should be an objective of cost recovery.

Government adopted the recommendations of the report, and in adopting an objective of cost recovery 433 branches were closed with an annual saving of $41 million in subsidies. The loss of rural post offices was to be supplemented with more posting boxes, community mail boxes and the extension of rural and postmen's deliveries. This has occurred so that the total number of outlets has actually increased since before the 1987 deregulation. The below table gives a breakdown of the number of postal facilities in New Zealand. (Note, law requires their to be at least 880 facilities in NZ, till 1992)

Table 2.4 Number of Postal Facilities in New Zealand.

	1986	1988	1989
Official Post Shops	-	513	338
Post Agencies	-	220	134
Post Delivery Centres	-	242	424
Stamp Retailers	-	173	537
Total Outlets	1,261	1,148	1,433

(Source: NZ Yearbook)

New Zealand Post has maintained the monopoly on letter and small parcel delivery. This monopoly has enabled New Zealand Post to subsidise the provision of rural delivery services; rural/town postal facilities and the cost of postings to and from more remote areas. It is estimated the annual subsidy to rural areas is $35-45 million paid for through the price averaging scheme. (Moore 1989).

The Government has proposed the removal of New Zealand Post's monopoly, and a deregulation of the communications industry being phased in by 1991. If approved this would allow carriers to compete for letter delivery and force marginal cost pricing. The removal of cross-subsidies would see the cost of posting from rural areas rise. The deregulated system would mean subsidies to rural delivery services of $15 million (1985) would have to be phased out and it is estimated rural postal customers would pay 40% more on delivery and postage costs. In preparation for competition NZ Post has recently increased the cost of rural delivery by 33 percent.

Cabinet has agreed to maintain the monopoly on standard letters until 1992, while allowing some increased competition. In exchange for this statutory protection NZ Post must fulfil certain performance standards.

- Maintenance of five to six deliveries per week to 99.5% of rural customers.

- Maintenance of a uniform price for standard letters.

- Letter rates can only be increased at rates lower than the prevailing rate of inflation.

- Maintenance of at least 880 official, agency and postal delivery centres.

- Lowering of the minimum charge by other carriers from $1.85 at present, to $0.80 by 1991 and a lowering of minimum weight that they can carry to 200 g (from 500 g) over the same period.

TRANSPORTATION

Through licensing and a rating system the number of suppliers, geographic distribution and pricing of transport services was determined by the Ministry of Transport. As with any licensing system the beneficiaries were licence holders who benefited from limited entry and less flexibility in the industry.

The introduction of the 1984 Transport Amendment Act saw the phasing out of pricing and supply restrictions. Deregulation meant that, "all geographical restrictions on freight transport operators were lifted, restrictions on road transport competition with New Zealand Railways were removed and entry into the industry became a matter of suitability of applicants rather than a bureaucratic assessment of demand for their services. Rate fixing became a matter to be decided solely between operators and their customers" (MOT, 1988). The impact has been a 10% decline in farm transport costs in real terms and a large number of new entrants to the freight industry, offering a much wider range of services (Arthur Young, 1988).

Possible concerns are the availability of services to more remote areas and a profit squeeze forcing possible negative implications for safety/maintenance standards.

FUEL

The petroleum wholesaling industry was deregulated in May 1988. Retailers benefited from a licensing system, which protected them from takeovers. The trade-off was a system which specified the minimum and maximum prices that could be charged at a wholesale level which protected the licence holders. In return the licence holders had to maximise their use of Marsden Point. The net result of the system was a uniform national pricing control regardless of location and actual supply costs.

After deregulation the extent of cross-subsidised pricing was revealed by price movements. Urban retail prices dropped by about 5%, while more isolated regions experienced petrol and diesel price increases of between 1.5-10% (Moore, 1989). Some farmers have reacted by changing their purchasing policy.

ROADING SERVICES

Since 1977 New Zealand has had a user pays system for funding road maintenance expenditure. The National Roads Board (NRB) funded road maintenance and construction with its income from licence fees and exercise taxes on fuel sales. The Board subsidises roading expenditure undertaken by local authorities. The assistance to local/rural roads is based on both use estimated rates and equity consideration.

Recently NRB and Urban Transit Council merged to form Transit New Zealand. The impact has been a large reduction in construction expenditure. Local authorities are being forced to contribute more to road expenditure. "Uneconomic roading" criteria is being added by the NRB that may restrict funding of low use, back country roads. If an area has a maintenance, cost/average daily use ratio that exceeds $5000 the road may not qualify for NRB funding. The impact is already evident with some damage to roads caused by flooding remaining unrepaired, while the users and local authorities debate as to who pays.

Transit NZ has de-classified many highways so that the funding of these highways is no longer 100% funded by Transit NZ. The new classification means local bodies have to contribute 50% of the funding. To meet the cost of road maintenance, repairs and improvements some councils are trying to cut costs by returning dead and/remote roads to the users, rather than by increasing rates.

ADVISORY SERVICES (RESEARCH AND DEVELOPMENT)

Government policies have changed and are changing to provide an environment more beneficial to Research & Development and to lower transaction costs for market participants. The legal and regulatory framework has been strengthened in the area of patents and property rights to enable the funder to more readily capture the benefits of the research (Eveleens et al 1989). Policy moves have attempted to reduce transaction costs, and increased the power for industry groups to impose levies, to expand the funding costs, and to overcome the free-rider problem.

The application of user-pays within MAF has seen revenue rise from $2.3 million in 1985/86 to an estimated $14.8 million for 1988/89. The Science and Technology Advisory Committee (STAC) suggests that the increase in private sector expenditure on Research & Development has not offset the reduction in public expenditure.

As the user-pays base widens there is already apparent an increase in researchers accountability and links with client, leading to improvements in efficiency (Eveleens 1989). It is recognised that there will probably be areas where practical enforcements and collection costs are too high to justify user pays and that government will have a continuing role as supplier of Research & Development funds.

EDUCATION

Within government's role as a provider of agricultural services fall the provision of rural schooling and equal access to education.

Educational policy reform has seen the introduction of tomorrows schools in October 1989. It established a new structure for primary and secondary education,

in which schools gain control over their educational resources seeking to give effect to the perceived educational and learning needs of their communities.

Tomorrow's Schools summarises the new structure in this way:

"The basis unit of education administration will be the individual school ... Each [School] will be under the overall policy control of the institution and the implementation of the policy will be the responsibility of the principal. The principal will also be the professional leader at the institution and will be responsible to the board." [pg 3]

In addition to the budget responsibilities, the school board must involve the community in the decision making process, obtain advisory services without reducing the availability of other resources, employ teaching and other staff, and solve distance and transport problems, ie provide the school bus services and write the school's charter.

The requirement of Tomorrow's Schools has placed a great strain on rural communities which lack the resources available to their urban counterparts (Skene, 1990).

To show some changes in education over the period 1985 to 1989 the Ministry of Education provided information on changes in school rolls for schools in the electorates of Wanganui, Waitotara and King Country (this being the nearest breakdown they had to Waimarino). Analysis of the data showed that a total of four schools have closed and there has been significant decline in primary school rolls over the five year period. The following table highlights some changes in school rolls.

Table 2.5 School Rolls in Wanganui, King Country and Waitotara

	Year		Change in Roll
	1985	1989	
Primary Schools			
Wanganui	5 396	5 146	- 250
King Country	6 397	5 631	- 766
Waitotara	5 489	4 864	- 625
Total	17 282	15 641	- 1 641
Secondary Schools			
Wanganui	3 480	3 448	- 32
King Country	1 987	1 963	- 24
Waitotara	2 150	2 110	- 40
Total	7 617	7 521	- 96

(Source: Ministry of Education)

The School Transport Division of the Ministry of Education indicated that no bus runs have closed in the Wanganui, Waimarino, or Waitotara areas and there are no present difficulties in these runs.

The following is a summary of changes to Rural Services and related possible farm impacts from 1985 to 1990.

Table 2.6 Summary of Changes To Rural Services and Related Impacts.

Service	Change	Possible Farm Level Impact
Weed and Pest Management	Reduction in subsidies for control of noxious plants and agricultural pests	Higher control costs/ reduced control activity Higher regional rates
Irrigation	Transfer of schemes to private ownership Elimination of development assistance	$2,000 average cost per irrigated property
Catchment Boards	Elimination of project specific subsidies, Funding now through block grants	Rise in conservation costs Higher water charges/ regional rates Moves towards landowner funding of projects

Service	Change	Possible Farm Level Impact
Transportation	Commercial licensing system and rate schedules phased out commencing 1985	Lower cartage costs of between $100-$300 per year per farm (MWBES) Reduced availability of transport operators
Road Services	Elimination of Central Government funding	Higher licence fees
	Possible reduction in NRB subsidy rates to local road boards	Higher regional rates Return of bridges Return of dead end/remote road additional cost $2000-$3000 per year per farm affected
	Marginal road maintenance criteria	Maintenance costs born directly by users
	Re-classification of highways	

Service	Change	Possible Farm Level Impact
Fuels	Elimination of price controls on diesel (1987) super petrol (1988)	Higher fuel prices for remote areas
		Changes in farm purchasing policy
Electricity	Change from uniform pricing along national grid	Fall in consumption, rise in maintenance and reticulation costs, net effect per farm a rise of 50 to 150% per year
	Policy directives to reduce cross-subsidies by local authorities	
	Private competition allowed	Removal of average pricing
Phone Services	Elimination/reduction of cross-subsidies between tolls and rental	Average 18% reduction in telephone cost per hill country farm per year

Service	Change	Possible Farm Level Impact
Postal Services	Loss of Post Offices	Increased rural delivery service to compensate for lost PO's
	Net increase in postal facilities	
	Possible end of subsidy to rural delivery services and letter rates (1992)	Rise in rural delivery changes
Education	Tomorrow's schools	(Amalgamation of schools)
	Bus service no longer provided by Department of Education	(Loss of bus services)

2.5 Previous Studies on Changes in Rural Services and their Related Impacts.

This section identifies and briefly summarises, mainly New Zealand, studies that investigate changes in rural services.

General

In the late seventies a number of reports appeared that addressed the problem of declining rural services, these include:

- Danna Glendining's "Why did they leave Eketahuna?" which charts the loss of population and services in Eketahuna from 1960-1977 (1978).

- Paul Kaplan's "Social Aspects of Productivity: Hill country sheep-beef farms in the Mangamahu Valley" which examines the impact of declining terms of trade on social conditions and farm productivity (1979).

- David Walter's "Who's killing Whangamomona?" showed how farming conditions and attitudes are completely interlinked with social conditions and the impact of closures on a small community (1980).

- Shepherd, Arthur-Worsop "Factors affecting agricultural production from a group at hill country farmers comprising Akitio County" investigates the same issues (1980).

All of these reports are relevant in identifying the rural services environment prior to reform in 1984/85, and are therefore cited here. Ann Pomeroy's thesis provides an excellent understanding of the structure of farm enterprises and rural communities prior to 1985. The common theme of these reports is the connection between diminishing farm profitability, declining rural population and hence less rural services.

Post 1984

The following identifies and summarises studies post 1984. These studies investigate the impacts of changes in rural services, the exception being "Bridging the Gap..." which examines the role of local government in co-ordinating services.

Farming in the Pongaroa Region (Gray, et al., 1990)

This report assesses what adjustment strategies were used by hill country farmers in the Pongaroa district to cope with deregulation. Of interest to this study was

the section on rural services. The results indicate that "nineteen of the twenty two farmers surveyed considered that rural services had declined. ... thirteen farmers considered that this had no real effect on farm profitability, other than through general inconvenience. Five farmers considered that the decline in rural services had resulted in higher vehicle running costs and car maintenance cost as they had to travel further for some services and roading had deteriorated". Schooling, telephone, roading and health were considered in the most need of improvement

Bridging the GAP a study of rural services in New Zealand (Packman, 1986)

Examined are five services in rural areas; libraries, early childhood education, health services, mail delivery and women's refuges. The book provides a detailed look at the role of local bodies in co-ordinating services and shows how rural services have 'just grown' without any real planning.

As the study was undertaken in 1984/85 it provides an excellent basis to discern what changes in rural services were likely to happen if reforms had not occurred.

Communities main concerns in 1984/1985 were:

(i) Roading.
(ii) Maintenance of school bus transport as numbers decline.
(iii) Maintenance of numbers of school-age children.
(iv) The provision of rural medical services.
(v) Ensuring communities have a major employer for stability.

The study concludes by saying that:

"Rural areas are very sensitivity to change because of their small populations ... Farm amalgamations have reduced the number of permanent residents in certain hill country areas. Similarly recent economic pressures on the farming community have reduced significantly the permanent and casual labour

employed, in favour of farm contractors. This has led to a decline in the number of rural residents. ... Another trend in certain areas has been for the long-term unemployed to move out into rural areas."

Effects of liberalisation on the provision of government services to agriculture (Eveleens, et al., 1989)

This discussion paper examines the impact of reduced government assistance on the provision and pricing of government services. The rationale behind this change and the government's changing role in conduct, funding and setting the economic climate is discussed. Examined are the effects of changes in four areas; meat inspection services, research and development, rural lending and rural services.

The likely implications according to the report are:

"Initial increases in costs of services ... due to user-pays. However, these increases may be offset by cost saving from both (a) cutting services no longer demanded, and (b) increases in efficiency of the remaining services..."

Changes to Agricultural Services and Related Impacts (Moore, 1989)

This discussion paper identifies the likely new environment, pricing and supply conditions facing agricultural services. Included is a discussion of changes to government's role in lending and development, electricity, transportation, pest control, communication, irrigation and catchment control services and a preliminary analysis of likely resulting impacts on costs and resource use in agriculture. Likely on-farm impacts are assessed based on industry reports.

The report suggests the magnitude of cross-subsidies to rural services is in the order of $100-120 million annually. The report identifies the following on farm impacts. "More remote farms will bear the largest impact of marginal cost pricing

of goods and services ... The decline in assistance has contributed to the cost-price squeeze ... resulting in a decline in input usage and capital disinvestment".

Changes to Post, Phone and Electricity Services (Moore, 1990)

This paper examines specific reform in government's commercial policies and the implications of these changes for rural communities and on-farm costs.

A survey of changes in telephone pricing and the on-farm impact indicate that "total phone charges to farms have fallen by an average of 18% as a consequence of rebalancing of Telecom's charging".

The restructuring of postal services has had the following impact "NZ Post has increased the total number of postal outlets and rural delivery services and uniform letter rates have been maintained."

Given the possibility of competition Electricorp will be forced to remove the average pricing policy. "Total electricity charges to farms are likely to fall for dairy farms and rise for sheep/beef farms due to the proposed restructuring of electricity supply operations."

Rural School Reform - The impact of Government policies on rural schools and rural communities in the Wellington Region (Skene, 1990)

In reviewing literature the impact of change in government provision of schooling is well documented and part of government assistance to Agriculture. This report assesses the impact of recent government education policy changes on rural schools and rural communities in the Wellington Region. Reported are problems in providing rural bus services, staffing rural schools, meeting administrative responsibility, and paying for advisory services.

Farming without Subsidies (Sandrey and Reynolds, 1990)

This book identifies the beneficiaries, the impact, the effects and the responses to the removal of agricultural assistance. While mainly concentrating on the impact of the removal of direct subsidies, the chapters on "The Regulatory Environment" and "How Agribusiness Responded" are highly applicable to this study.

To summarise, common farming concerns in rural services post 1984 were roading, school bus transport, rural medical services and schooling, which shows little change from pre 1984 concerns. We see the recurring scenario of declining profitability caused by the cost-price squeeze, a changing rural population with the movement of beneficaries out into rural areas, coupled with a movement of farm employees to urban areas, resulting in less rural services.

The studies show that the impact of reduced government assistance to rural services has accelerated this trend, by increasing the cost of rural services, hence enhancing the cost-price squeeze facing the farming community. This also resulted in less input usage and capital disinvestment. Reforms have seen rationalisations in many services, resulting in greater efficiency. Changes in rural services have had the greatest impact on more remote hill country farms which benefited most from government assistance in rural services. It is interesting to note that little has changed in the content of reports on rural services over the years. Conclusions drawn and recommendations made in the pre 1984 reports, could still apply to today's situation (pers. comm Millard, 1991).

CHAPTER 3

THE VALUE OF UNPRICED GOODS AND SERVICES

3.1 Introduction

In this chapter the two non-market evaluation methods attempted in this study to value the indirect costs of a lost/changed rural service, are described. The major part of this chapter will be devoted to the discussion of the Contingent Valuation Method (CVM), as the application of this technique proved to be feasible. This discussion will include an examination of the CVM strengths and weaknesses, the comparability of willingness to pay and willingness to accept measures and their application to valuing rural services.

The chapter concludes with a brief discussion of the Hedonic Pricing Method. This discussion will include, why the application provided to be infeasible, identification of an application of the technique in New Zealand and the techniques potential for future application in New Zealand.

3.2 Market Failure and the need for Non-Market Evaluation

As described in section 2.2 government has historically intervened in the agricultural sector to correct market failure and to compensate farmers for distortions elsewhere in the economy. According to the market failure argument the market may fail from the presence of imperfect competition, decreasing cost industries, externalities and public goods.

The question this raises is, where do rural services fit into the market failure arguments and hence, is there a case for government intervention? Some rural services are considered natural monopolies, these include communications, electricity and roading services. As monopolies, there exists a situation where

the profit-maximising price does not equal marginal cost. Government has therefore intervened by conduct i.e. supplying the service and therefore maintaining a fair price to all users. Other market failures which often caused government intervention are the existence of public goods and externalities. It is important to realise that there is really no distinction between externalities and public goods. An externality (positive or negative) can become a public good. The public good aspect of goods very much deals with optimal levels of provision, where the externality aspect deals with the reason for their existence.

An example of a negative externality is that of a farmer who does nothing to control soil erosion on his farm. The soil then washes into waterways, polluting the water, which then affects downstream users of the water, who incurr a cost (in purifying the water). The externality i.e. water pollution, causes public awareness of the existence of the problem. Hence government intervention to provide a public service/good to alleviate the problem, in the form of catchment control services. Catchment staff provide the farmers with technical advice and financial assistance to control the soil erosion and prevent the externality of water pollution.

An example of a positive externality is reduced TB in cattle through the control of opossums. The farmers benefit indirectly by having less stock infected by TB and hence a greater income. The public good/service is the control by DOC. It is important to note that the catchment services undertaken by government are not pure public goods as they convey direct benefits to individuals in the sense that the services are received separately by the individuals and persons can be excluded from the benefits. The above examples show that the existence of an externality creates the reason for the public good. The allocation of a public good requires society to decide the optimal level of provision, a decision which is hampered by the characteristics of public goods described below.

In market type economies goods are allocated by means of markets where wiling buyers and sellers reach an agreement about transactions. Private goods are exchanged in these markets at market prices and hence we know their value to

society. On the other hand there are no markets for some types of goods and their value to society is unknown. Goods of this type often have characteristics that make it impossible for the provider to capture all the benefits of the good that the good gives to society. These benefits are "public", hence they are called public goods.

A feature of public goods is that everyone can consume them without detracting from their availability to other users. Public goods are characterised by the condition of non-excludability of and non-rivalry between individuals who wish to use the goods. Clearly rural services are not public goods; possible exemptions being rural roads, as one can exclude individuals from the benefits, but they are often classified as merit goods. Merit goods/services are not regarded as suitable for sale on a pay for what-you-get basis because of distributional consideration and the desire of society that all persons receive the services as a matter of principle, even if not warranted by externalities. Examples often cited are the right to education, electricity, phone and postal services. As merit goods they display some of the characteristics of public goods.

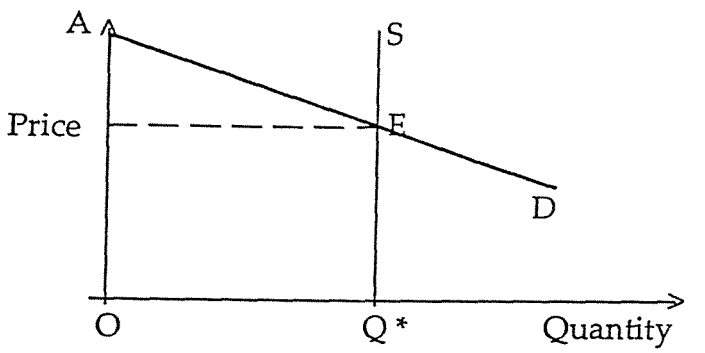
Having established the criteria for market failure, intervention by government is through means of regulation and control of externalities and through provision of public goods. In the latter case the government is faced with the problem of how to decide on the optimal level of provision of a public good (defence flood control; water quality control etc) in the absence of direct market information on demand and preferences. One way of obtaining such preference information is by using 'non-market valuation techniques. These techniques allow the estimation of a demand curve for a public good (or a value for a specific quantity) which then can be used in the determination of the supply of the good in question.

In what follows, two of these non-market techniques will be discussed: a surrogate market approach - the hedonic pricing method, and a survey based approach, - the contingent valuation method (CVM).

Measure of Value

Before discussing CVM in detail it is important to understand consumer surplus, as consumer surplus is the value measure of interest in estimating benefit information for non-market goods. Consumer surplus is the total amount one would be willing to pay for a given quantity of goods over and above their cost rather than to go without the goods altogether. In Figure 3.1 we have a demand curve for a public good. From this demand curve we can measure appregated maximum willingness to pay i.e. total willingness to pay for the public good. Total willingness to pay is a measure of gross benefits, while the purchase price is a measure of costs. With pure public goods the purchase price is zero hence, the total consumer surplus equates to the whole area under the demand curve i.e. OAEQ*.

Figure 3.1 Demand Curve for a Public Good.



The consumer surplus concept is based on the Marshallian demand curve theory. If expenditure on the public good is a substantial part of total expenditure, acquisition of the public good will affect consumption of other commodities and will change the consumer's real income, changing the marginal utility of money and the position of the demand curve. This has led to the establishment of Hicksian measures of value; compensating variation/surplus and equivalent variation/surplus. These Hicksian Welfare values come under the Willingness to Pay (WTP) and Willingness to Accept (WTA) measures. WTP is the amount

of money an agent would be willing to give up to obtain a change and still be as well off as with his previous entitlement. WTA is the amount of money which would have to be given to an agent, with a specified entitlement, to forgo a change and still be as well off as if the change had occurred. For a theoretical discussion of the concepts of WTP and WTA see Appendix F. The compensating measures are related to the money transfers needed to keep the individual at the same utility level as in an initial situation, whereas the equivalent measures are related to the monetary equivalent of a change in welfare to a final level of utility. In valuing non-market goods the Hicksian measures are the appropriate measure of benefits. (Kerr, 1986, Kirkland, 1989 and Brookshire, Randall and Stoll, 1980).

3.3 Selection of the Contingent Valuation Method for the Study

3.3.1 The Development of Non-Market Valuation Techniques

The development of non-market valuation techniques arose from the need for benefit/cost assessments related to environmental or public goods. As stated earlier, public goods do not have market prices, and deriving a measure of value to society must be done by some alternative means, to enhance decision making.

The problem of addressing public goods and the relationship between them and social welfare was introduced by Samuelson in 1954. Samuelson made two important conclusions which were refuted by later academics. Those conclusions were as follows:

(i) One cannot hope to obtain values/measures of individual performances for public goods by directly asking people to reveal their preferences.

(ii) That in the absence of market prices reflecting (however imperfectly) individual preferences "we are unable to define an unambiguously best state", p.388, in terms of a level of provision of public goods. (Samuelson, 1956).

One such academic Ciriacy-Wantrup (1952), who refuted the conclusions, proposed the use of the survey method for obtaining values for public goods related to resource and environmental conservation. While proposing the survey methods Ciriacy-Wantrup identified possible objections to this valuation procedure, justifying careful design of questionnaires as a means of overcoming the objections.

Following a period of little interest in the use of survey methods for deriving estimates for public goods, three distinct lines of enquiry were introduced in the later 1960's/early 1970's which laid the foundation for non-market evaluation.

These three lines of enquiry included:

Clawson and Knetsch circa 1966, refined and popularised the Travel Cost Method (TCM) for valuing recreational sites, Rosen circa 1973, introduced the Hedonic Price Method (HPM) as a means of valuing some classes of non-market goods and a renewed interest in surveys was brought about by:

(i) an experiment wherein Ciriacy-Wantrup's suggestion for using surveys was implemented by Davis (1963a and 1963b) and later by Knetsch and Davis (1965); Bohn's (1971, 1972) experiments with survey methods which tested and rejected Samuelson's strategic bias hypothesis.

(ii) refinements in the survey method introduced by Randall et al (1974a) based on the aggregate "bid curve" suggested by Bradford (1970).

The work done by Randall et al provided the basis of the CV Method. In refining the method, Randall et al defined and imposed a design whereby values were elicited from individuals by means of a survey method called a "bidding game" in which willingness to pay questions were posed within the framework of contingent markets, hence the name.

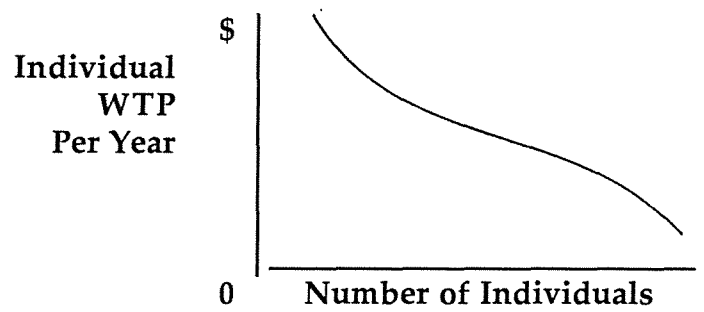
3.3.2 Strengths and Weaknesses

The CV method uses surveys to derive estimates for social benefits attributable to the non market good in question. (Cummings, Cox and Freeman, 1986.) The CVM is designed around the framework of a contingent market which represents the hypothetical opportunity for transactions between the public good and WTP/WTA.

By surveying a sample of the population, the method can produce an aggregate value of their maximum WTP (annually) for the maintenance of current amenities, or hypothetical increases in them. The value obtained is assumed to correspond to the point of indifference between having that amount of income or the environmental amentity (Walsh, Gillman and Loomis, 1984).

The individual bids can be summed to provide an aggregate bid schedule which is a surrogate for an income-compensated demand curve. (See Figure 3.2). Note this is not a proper demand curve.

Figure 3.2 Aggregate Bid Schedule.



The curve is the bid distribution of the number of individuals willing to pay a particular amount of money. For this study the farmer is used instead of the individual. By multiplying the number of farmers willing to pay a certain

amount, by that amount, and then scaling the upward to the total population a community value is obtained. This total value is taken to represent the consumer surplus of the improved rural service, in the case study used here, the ambulance service.

The question regarding the validity of the CVM to reveal consumers true WTP arises from the assumptions of the method. There are two major assumptions underlining the use of CVM which are behavioural. One is that "subjects can (and have incentive to) determine their preference orderings between the public and all other relevant goods and services", the other that: "subjects will not behave strategically that is, offer willingness-to-pay or accept values which, rather than reflecting their true performances, are intended to bias survey results in directions which are consistent with the subject's preferences" (Samuelson 1954, Bohn 1971, 1972; Smith 1976, 1977, Rowe and Chestnut 1983)" in Cummings et al (1986).

Weaknesses of the CVM

Given the concerns about the accuracy of the CVM, arising from the above assumptions, (Freeman, 1979) the following describes the major weaknesses of the method.

Strategic Bias

One of the major assumptions of the CVM is that subjects will not behave strategically. This occurs when individuals attempt to influence the outcomes or results by not responding truthfully. Strategic bias or free rider behaviour is created by the offer/acceptance being greater or smaller than the true valuation of the individual in order to influence the results in the direction consistent with the individuals preferences. Tests for strategic bias examine the distribution of bids and query the respondents on new bids. Research by Bohn (1972) tested the

significance of strategic bias and tends to reject the strategic bias hypothesis in the valuations of the public goods.

Recent thinking on the subject (Cummings et al, 1986) is that strategic bias is insignificant in purely hypothetical or contingent market settings, i.e. the potential for strategic bias is less the more hypothetical the setting, hence there exists a trade-off between strategic bias and hypothetical bias.

Hypothetical Bias

The potential for hypothetical bias in the CV Method enters through the hypothetical nature of payment, as well as the hypothetical commodity and the institution within which the commodity is exchanged. Careful question structure and design can reduce the potential problem by making the situation as real as possible to encourage behaviour true to real life, but that again is a trade-off for strategic bias. The most prominent source of bias is in instances where the CV commodity and its market are unfamiliar to the subject. The familiarity of the commodity being valued by a subject is of key importance to a good CV study. (Cummings et al, 1986).

Starting Point Bias

Depending on the approach one adopts, starting point bias can be the greatest weakness in CV. As an example the iterative bidding approach asks a respondent to respond "yes" or "no" to a question in the form: "Would you continue to use this recreation area if the cost to you was to increase by X dollars?" The X amount is then varied among respondents to derive a demand curve for the recreation area. The problem is what value to attach to X. As one can see the X value creates a source of starting bias. The starting bid (values of x) may suggest incorrectly to the individual the approximate range of "appropriate" bids or costs.

The consensus of research indicates that although starting point bias can be a problem, (Cummings et al 1986), control is available through proper payment

card design. The author's opinion is that while a payment card system can reduce starting point bias the respondent is still influenced by the card. Note that in the case of the payment card, the choice of a starting bid is left up to the subject in that the subject chooses his/her starting point from the values given on the payment card. This view is supported by Carson and Mitchell (1986).

Vehicle Bias (Instrument Bias)

The CVM involves asking respondents their WTP through a specific mode of payment, e.g. rates, taxes and entrance fees bills. If a respondent resents the payment mode provided, a bias in revealed preferences may result. For example a payment vehicle such as taxes may influence the respondent to reveal a WTP lower than their true preference because they feel they already pay enough tax. Work by Sandrey (1986), Bonnet (1984), Walsh (1986), provides evidence of vehicle bias and suggest selection of a payment vehicle which is acceptable, realistic and neutral. The potential for vehicle bias can be reduced by providing provision of payment mode options from which respondents can choose.

Information Bias

The amount of information provided to the respondent can influence bids. Information bias is argued to result from the quality and quantity of information given to subjects. To ensure a consistent interpretation, respondents need to be well-informed on the situation they are valuing. Recent work by Randall et al (1990) shows the potential for information bias to be present but of little consequence.

Other potential forms of bias in CVM are:

> **Interviewer Bias:** In the interview an interviewer can influence bidding by making gestures as to acceptable bids. By rushing the process, the interviewer can fail to elicit true preference.

Incremental Values: If valuing several alternatives in one particular CVM vehicle, then the order of presentation may influence the level of response.

Protest Bidding: If zero bids are present one must evaluate the reason behind the bid. Respondents who are objecting to the hypothetical market or payment vehicle rather than genuinely valuing the amenity at zero must be removed.

Non-response Bias: If systematic differences exist between respondents and non-respondents, then results may be invalid. The solution is to avoid non-response by extensive follow-ups.

Strengths of CVM

The major strength of CVM as identified by Randall et al (1974), is that the method could be applied to valuing a wide range of environmental improvements. Indeed, some authors argue that the applications of the CVM have gone too far. Interest in the method was enhanced when, in adopting the method as an authorised evaluation technique, the United States Resource Council identified the following advantages over other techniques.

1) The independence of the method from secondary data allows its (potential) application to a wide range of public and open-access goods. (Chow and MacGrimmon, 1979)

2) Existing evidence belies the existence of strategic bias in the CVM. Well-designed surveys may reduce the structural weakness.

3) While there is currently no accepted standard by which the accuracy of CV values might be assessed, substantial evidence exists which demonstrates that in the conditions described below under "appropriate applications",

the CVM generates values which usually compare well with analogous values obtained from alternative, market-based methods. (Chapters 5 and 8 in Cummings et al, 1984).

4) The CVM is well suited to estimating the value of environmental resources for both users and non-users benefits. The non-use benefits are commonly referred to as the following values (Kirkland, 1989):

Option Value: This is normally defined as an annual payment (a kind of insurance premium) when retaining the option of possible future recreational use, in addition to any expected consumer surplus.

Existence Value: This is the WTP for the knowledge that a natural environment is protected even though no recreation use is actually contemplated.

Bequest Value: Commonly described as the WTP for the satisfaction derived from endowing future generations with a particular amenity.

Theoretical measurement of non-use benefits can be difficult, but Bishop and Heberlein (1984) and Walsh et al (1982) in Kirkland (1989) have assessed existence and other preservation values respectively. Given current legislative moves in New Zealand, assessment of intrinsic values needs to be part of resource management decisions. The Conservation, State Owned Enterprise and National Parks Acts and possibly the new Resource Management Act all have the requirement that recognition of intrinsic values be balanced with other objectives when interpreting the Acts.

In conclusion one cannot say CVM yields reasonably precise measures of social values. The main weakness of CVM stems from bias associated with question structure, sampling and design. It can however be said that the method generally yields order of magnitude estimates of values. The reliability of the results is enhanced given the following:

- The more familiar the subject is with the public goods in question the better.

- The less the degree of uncertainty associated with public good (Kahneman and Tuorsky 1972, 1982).

- When WTP measures as opposed to WTA measures are sought.

3.3.3 The Accuracy of Contingent Valuation

To evaluate the accuracy of the CVM one needs to establish a standard to measure values against. The CVM aims to obtain a value that reflects a "true" preference for the commodity being valued. The problem is how do we measure such a standard. In Cumming et al (1986) it is agreed that error ranges in most instances for contingent values are within ± 50% of values derived from alternative methods for estimating preference revealed values. There I agree with Carson and Mitchell, Rosen, Freeman in Cumming et al (1986) in rejecting such a figure as inappropriate. The above practitioners conclude that CV studies are able to measure meaningful values for "familiar" goods such as the safety issue use in this study.

As a means of assessing accuracy, Cumming et al (1986) define accuracy in terms of biases resulting from deviations from Reference Operating Conditions. The Reference Accuracy is a means of assessing error in a CV application and should be a mandatory reference for anyone contemplating a CV study.

Table 3.1 Alternative Reference Operating Conditions.

Reference operating condition	Measurement error when ROC is not satisfied
1. Subjects must understand, be familiar with, the commodity to be valued.	?
2. Subjects must have had (or be allowed to obtain) prior valuation and choice experience with respect to consumption levels of the commodity.	?
3. There must be little uncertainty.	?
4. WTP, not WTA, measures are elicited.	? ± 300%
5. (Kahneman) Valuations must involve transaction structures, not compensation structures.	? ± 300%
6. (Kahneman) CVM values obtained must relate to use, with minimum ideological content.	?
7. (Kahneman) Payment vehicles must be well defined and credible vis-a-vis the CVM commodity; values obtained with one vehicle may not be interpretatively "transfer-red" to those which we could obtain with other vehicles.	?
8. CVM application must involve:	
(i) No basis for starting points or anchoring;	?
(ii) "appropriate" information concerning the commodity and the valuation process;	?
(iii) initial, noniterated valuations.	?
9. (Mitchell-Carson, from referenda/psychological re-search):	
(i) Subjects must be given as simple a choice as possible;	?
(ii) outliners should not unduly influence research;	?
(iii) subjects should be permitted to abstain from the valuation process.	?

10. (Implied by Randall Chapter 8): Subjects must view the CVM process as a meaningful opportunity to influence policy via their responses; ?

or

(Arrow, Rosen and Freeman 1979): Subjects must view questions as being sufficiently hypothetical so as not to provide incentives for strategic behaviour. ?

11. (Bishop-Heberlein):
    (i) Azjen-Fishbein criteria for the structure of valuation questions must be satisfied; ?
    (ii) "close correspondence between attitudes and behaviour is required. ?

3.3.4 Contingent Valuation Application to Rural Services

In deciding on the appropriate value to use in the case study, earlier literature and a similar case study by Jones Lee et al (1985) all favour the use of the WTP approach. Hence the WTP measure of value was used in this study.

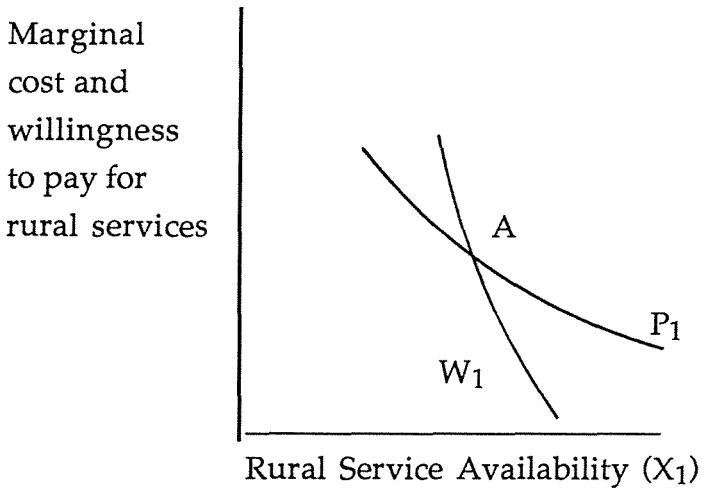
The WTP question for valuing an improved ambulance service must be considered as an extra benefit measure given the current situation is the status quo. Hence, the measure is a compensating surplus, one where the amounts are offered to obtain a preferred level of welfare and is therefore the theoretically correct measure.

3.4 Measuring Demand for Rural Services - Hedonic Pricing Method

Many of the goods we purchase are composed of bundles of characteristics and demand for these goods is dependent on these attributes, e.g. the price of a farm is determined by its attributes. By isolating the particular attributes of interest, in this case rural services and then varying them by reducing the availability of

rural services, (by moving further away or nearer to the services) while maintaining all other characteristics constant, it is possible to measure the marginal price of rural services by determining how the price of farms is affected by changes in rural services. If the farm market is competitive, so that no single household can influence prices, the cost of moving is low relative to farm prices and farmers have perfect information about the availability of rural services in different areas, then farmers will choose to locate themselves so that the marginal cost of an improvement in rural service availability is equal to the farmers willingness to pay for a marginal improvement. (See Figure 3.7). The farmers marginal willingness to pay for rural services (W_1) is likely to be a function of the level of rural services, household income (M) and other factors; ie, $W_1 = g(X_1, M, \text{others})$. Each farmer will attempt to purchase a farm such that $W_1 = P_1$, where W_1 is the individual farmers demand curve for rural services.

Figure 3.3 Marginal Cost of Rural Service.



This technique is attractive in that it is market based and is appropriate for localised valuations. However, it requires an informed public and data analysis requires considerable statistical proficiency.

Applicability of Hedonics to New Zealand

Given the technical difficulties and large data requirements of the technique it is surprising that the method has been applied in New Zealand. The study conducted in Auckland used the hedonic approach to evaluate consumer behaviour under conditions of risk and uncertainty where the source of risk is from non-market hazards occurring in the natural environment.

In the study conducted by Kask and Maani (1989) the hazard was the possibility of an explosion from a high pressure natural gas pipeline installed in urban neighbourhoods. The consumers willingness-to-pay to avoid exposure to the risk of a hazardous event was reflected in his/her decision to pay a higher price for a comparable home that was not exposed to the hazard.

Cross-sectional data for the study was collected from Government Valuation Department statistics, as well as floor plans, and field surveys. The house price data used was the latest government valuation. To mitigate the information problem a comparison between 1983, 1984 and 1986 was made. The sample size in 1983 was 83, 1984 was 87, and 1986 was 83.

The results are present in Table 2.4. The 1983 results suggest consumers are willing to pay 9.7% more for a home off the pipeline route to avoid exposure to the risk of explosion. When they reviewed the period of construction the price increased by 5.2% to 14.9% more for a home off the pipeline. The changing WTP's from 83 to 86 show how the availability of information and awareness of the problem can under or over estimate the hedonic price.

Table 3.2 Regression Results of the Housing Price Model Dependent Variable: Log of Price Sold+.

Independent Variables	1983 Co-efficient (t-ratio)	1984 Co-efficient (t-ratio)	1986 Co-efficient (t-ratio)
Intercept	8.974***	8.703***	8.794***
	(40.57)	(30.863)	(25.279)
Log Floor Area	.393***	.335***	.413***
	(7.755)	(5.863)	(5.192)
Bedrooms	.023	.133***	.108***
	(0.805)	(3.678)	(2.820)
Bathrooms	NA++	.203***	NA++
		(3.066)	
Age	-0.041***	.047***	.030
	(2.008)	(2.593)	(1.366)
On-pipeline, sold during construction	-0.149**		
	(2.097)		
On-pipeline, sold after construction	-0.097*	.022	-.064
	(1.760)	(.438)	(1.190)
Good wall condition	0.098***	.174***	.106*
	(2.729)	(3.242)	(1.871)
Good quality of construction	0.046	.065	.019
	(1.285)	(.146)	(.382)
Sea view	0.015	.025	.185***
	(.409)	(.604)	(3.401)
Traffic	-0.020	-.092**	-.069
	(.592)	(2.055)	(1.376)
Section size	0.0001**	.0001**	-.00002
	(2.319)	(2.05)	(.371)
Time of the Year Sold	NA	NA	.096**
			(2.180)

Sample size	85	87	83
F-value	20.603***	23.362***	14.006***
R^2	.697	.720	.610

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level
+ Mt Roskill, Auckland, New Zealand
++ In this sample there is no variation in the number of bathrooms

The example shows how the technique can be successfully applied in New Zealand. The larger metropolitan areas such as Christchurch, Wellington and Auckland have the potential to provide the housing market data requirements across differing geographical locations. In agriculture there is potential for using the technique in safety and estimation of farmer valuations of avoiding or incurring the risk of loss from a natural hazard. In such an assessment, many of the technical difficulties of the approach are avoided because the second stage is not needed.

Problems in Applying the Hedonic Price Method to Changes in Rural Services

In quantifying the impact of changes in Rural Services over the last five years, it was hoped to use the Hedonic Pricing Method to assess the impact on property values. Initial research on assessing the feasibility of the method to such an application concluded that the major problem would be obtaining the number of farm sales required in the geographical localities and in the timeframe needed.

In sampling the farming population for changes in rural servicing, a question on acquisitions and disposals was included to obtain sufficient data on farm sales over the five year period. By adopting such an approach it was hoped sufficient respondents would indicate farm sales in localised geographical areas to allow follow-up interviews to assess further data to implement the method.

Unfortunately only 30% of respondents indicated a farm sale and the diverse geographic nature of the sales meant enough data would not be available to show any significant statistical relationship between property values and changes in rural services over the past five years.

The questionnaire also asked farmers to indicate what % of change in market valuation of their property would they attribute to changes in Rural Services. The idea behind asking this question was to ascertain if farmers perceived changes in Rural Services to have an impact on the farm's market value. A lack of knowledge of the changes will inevitably lead to an under-estimation of the social benefit or costs. Given only 40% of respondents perceived change in Rural Services to have an impact on market value of that property, the potential for under-estimating the cost was high.

Valuation NZ statistics show that only nine grazing farms were sold in 1985, while 50 grazing farms were sold in 1989 in the Wanganui area. The reason for the high number sold in 1989 was due to farmers holding out from selling until farm prices improved, which they did in 1989. Given only nine farms were sold in 1985, this does not cover the degrees of freedom required given that one would need at least this many independent variables in the price function. To gain any significant statistical relationship to cover variance, the sample size would have to be a lot larger.

Given the lack of farm sales needed for a hedonics application which clearly was not available, government valuation figures were the next best option. It was extremely unfortunate that while government valuation figures were available for 1985, the 1990 figures were not completed at the time of this study.

It is interesting to note that the recent 1990 government valuation of Wanganui hill country farms does allow for changes in rural services, namely roading and schooling. An example was given of a Mangamahu Station sold recently, in that the government valuation had changed because of the closure of the local primary school. The distance from a main road and the condition of the road the

property is located on did influence the government valuation. No exact percentage was given as to what impact the availability of rural services had on government valuations other than it is allowed for (pers comm, Henshaw, Valuation NZ, 1990). Hence, if farmers could be shown the impact of the loss of rural service on the farms property value, they would do a lot more to prevent the loss of rural services.

As to the feasibility of the approach, an opinion expressed by a Valuation lecturer was that to isolate the impact on changes in rural services over the last five years was impossible given all the macro and micro changes that had gone on in farms over the last five years. (pers comm, Hargreaves, Massey University, 1990).

In summary, given the data requirement problems and the numerous assumptions and theoretical difficulties associated with the hedonic price technique, it was decided that an empirical application of the technique would be unsuited to the rural services application.

CHAPTER 4

METHODOLOGY

4.1 Introduction

Any attempt to value the impact of changes in rural services over the period 1985-1990 encounters considerable problems. There is a problem of identification and a problem of valuation.

With regard to identification, one much firstly define the fine boundary between cost structure changes due to changes in rural services and changes due to the general macro environment the farm operates in. Secondly, to determine the full effect of the changes in rural services one needs to go beyond the direct effect (i.e. the changes in direct costs) and look at the wider costs (often not measurable but non-the-less very real). For example the loss of one or two transport operators in the region may/may not affect costs directly, but does affect the loss of choice open to the farmer, or, the loss of the local maternity hospital does both affect direct costs (further to travel) and the intangible cost (peace of mind). It is these direct and wider costs that need to be identified.

With regard to valuation what is intended here is to place a value on the total cost of the change in, or loss of, a service. With regard to the examples given above, what to the farmer (and the farm family) is the total cost of say the loss of a local maternity hospital? This requires information on the direct costs and the intangible costs. This chapter describes the survey methodology used to obtain that information, and the techniques used to place a monetary value on some changes incurred.

Three surveys were planned. One of a large group of hill country farmers in the Wanganui area, one of non-government rural service firms in the area, and a

survey of the farmers in the Mangamahu Valley (the place for which earlier survey data was available).

4.2 Rural Services Survey

A postal survey approach was chosen to obtain data on actual changes in rural services and to elicit data on farmers' opinion regarding the changes.

The sample of farmers chosen for the postal questionnaire was a group of hill country farmers in the Wanganui area. This area was chosen because data existed from a previous farm survey that would be very helpful to look at changes over time (Kaplan, 1979). The reasons for the choice of hill country farmers were:

1. Hill country farmers are more remote and isolated than other farmers, hence the impact of changes in rural services is expected to be most severe in their case.

2. Hill country farmers provide the heart of the NZ's farming industry, i.e. breeding replacement stock for the lower country. Hence the effects of changes in rural services on farm profitability/viability will precipitate down the chain.

3. Hill country farmers tend to be dependent primarily on the farm for an income.

Table 4.1 Number of Significant Farms By County and Farm Type.

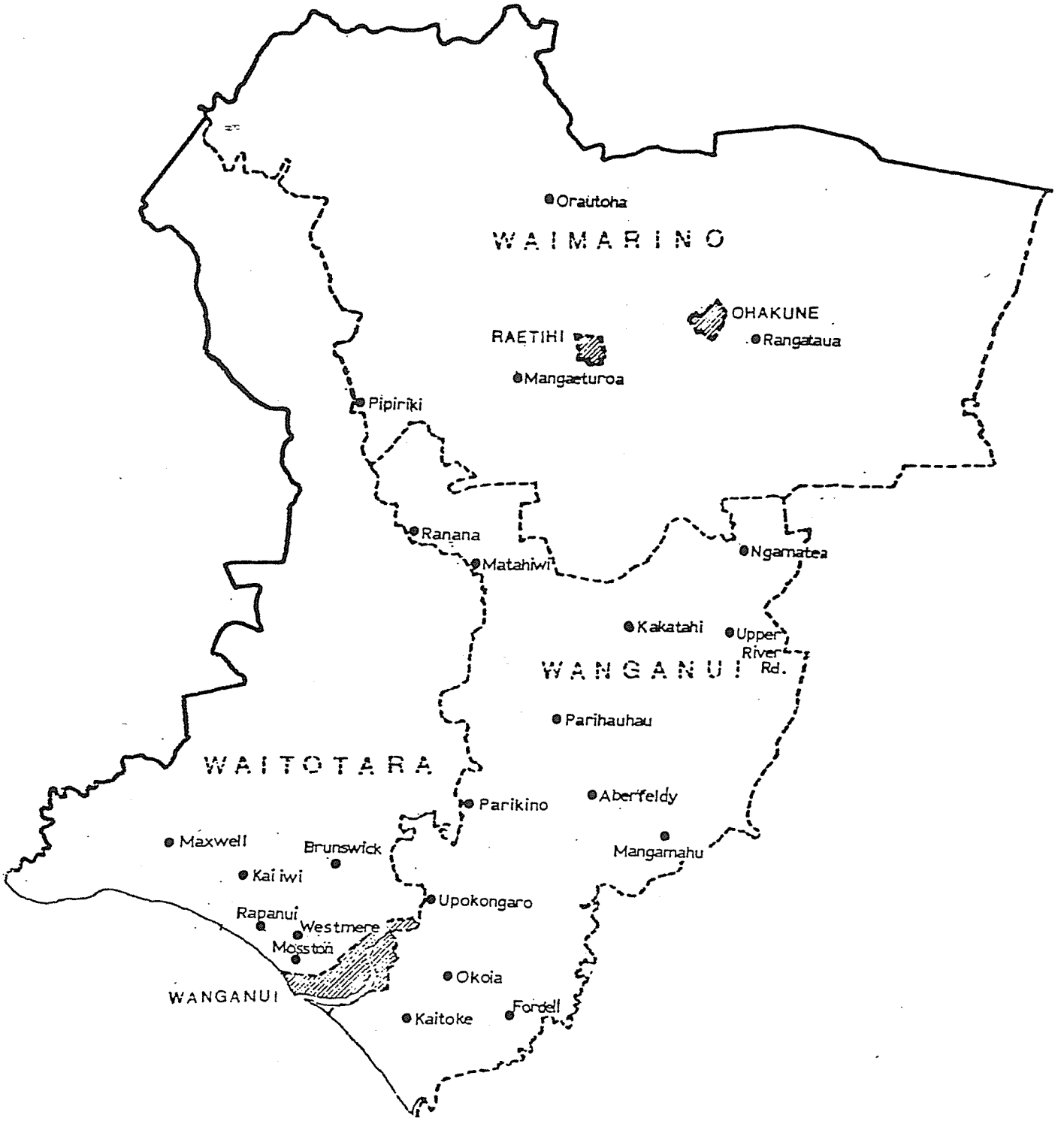
	County			
	Waimarino	**Waitotara**	**Wanganui**	**Total**
Farm type				
Sheep farming	54	34	44	132
Sheep farming with beef	64	27	64	155
Total All Farm types	118	61	108	287

(Source: Department of Statistics, 1988)

From published reports provided by the Department of Statistics (Agriculture, June 1988), the number of farms in the Waimarino, Waitotara and Wanganui area were determined. Hill country farms are either principally sheep farms or sheep farms with beef. Table 3.1 shows that there is a total of 287 farms in the areas. The sample size for the survey was obtained by working backwards from the response rate expected to be obtained. The consensus on the response rate to a postal questionnaire is 30 percent (Yu and Cooper, 1983). Therefore, to achieve enough degrees of freedom for explanatory analysis, it was necessary to extend the sample population to include Waimarino and Waitotara (i.e. not only Wanganui as originally planned).

A mailing list, of the whole rural population of these counties, was obtained from the Department of Statistics. This list only included 255 farmers. The discrepancy between the number of farms in the table and the mailing list is due to a recent update of information for the table.

Figure 4.1 Map of the Study Area.



4.2.1 The Rural Services Questionnaire

The postal questionnaire was designed to obtain information on actual direct costs, and the impact on the farmer and the farming enterprise. Questions on actual changes in costs and travel time (evaluated in terms of actual travel cost and lost working hours) were included as well as more open-ended questions to elicit changes in farm policy and operations stemming from the changes in rural services (see appendix for a copy of the questionnaire).

A brief summary of the objectives of and the information to be gained from each question follows:

Question A (1 & 2). To obtain general information on the size of the property for evaluation of productivity and to test if the respondent is in sample population.

Question A (3). To elicit data for a hedonics application.

Question A (4). To provide information on changes in productivity, so that changes in stock unit could be related back to direct charges/costs for rural services.

Question A (5). To assess if farmers perceived changes in rural services to have affected property values.

Question A (6). To test the theory that rural depopulation goes hand in hand with a decline in rural services.

Question B (1, 2 & 3). The availability and quality of rural education has a major impact on farmers ability to employ farm workers and whether to stay on the farm when children reach the secondary schooling stage.

Question C (1). To obtain data on the changes in availability of rural services over the last five years.

Question D (1 to 4). To elicit information on the impact of deregulation in the transport and fuel sectors.

Question E (1 & 2). To assess the impact of changes in roading and the impact on farmers.

Question F (1, 2 & 3). To elicit information on the change in the nature of catchment projects and what is causing the change.

Question G (1). To assess the impact of a user-pays system on advisory services.

Question H (1 & 2). To elicit information on the impact of changes in communication services.

Question I (1). To obtain data on the impact of changes in weed and pest control funding.

Question J (1). One way of compensating for loss services is to purchase substitutes, this question identifies items being purchased.

Question J (2). To obtain data on changes in farm operating costs, which can be related back to stock units for the purpose of comparison.

Question J (3). To gauge, farmers perceived outlook for rural services.

4.2.2 The Non-Government Services Survey

A sample of 60 services included in the Business Directory Data was obtained from the Department of Statistics. This sample was drawn from a total

population of 244. To gauge the degree of lost services, a 1987 mailing list was obtained in preference to the 1990 mailing list.

The aim of the survey was to gather data for a structural/conduct/performance evaluation and to evaluate the main reasons for any business closures (see appendix for a copy of the questionnaire).

To achieve this, the questions in the survey were framed to obtain the following information:

Question 1. To obtain information on the nature of the business and to test if the respondent is in the sample population.

Question 2. To evaluate if the business is still operating and if not, why the business has ceased.

Question 3. To elicit data on the impact of selected economic liberalisation policies on the business structures.

Question 4. To gauge how businesses have responded in the face of change.

Question 5. To obtain quantitative performance information to gauge the impact of change on the business' performance.

Question 6. To elicit general opinion on the impact of economic liberalisation on their business.

Question 7. To evaluate business confidence.

Questions (3) and (4) resemble questions used by Dobson and Rae in evaluating how agribusiness has responded to recent economic liberalisation in Farming Without Subsidies (Dobson and Rae, 1990).

4.2.3 The Mangamahu Survey

In surveying the Mangamahu Valley it was hoped to sample all farmers in the valley. A list of 33 farmers was obtained from Wanganui Federated Farmers. In the end, only 15 farmers were personally interviewed because of the difficulty of arranging a time to interview, and because of the fact that after having interviewed approximately 10 of these farmers an obvious pattern of answers was developing and the answers became simply repetitions of what had been discovered already (see appendix for a copy of the questionnaire).

4.2.4 Personal Interviews

In addition to the three surveys, personal interviews were conducted with a small sample of the respondents to the hill country farmers questionnaire to validate the information being obtained. These interviews were strategically located as to interview farmers in each geographic area within the study area.

Personal interviews were also obtained from the following local representatives: Mr Finlayson of MAF, Wanganui, Mr Henshaw of Valuation NZ, Mr Harrison, Head of Land Inventory with Manawatu/Wanganui Regional Council and past and present presidents of Wanganui Federated Farmers.

4.3 Survey Implementation

The method of delivery and follow-up procedures described below apply to the postal questionnaires (rural services and non government services).

The final postal questionnaires were printed in a back to back form to reduce the size and to save cost. Contained inside the A4 envelope was a stamped return envelope, a cover letter and the questionnaire (see appendix). The cover letter

was designed to stress the personal approach (pers. comm Hughes, Massey University). The envelopes were mailed using standard post in early October.

A reminder letter offering the author's assistance to complete the questionnaire was mailed one and a half weeks after the original posting date.

Given that most people who answer questionnaires do so almost immediately after they receive them according to Dillman (1978) and a questionnaire that lies unanswered for a week or more is not very likely to be returned a second follow-up letter was not considered necessary.

To encourage greater response to the rural services questionnaire, telephone contact was tried as a method of follow-up. The author rang 30-40 farmers only to obtain three additional responses. This method was abandoned because of the lack of success and high cost associated with the method.

4.3.1 Response Rate to the Non-Government Services Survey

Of the 60 surveys posted out, twelve were returned stamped "Gone - no address". The reason for this large number of returns was due to using the 1987 mailing list. Usually to compensate one would draw twelve more addresses out of the population. This strategy could not be adopted because the sample mailing list was provided by the Department of Statistics and their policy would not allow it without paying for another mailing list. The sample size was therefore reduced to 48. One can only speculate as to what has happened to the businesses that are no longer at the 1987 address. Options are changed address (Private Bag and PO Box no longer in existence) or they are no longer in business.

Of the sample of 48, the following questionnaires were returned incomplete with the comment that it did not apply to them. This was expected as the Business Directory data includes activity units that do not directly service the rural community.

Table 4.2 Source of Incomplete Returns.

Dentists	2
Doctors	3
Bulk Transporter	1
TOTAL	6

A further nine questionnaires were returned for the following reasons.

Table 4.3 Reason for Returns Incompleted.

Injured and unable to complete	1
Gone overseas	1
Just returned (no reason)	2
Gone out of business	4
Business sold	1
TOTAL	9

Given that six of those sampled clearly did not belong to the sample population the sample was reduced to 42. While the response rate was good at 57% (24 out of 42), nine of the responses were not completed sufficiently to warrant further analysis. This left a usable response rate of 36% (15) which, while useful for comparative work, is not enough to place too much significance on the findings.

4.3.2 Response Rate to the Hill Country Farmers Survey

The postal questionnaire was sent to 255 hill country farmers. As 30 of the questionnaires were returned marked "gone no address" the sample size was reduced to 225 and the response rate achieved was 40%. This response rate was relatively high for a survey of this type. The survey required the respondents to recall data from five years ago (1985) and was time consuming, all things to detract from a good response rate (Dillman, 1978). The response provides a fair representation of all counties. A mistake made by the author in not coding posted questionnaires meant testing for non-response bias was not possible.

4.4 Techniques Used to Place a Monetary Value on Changes in Rural Services

Contingent Valuation

To apply the contingent valuation technique all members of the household 15 years and older which were present when personally interviewing Mangamahu Valley farmers were asked a willingness to pay question.

The question asked related to the situation whereby a second ambulance officer was not always accompanying the ambulance driver in an emergency call to the Mangamahu Valley.

The respondents were asked how much they would be willing to pay to see an improvement in the service, whereby in an emergency call-out the ambulance driver was accompanied by an ambulance officer. Thirty-one responses were obtained.

Hedonic Pricing

A question was included in the questionnaire sent to hill country farmer to assess the feasibility of an hedonics application (see rural services question A.3). The question on acquisitions and disposals was included to evaluate if enough market transactions had occurred in the study area and if this was the case, as a means of identifying the sample to be surveyed, further to obtain the information to implement an hedonics application.

CHAPTER 5

HOW NON-GOVERNMENT SERVICES RESPONDED

5.1 Introduction

As explained in Chapter One the impact on rural servicing infrastructure due to a change in government policy was determined from an analysis of business directory data obtained from the Department of Statistics. The business directory provides information on the number of activity units (rural servicing businesses) and persons employed by area in each category for the years 1987 to 1990. For the purpose of this study, information from 1985 to 1990 was sought, but unfortunately the business directory data was only available from 1987. Data was obtained for the Waimarino, Waitotara and Wanganui local authority areas. From the business directory data obtained the impact of changes in rural services in Raetihi and Ohakune was analysed.

The rural service categories provided by the Department of Statistics were construction/not building (includes drainage and flood control projects, irrigation projects, road works, road construction and sealing), water works and supply, ie catchment staff, shearing services, scrub cutting, noxious animal control, route bus services, general freight carriage, stock haulage, school bus contractors, postal/courier services, crop harvesting, fencing, aviation spraying, hospitals, ground spraying, telecommunication, trading banks, savings banks, general practitioners, dental services, libraries, live stockholding, livestock contractors, ground topdressing, private veterinary practices, other agricultural consultancy services, aviation topdressing, agricultural and other related products, other veterinary services including clubs and agricultural consultants.

While the analysis of the business directory will show information on changes in firm numbers and employment over the time period, of interest is also what changes have happened within the rural services units, e.g. strategies adopted

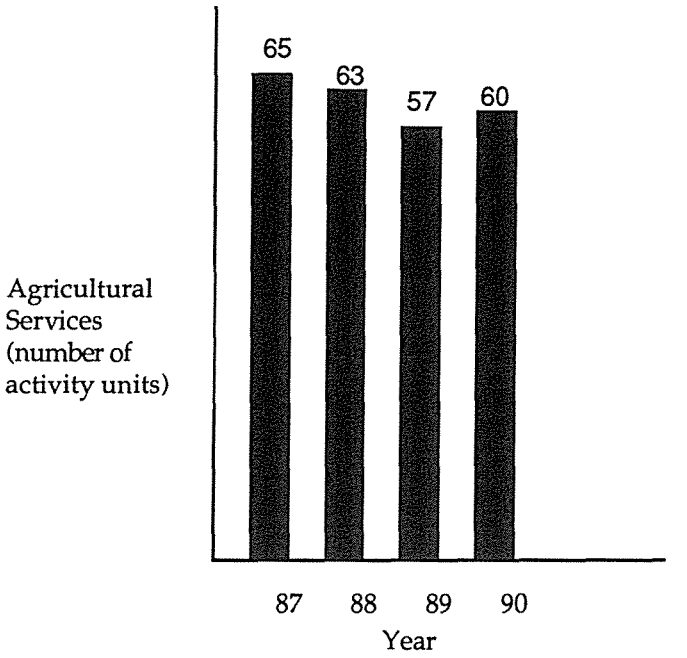
and how have they reacted. To that end, a sample of non-government services were surveyed. This information was analysed using a structure/conduct/ performance framework, similar to that used by Dobson and Rae (1990) in their study on "How Agribusiness Responded?" "The structure/conduct/performance paradigm is the traditional framework within which industrial economists view regulation (Weiss and Klass, 1986)". This views perfectly competitive markets under certain restrictive conditions as involving an idealised form of self-regulation, and measures the success of public intervention in terms of its ability to recreate these same conditions in the market (Bollard, 1987). By adopting a similar framework, comparison between the results was possible.

5.2 Changes in Non-Government Rural Services and Employment

Analysis of the business directory showed how the availability of non-government rural services has changed over time. The bar graph (Figure 5.1), below, shows the total number of rural services (in terms of activity units) available for the years 1987-1990.

Agricultural services were defined as including the following services: scrub cutting, aviation spraying, groundspread cropping services, livestock holding, noxious plant authorities, stock haulage, private veterinary practices, other agricultural consultancy services, agriculture and other related products (stock firms) and water works and supply (catchment boards).

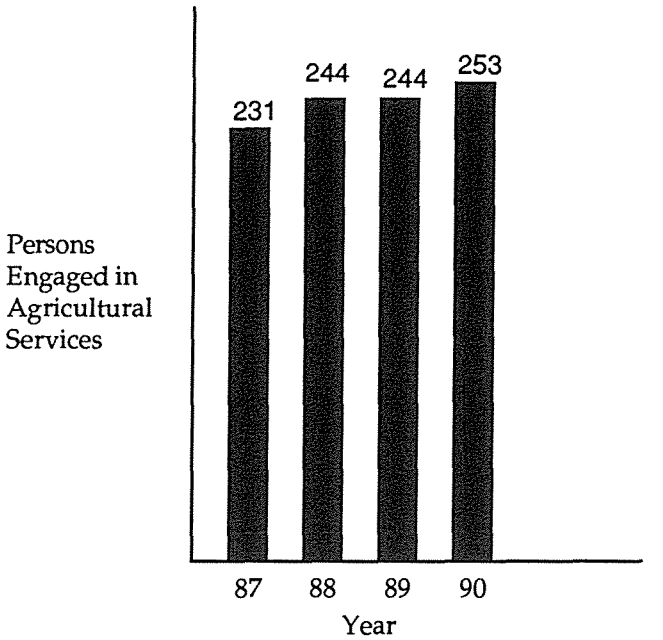
Figure 5.1 Total Agricultural Services Available.



The results are surprising, in that the number of services available has remained relatively constant from a high in 1987 (65) to a low of 57 in 1989. Conversations with farmers in the area seem to always convey the message that the number of agricultural services available to them had declined dramatically since economic liberalisation measures were introduced in 1984. One possible explanation is that a large number of firms exited the industry from 1984 to 1986. The most likely answer to apparent contradiction is that the disappearing agricultural services farmers talk about, differ from those included in the business directory data.

The next graph (Figure 5.2) shows total persons employed by agricultural services over time.

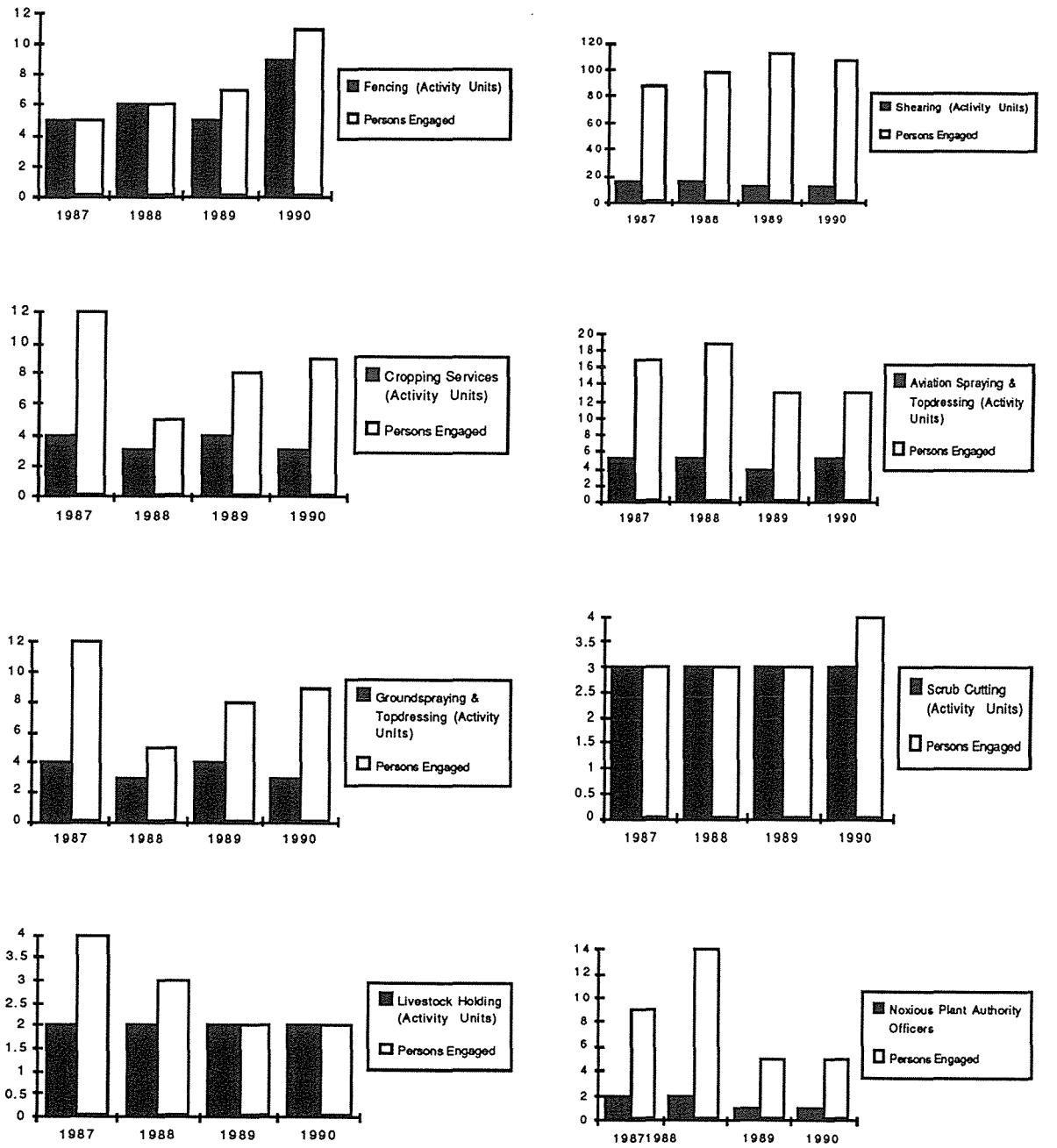
Figure 5.2 Total Persons Employed By Agricultural Services.

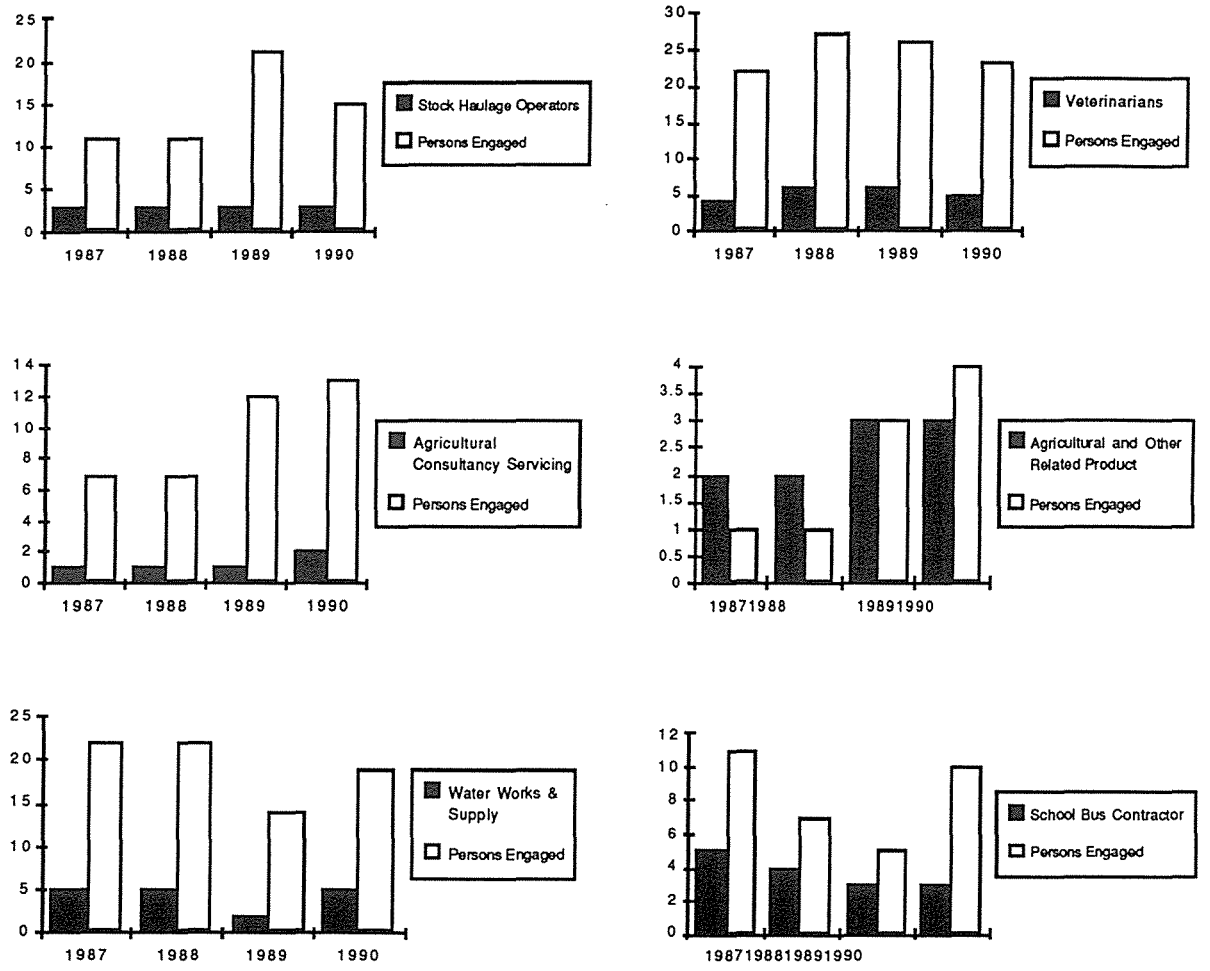


The graph shows a trend toward an increase in persons engaged in agricultural services. It is interesting to note that while there has been an increase in persons engaged in agricultural services, the number of activity units has declined (although not by much). This indicates that rural services firms are getting larger. This trend is consistent with the findings of Dobson and Rae (1990).

To have a closer look at how individual agricultural services have responded over time, the following series of graphs (Figure 5.3) depict categories of services between 1987 - 1990.

Figure 5.3 Changes in Firm Numbers and Persons Employed for Different Categories of Services.





The graphs show that between 1987 and 1990 the number of activity units/firms for the different categories remained, largely, fairly constant. The only significant changes are the increase in fencing contractors (the number doubled), and the decreases in school bus contractors and noxious plant activities. The changes show all services are still readily available. One farmer's comment was "The situation actually has improved, the agricultural contractors now ring me instead of me having to ring them". This situation is due to reduced demand for agricultural services.

Given the earlier contradictory information that shows a constant availability of rural services and farmers' comments that indicate there has been a major

reduction in the availability in rural services, I have superimposed the employment statistics on the above graphs to test if the availability of services has dimished due to lower staff numbers. The graphs show this is not the case, with employment levels increasing.

5.3 Impact on Raetihi and Ohakune

With the help of the business directory data, the following two tables were put together showing the change in activity units and persons engaged in rural servicing infrastructure in Raetihi and Ohakune Boroughs (Table 5.1 and 5.2).

Table 5.1 Changes in Rural Servicing Infrastructure in Raetihi.

Raetihi

	1987		1988		1989		1990	
	Activity Units	Persons Engaged	Activity Units	Persons Engaged	Activity Units	Persons Engaged	Activity Units	Persons Engaged
Scrub cutting	1	1	1	1	1	1	1	2
Fencing	1	1	-	1	1	1	1	1
Shearing services	2	10	3	11	1	1	-	-
Live stockholding	1	2	1	1	1	1	1	1
Livestock contract	1	2	1	2	-	-	-	-
Groundspread topdressing	-	-	1	5	1	5	1	5
Groundspread spraying	1	1	1	1	1	1	-	-
Noxious animal control	1	-	1	-	-	-	-	-
Water works & supply	1	-	1	-	-	-	1	-
Construction/not bldgs	7	29	7	24	5	13	5	12
School bus contractors	1	4	1	4	-	-	-	-
Stock haulage	1	5	1	5	1	5	1	5
General freight carriage	3	15	2	7	2	9	2	9
Postal/courier services	1	6	1	5	1	6	-	-
Trading banks	1	8	1	8	1	3	1	3
Savings banks	1	2	1	4	1	4	1	3
Hospitals	1	325	1	325	1	28	1	28
Private vet practices	1	3	1	3	1	3	-	-
Libraries	1	-	1	-	-	-	1	-
Route bus services	-	-	-	-	1	4	1	3
General practitioners	-	-	-	-	1	3	1	4
TOTAL	27	414	27	407	21	88	19	76

Table 5.2 Changes in Rural Servicing Infrastructure in Ohakune.

Ohakune

	1987		1988		1989		1990	
	Activity Units	Persons Engaged	Activity Units	Persons Engaged	Activity Units	Persons Engaged	Activity Units	Persons Engaged
Groundspread topdressing	-	-	1	3	1	2	1	2
Water works & supply	1	-	1	-	-	-	1	-
Construction/not bldg	5	37	3	12	4	49	7	33
School bus contractors	2	4	2	2	2	2	2	2
General freight carriage	4	13	4	9	5	7	5	9
Telecommunications	-	-	1	33	1	19	1	16
Postal/couriers service	2	20	1	10	1	5	1	6
Trading banking	1	9	1	9	1	12	1	13
Savings banking	1	4	1	4	1	4	1	2
General practitioners	1	3	1	3	1	3	1	3
Dental services	1	2	1	2	1	-	-	-
Libraries	1	1	1	1	1		1	1
TOTAL	19	93	18	88	19	103	22	87

In table 5.1, the activity units and persons engaged in rural servicing in Raetihi are shown for the year 1987 to 1990. Some obvious changes are immediately apparent, such as the huge loss in employment created by the closing down of part of Raetihi's hospital services. This is a direct consequence of government's restructuring of the health services. In terms of activity units, the drop of 22 percent between 1988 and 1989 represents a significant reduction. The reduction in activity units has seen the loss of shearing services, livestock contractors, groundspread spraying, noxious animal control, postal/courier services, school bus contractor and private veterinary practitioners based at Raetihi.

Given the geographically locations of Raetihi and Ohakune, only ten kilometres apart, it is important to note that of the above services lost from Raetihi only the

postal/courier services and school bus contractors can be substituted for by travelling to Ohakune. One must therefore assume, and this is also based on the result of the postal survey of farmers, that farmers now have to obtain these lost services from Wanganui or Taumaranui. For the same reason, the loss of dental services from Ohakune is a major blow for Raetihi.

The other notable feature of the table is the reduction in trading bank staff due to the formation of an agency at Raetihi. Only slight variations occurred for the remaining services. On the positive side, Raetihi has gained a permanent general practitioner.

The table for Ohakune (table 5.2) shows a small increase in activity units over the four year period from 19 in 1987 to 22 in 1987. Note the scaling up of the trading bank at Ohakune to replace the lost service at Raetihi. The only service lost is the dental service.

The changes discussed above were reinforced when talking to local farmers based near Raetihi and Ohakune. Interesting comments were "only cheap housing in Raetihi maintains the population", and "you only need to drive through the centre of town to see the change". Or as one farmer put it, "if it wasn't for the old established retailers based at Raetihi that would never close, Raetihi would be a ghost town." It is interesting to note that Raetihi's community fought hard and won the battle to stop the local Post Office closing. Tied in closely with the battle to save the Post Office is the availability of cheap housing which encourages Social Welfare recipients to the town.

Ohakune on the other hand has been buoyed by the tourist (recreation) and market gardening income, which shows again that a town not solely dependent on a single industry finds it easier to survive. Ohakune can count itself lucky to have the mountain, and good market gardening soils. Raetihi currently has neither of these, even though there may be some potential in river tourism and forestry in the future.

Similar changes as experienced by Raetihi were experienced by Waitotara (no table was created for this town from the business directory). This town is mainly dependent on hill country farmers for its survival. Services lost in the last five years (1985-1990) include an agricultural contracting business, the local mechanic and petrol station, and the local Post Office.

5.4 The Rural Services Survey, and Comparable Studies

The services analysed for the study were agricultural contractors, aviation spraying contractors, aviation topdressers, trading banks, savings banks, doctors, garage owners, rural mail delivery contractor, shearing contractor, stock haulage operator and a veterinarian. As indicated in the methodology (section 4.2.1), the responding population was small, but the wide distribution of firms (of those that responded) does provide a large cross-section of rural services. Because of the low number of observations, caution should be taken when interpreting the results.

Additional information, both to boost the results and to provide a cross check, is found in the study by Dobson and Rae (1990), and Corbo and de Melo (1985). Before using this extra data however, one needs to recognise the differences between the studies. Both studies deal with rural services, this study however deals with services that relate directly to on-farm business while the Dobson and Rae study dealt with large, medium-size and smaller businesses serving pastoral agriculture, including exporters, statutory boards, co-operatives, processors, farm input suppliers, finance firms and other service industries. While broad macro economic policy changes had impacts on all firms, the impacts of liberalisation measures were expected to affect exporters differently than farm servicing businesses. This makes direct comparison not possible, although trends should be similar.

As explained earlier, Dobson and Rae's analysis uses a structure/conduct/ performance framework to describe the underlying economic and technical

characteristics of an industry which affects internal competitive forces, the industry's environment, the industry's attractiveness and the profitability of firms. This study adopts a similar framework in that the conduct (strategies), structure and performance of the firms in adjusting to liberalisation measures are assessed. While questions pertaining directly to structural change are omitted, inference can be drawn from the business directory and comments made in the questionnaire responses.

The Corbo and de Melo (1985) study, analyses business adjustment, in the low southern cone countries of South America, to greater emphasis on markets to allocate resources and greater openness to trade and capital flows. While in these countries strong labour markets and a belief that the reforms were unsustainable hampered adjustments, the following strategies were adopted by surviving firms:

- Product quality was improved.
- Pricing decisions were guided to a greater degree by competitors' prices.
- Inventory management and control were improved.
- Financial management techniques were modified to reduce interest expenses.
- Specialisation increased (and the number of items in product lines decreased).
- Investments were made in new machinery and plant modernisation.
- Labour force was reduced in size.

In the Dobson and Rae (1990) agribusiness managers were asked to assess the effects on their profits of certain generally favourable and unfavourable changes in the economic environment related to economic liberalisation.

The top rated generally favourable changes are listed in order of ranking:

- Changes in tax laws.
- Better opportunity to adjust the structure of the firm by association with, or acquisition of, other firms.
- Elimination of price controls.
- Lower costs for imported raw materials.
- Better access to working capital.
- Better access to other financial capital.

The top rated generally unfavourable changes are listed below in order of ranking:

- Reduction in profitability of exports caused by appreciation of the New Zealand dollar.
- Reduced subsidies paid to purchasers of the firm's products.
- Increase in cost of borrowed working capital.
- Reduced purchasing power of customers in the domestic market.
- Increase in the cost of other borrowed capital.
- User-pays system increased the cost of goods and services obtained from the government.
- Increase in the prices charged for goods and services obtained from state-owned enterprises.

It is in light of these findings that the results of the rural services survey will be discussed.

5.5 The Rural Services Survey, Results and Discussion

The table 5.3 below shows for each of the businesses which ceased trading between 1985 and 1990, the reason for quitting, the date and the number of people employed.

Table 5.3 Businesses that Indicated They Are No Longer Trading and Reasons Why.

Nature of Business	Reasons Why Ceased Trading	When Ceased Trading	No. Employed
Shearing Contractor	Family matters	1986	9
Agricultural Contractor	Injury	1988	1
Agricultural Contractor	Downturn in services required	?	4
Agricultural spraying	Downturn in rural scene	1988	1
Agricultural contractor	Uncertain business conditions	1987	1
Agricultural spraying	With rural downturn became uneconomic	1987	1
Medical practitioner	Retired	1988	1
Bank closed two branches (Trust Bank)	Reduced trading levels	1990	7
TOTAL 8			25

A high 19 percent (8 of 42) of respondents indicated they had ceased trading in the period 1987 to 1990. The business directory data which allows the same information to be extracted indicate an 8 percent reduction in firms in the agricultural service industry. Given the response rate and the inherent possibility for error, this result is close enough to place a high significance on the reduction in agricultural servicing firm of 8 percent over the period 1987 - 1990. Of the reasons cited for closure, 63 percent are due to economic liberalisation measures.

Favourable and Unfavourable Factors Impacting on Rural Servicing Firms

Rural service owners/managers were asked to rank economic changes (as presented in the survey) in terms of the percentage impact on the firm's gross profit due to economic liberalisation over the last five years. The economic

changes used were those considered by the author and popular press to have had the greatest impact on the firms.

The impacts on profits are ranked from the least favourable economic change to the most favourable change (Table 5.4).

Table 5.4 The Impact on the Profits of Rural Services Due to Economic Liberalisation.

Economic Changes	Ranking	Average % Impact on Profits	No. of Responses
Reduced expenditure by farmers	1	-29	12
Reduced subsidies paid to farmers	2	-19	13
Deregulation of financial services	3	-5	7
Increases in the prices charged for goods and services obtained from SOE	4	-2.9	8
Increased cost of goods and services obtained from government departments under user-pays	5	-2.6	7
Change to tax laws	6	-2.5	7
Elimination of price controls on the firm's products	7	1.0	7

The two items ranked the most unfavourable changes were closely related. The effects of eliminating agricultural assistance and the loss of subsidies meant the inability of farmers to maintain purchasing power. It is therefore not surprising that reduction in expenditure and the reduced subsidies available to farmers had the greatest impact on rural servicing profits. This result is consistent with the findings of Dobson and Rae.

Deregulation of financial services was considered an unfavourable change. The result of financial deregulation was the elimination of price controls. In Dobson and Rae's work this was considered a favourable change by agricultural leaders. One must assume that in answering the question, rural servicing managers identified deregulation of financial services as meaning "increased interest rates".

Changes in tax laws, while being judged the most beneficial change in Dobson and Rae, was considered a slightly unfavourable change to small rural servicing firms. Since marginal tax rates and corporate rates have lowered, one possible explanation for rural services ranking it unfavourably is a backlash against the increased taxation base. One must assume the rural services owners/managers answering this question felt the increased tax base, ie GST, fringe benefit, land tax and the loss in tax write-offs, was unfavourable.

In Dobson and Rae "better opportunity to adjust the structure of the firm by association with, or acquisition of, other firms" was ranked as the second most favourable change. From earlier analysis of the business directory data it was clear that the number of activity units (firms) had declined by 8 percent from 1987 - 1990 while the number of employees in the remaining firms had increased by 10 percent. This indicates the same trend is occurring in smaller agribusiness. Indeed many farmers were fearful of monopolistic firms forcing up prices.

Changes in Conduct (Strategies)

Rural service manager/owners were asked to indicate how important certain strategies were in adjusting to economic liberalisation. Strategies cited were obtained from recent research and popular press. The manager/owners were asked to rate each strategy, in terms of importance to their business, using a ranking scale.

Table 5.5 Important Strategies adopted in Adjusting to Economic Liberalisation.

Economic Adjustments	Ranking[1]	Average Rating[2]	No. of Responses	Group Belongs To
Increased emphasis on cashflow	1	3.14	14	Financial
Changes in pricing policy	2	2.71	14	Pricing and marketing
Reduction in drawings paid to owner(s)	3=	2.64	14	Financial
Increased labour input by owner(s)	3=	2.64	14	Labour practices
Reduction in borrowed funds	5	2.23	13	Financial
Sale of assets	6	2.15	13	Financial
Improvement in service quality	7	1.85	14	Pricing and marketing
Increase in borrowed funds	8	1.84	13	Financial
Reduction in the number of employees	9	1.71	14	Labour practices
Adoption of labour saving techniques	10	1.69	13	Production
Changes in inventory policy	11	1.0	13	Production
Mergers and/or acquisitions, ie expansion	12	0.61	13	Organisational

(1) Rankings are based on average ratings computed from figures supplied by managers.

(2) Meaning of effect on profit scores appearing in average rating column: 0 = Not applicable; 1 = Not important; 2 = Somewhat important; 3 = Important; 4 = Very important.

The strategies enumerated in the table can be grouped into financial strategies, labour practices, production strategies, pricing and marketing strategies, and organisational strategies.

The results show that the financial strategies account for three of the top five reforms. Pricing and marketing strategies rate second followed by labour and production strategies. Organisational strategies came last.

The top ranking received by financial strategies is consistent with the results obtained by Rae and Dobson. Increased emphasis on cashflow management is no doubt the most important strategic adjustment taken by agribusiness firms.

As most of the small businesses surveyed would be sole traders the high ranking given to reduction in drawings paid to owners and reduction in borrowed funds is not surprising. Indeed the same strategy ranked highly for Dobson and Rae. The remaining high ranking financial strategies adopted by the firms are consistent with firms facing a declining industry.

Of interest is the low ranking placed on reduction in the number of employees. Work by Corbo and de Melo and Dobson and Rae indicates this strategy was important in adjusting to economic liberalisation measures. One can only assume that either employees in the rural services surveyed were needed, or the owners increase/decrease their own labour input in the firm to account for labour slack, or the services did not employ any labour. Earlier analysis of the business directory data indicated that the number employed in rural services in the study area had actually increased from 231 to 253 (see figure 5.2), an increase of approximately 10 percent. This figure supports the low ranking given to reduction in the number of employees. Other sources of employment data on agricultural services are provided in the census. This indicates a 12 percent contraction in employment in that industry between 1981 and 1986 (Savage, 1990). No data is available on the period 1986 to 1990.

Changes in Performance

Financial information was sought in the survey to assess changes in performance. No evaluation of competitiveness was included. Data on gross profits are presented in table 5.6.

Table 5.6 Agricultural Services Gross Profits.

	1985	1986	1987	1988	1989
Average Gross Profit[1]	53,856	53,037	45,629	43,514	39,973
No. of Responses	7	7	7	6	8

(1) In real terms, base year 1989 using the CPI (Source: NZ Yearbook, 1990)

Gross profits, in real terms, have decreased from a high in 1985. Given major economic liberalisation measures such as the removal of SMP's (1984) the results are what one would expect. Due to the low number of observations little more can be said.

The extremely low response to the question on changes in net sales means the results are of no significance and therefore are not reported. What is reported is the percentage of sales attributable to farmers (Table 5.7).

Table 5.7 Sales Attributable to Farmers.

	Work Attributed to Farmers				
	1985	1986	1987	1988	1989
% Sales attributable to farmers	83	84	82	80	77
No. of responses	8	9	9	8	8

Work attributed to farmers shows a slow decline. This is not surprising given farmers have reduced expenditure.

Although economic liberalisation has reduced demand for agricultural services in the agricultural sector, opportunities were made available to move into new market niches by the removal of the provision of many government services.

Indeed one respondent had seized the opportunity and improved performance twofold, by now spraying road sides, a job formerly done by the Ministry of Transport.

Business Confidence

Firms were asked to rate the outlook for their business over the next ten years. The options were:

1 = Optimistic, improving
2 = Pretty good, quite reasonable
3 = Fluctuating, no worse/no better
4 = Dismal, gloomy, at a critical point

A similar question was asked of farmers. For the businesses the result was a mean 2.64 which indicates that agricultural services see no signs of optimism or gloom, and view the outlook as maintaining a status quo. Analysing the result further, four rated the outlook as dismal, two felt it was fluctuating, seven indicated it was pretty good and one considered it as optimistic.

5.6 Summary

The changes in the availability of rural services analysed over the period 1987 - 1990 is minimal with a small decline of 8 percent. In conjunction with this decline in the number of rural services is a 10 percent increase in persons engaged by the fewer rural services. This indicates a trend towards fewer but larger firms, which is consistent with the findings of Dobson and Rae. Indeed many farmers are scared of possible monopolistic powers developing forcing prices up.

One possible reason for the low exit of firms is the specialised nature of agribusiness assets which are not easily transferable to other industries.

Comparing the changes in rural services in Raetihi and Ohakune, one sees the total loss of seven services now based in neither towns. Raetihi's dependence on farming has seen the town hit hard, not only in terms of the availability of services but also in persons engaged in those services.

The results of the survey on agricultural services indicate that the elimination of price controls on firm's products was seen to be a favourable change. Highly unfavourable changes were the reduction in expenditure by farmers resulting from reduced subsidies and lower income levels. Of interest is the reported 2.4 percent reduction in profit caused by the increased cost of goods and services obtained from SOE's and the 2.5 percent reduction in profits due to user-pays.

Important strategies adopted by agricultural services firms to adjust to economic liberalisation have been in order of importance: increased emphasis on cashflow, changes in pricing policies, reduction in drawings paid to owner(s) and increased labour input by owner(s). These results are similar to Dobson and Rae's (1990).

In terms of performance, agricultural services achieved lower gross profits and there is movement in sales away from the farming sector to non-farming sectors.

CHAPTER 6

RE-SURVEYING THE MANGAMAHU VALLEY AND THE APPLICATION OF CONTINGENT VALUATION

6.1 Introduction

To assess the impact of changes in rural services on a rural community it was decided to re-survey the Mangamahu Valley as discussed in the chapter on methodology (see section 3). This chapter presents the findings of the survey, including the results of the contingent valuation application.

6.2 The Results of the Survey

The Mangamahu Valley extends up the Whangaehu River Valley starting approximately $^1/_2$ hour from Wanganui ending 2 hours from the city. As one drives up the valley the land changes from mostly flat to very steep hill country, from tar sealed road to a gravel road. There are farms in fourth generation ownership and others that have just changed hands. Tenure varies from private ownership, leasehold, farm manager, to trust and farming companies. Land use is predominantly sheep and beef with some horticultural, mainly kiwifruit, in the lower parts of the valley, cropping on the flats and some forestry.

The following are the results of the personal interviews with farmers in the Mangamahu Valley:

6.2.1 Farm Numbers and Farm Characteristics

In 1978 there were 40 farms in the valley, at the time of conducting the survey there were 45 farms. Reasons cited for the change in farm numbers were: amalgamation, sale to forestry interests and the splitting up of properties into lifestyle blocks.

Farmers age and Retirement

All farm owners surveyed fall into the 35 plus age bracket. This result is consistent with the average age reported by the Statistics Department of 44.

Figure 6.1 Map of the Mangamahu Valley.

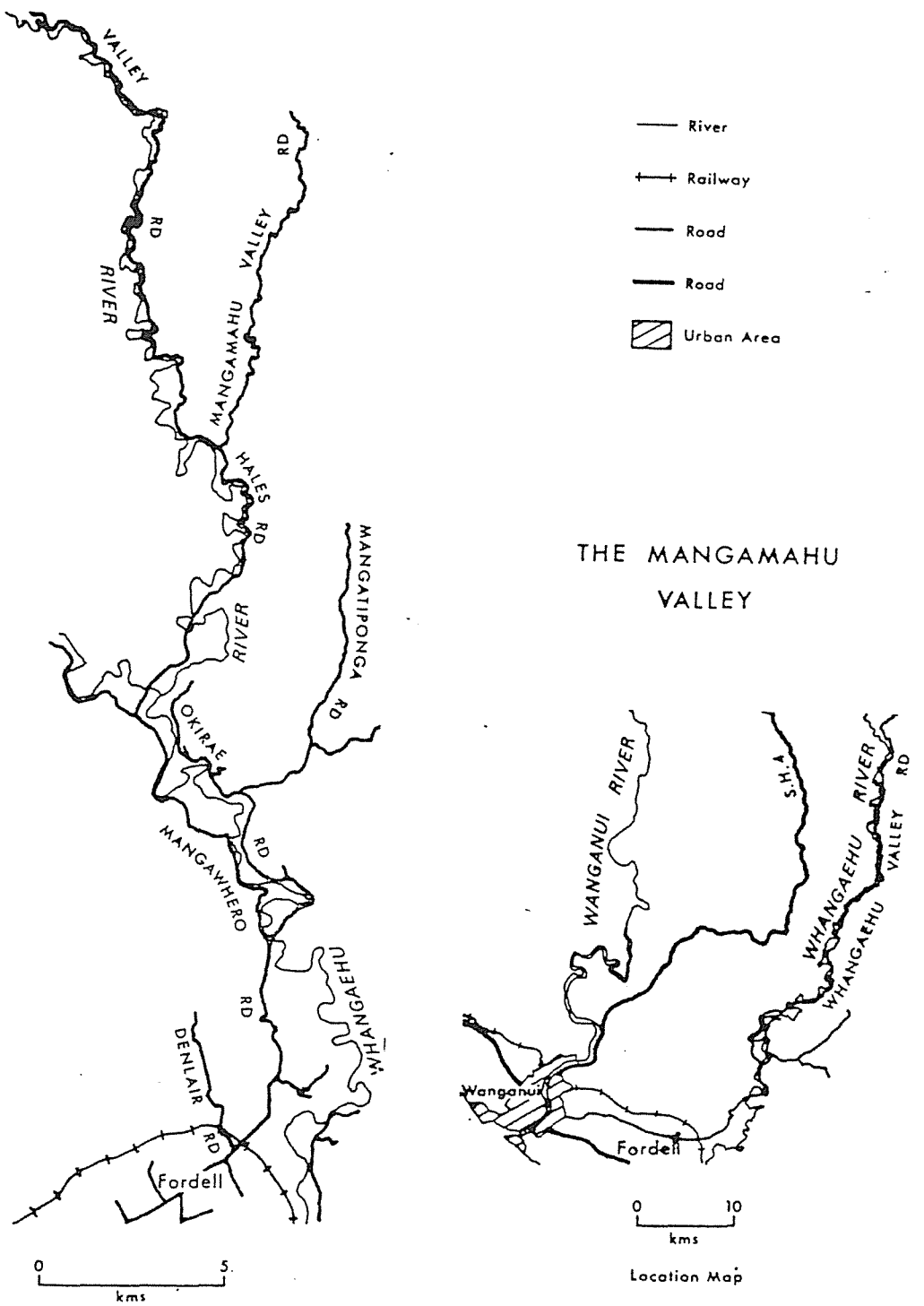


Table 6.1 Age of Farmers Surveyed.

MANGAMAHU STUDY			KAPLAN STUDY		
Age of Owners	No of Respondents	%	Age of Owners	No. of Respondents	%
35-44	7	47%	21-25	1	2%
			26-30	2	5%
			31-35	6	14%
45-54	3	20%	36-40	8	19%
			41-45	6	14%
			46-50	9	21%
55	5	33%	51-60	5	12%
			61+	5	12%
	15	100%		42	100%

In Kaplan's work he reports that most farmers retire after 52 years of age. The survey results indicate that the average age of retirement is increasing as most farmers over 55 wishing to sell or retire were unable to do so because of the need to maintain their labour input or because of the inability to sell and retire on these funds. Some farmers who wished to hand down the farms to their son indicated that poor economic conditions meant their sons could not afford this option.

Farmers were asked what would happen to their farms when they retired, the results of which are presented below.

Table 6.2 Future Owner of Farm When Present Owner Retires.

Farm's Future Owner	No. of Respondents	%	Kaplan Study
Sold	4	27%	-
Son's Takeover	3	20%	85%
Encourage sons/daughters to take a Profession	7	47%	-
Employ a Manager	1	7%	15%
TOTAL	15	100%	100%

The Kaplan study shows most farmers thought their sons would take over the farm. The survey results show a completely different picture. By far the largest number of farmers indicated that they would encourage their sons/daughters to graduate with some profession and only then if they were dead set on farming, would they hand the farm over to them. These farmers tended to be the younger farmers, in 35 - 44 age bracket. The farmers that indicated their sons would take over the farm were already in a situation where their sons had a partnership in the farm.

Aquisition and Disposals

Of the farmers surveyed 40% had made some acquisition. Two acquisitions were the lease and purchase of flat land for fattening and one had leased forestry land. Three had purchased the neighbour's farm and one had sold the hill country farm and moved onto flats further down the valley. Reasons cited for the disposal where "to retire", "to retire debt" and "to move out of risky hill country farming". Of the land sold, one block was sold to forestry interests, one block to a non-farming business man and one split into small lifestyle blocks.

Farm Employment

The following results relate to changes in farm employees and questions on the calibre of farm workers.

Table 6.3 Number of Farm Workers Residing on the Property .

Year	Total No. of Farm Workers (1)	Employed Workers	Family Workers
1978	25	14	11
1985	24	4	20
1990	17	2	15

(1) Includes owners and sons

The table shows minimal decrease in total farm workers from 1978 to 1985. For the period 1985 - 1990 we see a 29% decline in total farm workers. When we remove owners and sons from the picture we get a more dramatic decline. From 1978 to 1985 we see a 71% decline in permanent farm employees. From 1985 to 1990 there is a further 50% decline.

The overall trend is a decline in total labour input. Farm employment has fallen dramatically, but to compensate there has been a greater family labour input into the farm from 1978 to 1985. The trend from 1985 to 1990 is a movement of family labour input off the farm, mainly through retirement. Given all employed farm workers were married in 1978 and most had children, the impact on the valley population through lost farm workers would be highly significant. Most family members returning to the family farm were unmarried sons.

All farmers surveyed indicated they could get the calibre of farm worker required. There was no problem in getting enough farm workers. Farmers did comment that they tended to employ casual workers more than in 1978. Some

farmers commented that the lack of services, especially sport and schooling, made it hard to attract permanent farm workers with families into the valley.

6.2.2 Land Use Changes

Farmers were asked how land use had changed over the twelve year period since the Kaplan study. (Table 6.4)

Table 6.4 Changes in Land Use 1978 - 1990.

Changes	No. of Farms
From Stores to Finishing	4
Developed kiwifruit block	5
Moved to cropping	2
Goats and pines	1
Deer	1
Investment in a Packhouse	2
Other horticultural crops	1

Over the 1978 to 1990 period the farms surveyed showed a major change in land use. Five of the fifteen farms surveyed had enough productive flat land to allow them to move into kiwifruit production. This movement into kiwifruit occurred pre 1984. There are 8 orchards in the valley with a total of 50 ha of kiwifruit.

The diversification into kiwifruit has enabled the building of a packhouse. The ownership of the packhouse is through a four-way partnership with production of $^1/_4$ million trays in 1990. The part-time employment of approximately 60 staff injected $120,000 in wages into the community. Many farmers indicated that the

ability of their wives to get part time work at the packhouse had helped them survive the hard farming times with the removal of subsidies. The poor returns from kiwifruit over the last few seasons are forcing some growers to re-think this investment decision.

The availability of flat land determines whether a farmer has diversified and/or intensified to maintain farm profitability. Most farms further up the valley did not have 20 ha of flat land, an often used minimum amount to allow diversification (pers. comm Finlayson, 1990), hence the opportunity to change production to new land use was limited. Some farmers facing this predicament had leased flats to enable them to finish stock. Changes in land use after 1984 have been limited to a small movement from stores to fattening.

6.2.3 Rural Services

The signals sent to the farmers over the last five years have meant farmers have reduced expenditure on inputs and maintained a status quo in land use. To this end, farmers in the valley have reacted to changes in Catchment Boards, Weed and Pest Control Advisory Services and other services. These reactions are discussed in the following sections.

Catchment Boards

Most farmers that had a farm plan implemented before the gradual reduction in subsidies had carried out that plan due to end in 1990. As to investing in a new plan to control erosion, 20% of the farmers said "they would if they could afford it", and a further 26% said "when the subsidies stopped I stopped planting". Thirty three percent indicated they never used the service and 13% indicated they were still planting but at a much reduced rate without the subsidy.

To summarise, 46% of farmers that did use catchment services have now stopped. Only 13% were planting trees in the current economic environment. Hence if the economics of farming improves we should see 20% more plantings.

Farmers were asked if they had an afforestation programme. Twenty six percent indicated yes, that they had a small block (5-20 ha) planted in the late seventies.

Table 6.5 Reasons for Changed Investment in Erosion Control.

Reason	%
Inability to Pay	20
No Subsidy	26
Never Used the service	33
Still Planting at the Reduced Rate	13
No Change	8
Total	100

No farmers had a current afforestation programme. All trees planted were for shelter and erosion control.

Table 6.6 Number of Trees Planted from 1985 to 1990.

Year	Number
1985	1105
1986	1500
1987	1050
1988	50
1989	550
1990	-
TOTAL	4255

Weed and Pest Control

All farmers indicated that over the last five years weed and pest control carried out by them had decreased. Most were only spraying weeds to maintain clean areas and were using more labour rather than just chemicals to control the problem. The main reason given for reduced control was the lack of profitability in farming.

It was recognised that a lot of gorse country in the valley had been cleared because of subsidies and now, because times were tough, this country was reverting back into gorse.

Some farmers in the valley commented that they see Regional Council pest control staff more often now, but they spend most of their time counting the pests rather than controlling them. The opossum population was considered out of control by 20% of farmers. One farmer had changed his cattle farming policy to overcome the problem.

The conclusion one can reach is that changes in the delivery of catchment and weed and pest control have meant that they have become discretionary items in farming expenditure. They now will fluctuate like fertiliser application depending on the farm income.

Advisory Services

The consensus among kiwifruit growers in the valley was they used MAF Advisory Services a lot in establishing their orchard. Once the orchard was established their use has diminished due to their own increased knowledge. A kiwifruit discussion group held a meeting once a month in which a MAF horticultural consultant was paid to attend. One farmer commented that the discussion group was good value to start with but now it was more of a social event.

Table 6.7 Farmers' Current Use of Advisory Services.

Service	No. of Farmers
MAF Consultant	3
Private Consultant	2
Don't use a Consultant	10
TOTAL	15

Use of MAF and private consultants was minimal with only 20% of farmers using MAF two to three times a year. Private consultants fared worse with only 13% of farmers using them. The majority of farmers (67%) relied on reading, advice from the vet, bank managers and accountants.

Of the farmers not using consultants, 20% felt they were more educated than the MAF consultant. Farmers that used MAF consultants tended to use private consultants as well. The impact of user-pays has meant reduced demand for MAF services. The recurring comment was "If I used MAF before user-pays, I still use them, but less." Reduced farm profitability, and therefore development, limited the demand for advisory services.

Roading

Due to the declining roading contribution from Transit New Zealand, the Wanganui District Council had identified dead end/remote roads and bridges which it is considering returning to the user. The following is the reaction of farmers surveyed in the Mangamahu Valley.

There was a consensus that the condition of the road had improved since 1978 and even since 1985. Travelling time to Wanganui had reduced, hence the availability of services had improved in terms of travel time.

If one looks at the geography of the Mangamahu Valley we see farms on either side of a steep valley with the Whangaehu River flowing down the middle of the valley. Since only one road goes up the valley, bridges are needed to provide access to a number of farms in the valley. Hence, current talk of returning the bridges to the users is of major concern to a number of Mangamahu's farmers. To this end, two farms which sold in the valley in 1989 and which were properties with bridge access only considered that they were fortunate in selling their properties before the talk of returning bridges to users began. Such comments leads one to believe that the impact on a farm's property value of the proposed change would lead to depreciation in value. The returned bridge would be an improvement and increase the capital value of the farm, conversely the risk of lost access to the only road and the additional insurance cost on the bridge would reduce the land value.

Farmers faced with the situation of the possible return of a road were concerned about the additional expense. If the return of the road was to be matched by a reduction in rates equal to the Council's cost of maintaining that road, farmers felt it would be acceptable. The rationale behind this is that most thought they would be able to maintain the road at a lower cost than the Council could. Also, as the farmer's income fluctuated the decision whether to service the road could be based on the availability of funds. Most farmers thought their dead end road would cost about $2000-$3000 a year to maintain.

Electricity, Phone and Postal Services

The farmers in the valley had lost two post offices, one at Mangamahu and one at Fordell. Most farmers regret the loss of the post offices but indicated they did not use the services often, preferring to do all the registration, posting of mail, purchase of stamps etc. at once in town. The loss of the post offices meant the loss of PO Boxes for some farmers. This service has been replaced with an improved rural delivery service. Those wishing to maintain a private bag have to use a city post office. Most farmers prefer the rural delivery service as they get

mail delivered to their gate six days a week and do not have to travel to the local Post office to pick up the mail.

The possible removal of cross-subsidies on electricity, mail and phone services was considered to be "the nail in the coffin for hill country farmers". All were adamant that as New Zealand citizens these services should be provided "as of right". Farmers thought technological advances would reduce the cost of supplying telephone and mail services. Cellular phones had been purchased by a few farmers and a number had acquired faxes and computers.

All the farmers were appalled by the fact that if the phone broke down on Friday it would not be repaired until the following Monday. The phone was considered an important communication link with the outside world.

6.2.4 Availability of Rural Services

To assess some of the impacts of changes in rural services over the last five years, questions were asked on the reduced availability of services and the total loss of services and its impact on the farm.

Services Totally Lost Since 1985

In addition to the lost Post Offices, Mangamahu primary school lost its school bus in 1987. The parents now have to use private transport. One family spends two hours a day transporting their children to and from school. There is talk of purchasing a private bus.

The mail bus was replaced by a rural delivery contractor in 1985. This service is missed because the bus was based at Mangamahu and therefore provided a passenger service to and from town.

Services available in 1985 that are still available today but are a reduced service

The Mangamahu school was changed from a two teacher school to a sole teacher school in 1988. The sole teacher travels to school from Wanganui.

Mangamahu Primary School

Year	Roll	Teachers
1985	29	2
1987	15	2
1988	12	1
1989	13	1
1990	10	1

Fordell Primary School

Year	Roll	Teachers
1985	51	3
1988	58	3
1989	68	4
1990	79	4

(Source: Ministry of Education)

Many farmers see the Mangamahu Primary School under a real risk of closing. The Fordell Primary School has shown an increase in roll over the last three years. The loss of the bus service to the Mangamahu School was described as a major reason for the increasing roll. Farmers with young children indicated that transporting children back up the valley to the Mangamahu School was not a favourable option. Transporting children down the valley to Fordell was the logical choice even if it required more travelling. The reason for the preference to travel down the valley was because Fordell was on the way to town. Fordell also offered more resources and facilities than the Mangamahu School. Farmers thought smaller rural schools would close and education would be centralised at Fordell.

Farmers miss the weekly visit by the stock and station agent. Agents still deliver goods if required but the farm visit has been reduced to three to four times a year. Some farmers commented that:

- It was hard to get a doctor to visit the farm.
- Shearers were travelling more.
- The loss of the local trucking operator to a larger firm was sad.

The general consensus was that all services available five years ago are still available today. The services that have gone such as the post offices were under-utilised and hence it was considered inefficient to maintain them. The farmers as business people realised that "you have to pay for what you get", but they felt they should not be penalised in the delivery of electricity, mail and telephone services just because they lived in the country.

6.3 Summary of Results

To summarise, changes over the last five years have seen user-pays increase the cost of many rural services. The removal of income support subsidies has reduced demand for many services. The net result is that many farmers' standard of living is very poor.

Farmers have accepted changes as inevitable. They do however feel that other sectors such as manufacturing and labour should receive the same treatment. The use and availability of services is thought to go hand in hand with farm profitability.

The thing one notices is that the number of services has been declining since the turn of the century. Hence many services that have gone since 1985 would have gone anyway. For example, years ago Mangamahu had four post offices. The availability of services is improving with improved technology. For example, the mobile cellular phone enables the farmer to make a phone call from anywhere on the farm. Hence the impact of changes in services to a community such as Mangamahu is due to the increased cost of this service, which diverts income from investment to expenditure. The net result is less employment, development and general investment in the community and its resources.

The key to maintaining a community and its services such as the Mangamahu Valley is to encourage demand for rural services. To do this the valley must increase the population base and/or make more use of the available services.

To achieve this the existing packhouse provides an excellent opportunity to further integrate down the production cycle. Another opportunity would be to diversify into new investments to make better use of existing capacity. One such possible opportunity is apple production which ironically is still a regulated industry which totally controls the production cycle. This control would limit the use of the existing packaging and storage investment.

6.4 Contingent Valuation Survey Result

To apply the contingent valuation approach, residences of the Mangahu Valley were asked how much they were willing to pay to see an improvement in the ambulance service whereby an ambulance officer always accompanies the ambulance driver in an emergency call to the valley.

A total of 31 farmers, wives and sons were interviewed. Of the 31 responses, one of the three zero respondents was removed from the sample because it was clearly identified as providing a protest response to the valuation. This respondent's $0 bid was identified via further questioning on why this person responded in this manner.

6.4.1 Empirical Results

The mean for iterative bidding is $141.33, with a standard deviation of $126.13 (n = 30). The median is $100. Given that approximately 200 people reside in the valley, this equates to $28,266/year.

Table 6.8 Estimated Willingness to Pay for an Extra Ambulance Officer.

Method	Mean	Median	n
Iterative Bidding	$141.33 (126.13) (1)	$100	30

(1) Number in parentheses is the standard deviation.

6.4.2 Comments

As found by Kirkland (1988) the respondents tended to value and use the more "popular" amounts such as multiples of $50 and $100. The range of bids was from $500 to zero, with 36% of the valuations being $100. The respondent giving the $500 bid had used the service five times over the last five years.

He indicated that in each occasion only the ambulance driver attended the emergency. This respondent clearly identified with the need to have a second ambulance officer accompanying the ambulance driver in an emergency call. A total of 20% of respondents had experienced the hypothetical situation given in the contingent market, with many commenting that a farmer usually ended up driving the ambulance back to the hospital.

Of the two zero bids identified as valid valuations, the respondents felt that the close proximity to neighbours and experienced nurses who could assist the ambulance driver in an emergency made the need for the second officer unnecessary. One of these respondents indicated that if they lived further up the valley where you did not have close neighbours, their valuations would be a lot higher.

Given these comments it is interesting to see if there is strong correlation between location in the valley and the respondents WTP. Theory predicts the fewer the presence or availability of substitutes (rural services), the more convex the indifference curve the greater will be the willingness to pay (Sinden, 1986). This is the case with more remote farms where the availability of services declines.

Table 6.9 Correlation Analysis of How Location Influences WTP.

Factors Socio-Economic Elements	Correlation Coefficient (r) WTP
Location (1)	-0.02285

(1) coded as less than 15,000 = 1, 15,000-30,000 = 2, 30,000-45,000 = 3.

The value of the coefficient is -0.02285. This indicates there is no evidence to suggest any of the factors strongly influence the willingness to pay. Of interest is the sign of the value which can be interpreted as signifying in which direction a variable will influence willingness to pay. It shows that WTP tend to fall as the location of the respondents move further up the valley. This is not what one would expect. The variation in what one would expect and the result maybe due to the low sample size and the low value of the correlation coefficient.

6.4.3 Conclusion

The application of the contingent valuation question was very successful. All respondents readily identified with the hypothetical market and were very familiar with the situation. The decision not to have an opening bid created no

problems in obtaining a maximum WTP. No interview bias was introduced in trying to obtain an opening bid.

The standard deviation of bids show the distribution to be evenly spread, in direct contrast to a pilot run in which the range of bids was enormous. The even range of bids can be put down to the payment vehicle being realistic to the close and strong Mangamahu community.

It is interesting to note that a WTP $28,166 per year to ensure an ambulance officer accompanies the ambulance driver in an emergency in the valley, is approximately the cost of employing an additional ambulance officer.

This application has shown, how given the right circumstances, the contingent evaluation approach can provide an easily and quantifiable method of valuing a rural service. Contingent Valuation is a tool which can easily be adopted by policy makers and farmers in valuing the benefits of a rural service.

CHAPTER 7

RESULTS OF THE SURVEY OF HILL COUNTRY FARMERS

7.1 Introduction

This chapter summarises the results of the postal questionnaire sent to hill country farmers. The objective of this survey was to provide data on the impact of changes in rural servicing infrastructure. In trying to quantify the impact, the geographically diverse nature of farming makes accurate regional assessment of the impact of a lost/reduced service nearly impossible. For example, not all farmers will react to the loss/reduced service in the same way, hence aggregation of the impact requires the time consuming and costly process of interviewing all the individuals affected by the change.

The reaction to changes in terms of alterations in farm policy and spending patterns is hard to discern from reaction to the wholesale changes that have occurred in the agricultural sector over the last five years. Reduced spending on weed and pest control, advisory services and catchment work is due in part to the increased cost of these services, but is more likely to be due to reduced farming profitability.

7.2 General Characteristics of Farms Surveyed

This table summarises the general characteristics of farms surveyed as discussed in the following sections.

Table 7.1 Summary of General Farm Characteristics.

	No. of Respondents	Average	Total
Years of residence	89	23	-
Effective size (ha's)	80	719	61,152.5
Acquired land (ha's)	22	290	6,381
Disposed of land (ha's)	11	361	3,977

Farm Size

The average effective size of the farms surveyed was 719 hectares with the largest farm being 3,650 hectares and the smallest being only 76 hectares. The farmers surveyed account for 67,152 hectares which equates to approximately 28% of all occupied agricultural land in the Wanganui, Waimarino and Waitotara regions.

Residence

Of the 84 farmers that lived on the farm property, the average length of residence was 23 years. One respondent indicated he had resided on the property for 80 years. Five farmers that indicated they did not reside on the property, lived in town preferring to commute to and from the farm treating it as a 9 to 5 job. These farmers tended to farm land at the top end of a valley in a very remote area. The average size of these properties was 1,635 hectares. One of these farmers indicated that the two neighbouring farmers spend 60 man hours a month farming his property. Surprisingly the productivity on this farm had increased over the last five years. In conducting personal interviews the author was also made aware of two Waitotara Valley farmers and one Managamahu Valley farmer that had recently moved from the farm to Wanganui. The reasons cited for the moves were to enjoy the services available in the city and to get away from the remoteness of their properties. One farmer had children and indicated that education, access to sport and local recreational facilities such as

the swimming pool had a big part to play in the move to town. The senior Wanganui MAF advisory officer felt this was growing trend among larger farms that could afford to pay a manager or a head shepherd to reside on the property.

Acquisitions and Disposals

The question on acquisitions and disposals was included to evaluate the feasibility of a hedonics application. The data collected shows that the average size of the properties surveyed had increased by 28 hectares over the last five years. The national trend is for farm size to decline, with a bi-model distribution of farms developing (Fairweather, 1989). Acquisitions were made by 25% of respondents, acquiring an average of 290 ha compared to 13% of respondents disposing of an average of 361 ha. The net effect was an increase in the total land farmed by respondents of 2,404 ha.

Nationally, farm size has declined by 7 ha from 1985 to 1988 to an average size of 220 ha, while farms surveyed had increased by 28 ha to an average size of 719 ha over the last five years. The conflicting results are caused by geographic difference in land topography. Nationally, farm size is declining due to subdivision for intensive use and lifestyle blocks. The topography of land surveyed eliminates these possibilities. The farms surveyed are medium to steep hill country properties with limited diversification opportunities.

7.2.1 Land Use

To assess the dollar impact of an on-farm level of changes in rural services, respondents were asked to provide details on rural servicing expenditure. To make these figures comparable, details on productivity were needed to evaluate stock units carried in 1985 and 1989. The expenditure figures could then be divided by stock units carried to give a usable comparison index for 1985 and 1990. If expenditure is not related to productivity measures such as stock

units/ha, variations between 1985 and 1990 would be masked by changes in stock numbers.

The productivity data also provided another means of assessing whether the respondent belongs to the population sought. By definition hill country farmers obtain the majority of their income from wool and the remainder from beef. Using this information it was easy to check if the response was a valid one.

Table 7.2 Average Number of Stock Units Wintered on Farms Surveyed.

Type of Stock		No. of Respondents	1984	1989
Sheep	- Ewes	84	3,476	3,204
	- Lambs	84	855	889
	- Rams	84	77	78
	- Hoggets	84	1,082	1,065
Cattle	- Dairy Cows	84	-	-
	- Beef Cows	84	194	205
	- Bulls	84	43	38
Deer	- Hinds	84	3	10
	- Stags	84	2	3

The table shows changes in livestock which are consistent with national trends. Sheep numbers have declined while beef and deer numbers have increased over the last five years. Overall stock numbers have fallen.

In 1984 the mean stock units carried on the farms surveyed was 6314 SU/farm. In 1989 the rate had fallen by 219 SU to 6095 SU. No attempt was made to relate this reduced productivity to changes in rural services over the last five years. This was the objective of the Kaplan report (1979).

7.2.2 Property Value

The question on changes in property value was to be incorporated into a hedonics application. Unfortunately 1990 Government Valuation figures were not released in time to make the application feasible. Due to this fact only estimated market values were compared. The table shows in 1984 the average estimated market value of farms surveyed was $681,419, $892,659 in real terms (adjusted to December 1989 values). In 1989 the average estimated market value of farms surveyed was $620,070, a decline in property value of $61,349, in actual terms. Respondents were asked what percentage of the difference in estimated market values between 1985-1990 would you attribute to changes in rural services. The average percentage obtained from 62 farmers that answered this question was 7.66%. The percentage did have a high standard deviation of 13.41% with 62% of farmers indicating a 0% impact. The index used to adjust the 1984 estimated market value to a 1989 value was a national valuation index for changes in grazing land. It therefore is not a true reflection of changes in land values in the study area.

Table 7.3 Changes in Property Value.

	Change in estimated market value from 1984/1989	Proportion of change attributed to changes in rural services
	$	$
Actual Reported Values	-61,349	4,699
Real Values (1)	-211,240	16,181

(1) Adjusted to December 1989 values. (Source: Rural Property Sales Statistics, 1990).

Given the real difference in property values between 1985 and 1990 of $211,240, 7.66% of this amount equates to a perceived cost of $16,181 per farm. While the method of quantifying an on-farm cost looks basic, the principles behind the idea have some merit. A representative of Valuation New Zealand based in Wanganui indicated that changes in rural services do affect government valuations, specifically the availability of primary school education, proximity to the main road and the condition of roading.

Given that a property's value is based on productivity and productivity has fallen, it is not surprising that property values have fallen. One can conclude that farmers perceive the changes in rural services over the last five years to have had negative impact on property values mainly through reduced productivity caused by changes in services.

7.2.3 Farm Population Changes

Respondents were asked to indicate how many full time residents there are on their property now as compared to five years ago. This included farm workers.

Table 7.4 Changes in Farm Population.

	1985			1990		
	No. of Responses	Total	Mean	No. of Responses	Total	Mean
Adults	84	294	3.46	84	280	3.33
Children	54	154	2.85	52	131	2.51
Total Farm Residents	-	448	-	-	411	-

The table shows a decline in the on-farm population over the last five years. In 1985 there was a total farm population of 448 with 294 adults and 154 children on the farms surveyed. In 1990 the total farm population had fallen to 411, a 8% decline. The number of adults had declined by 5% to 280, while the number of children had declined by 15% to 131.

The average number of adults residing on the farm has declined from an average of 3.46 adults/farm in 1985 to an average of 3.33 adults/farm in 1990. In 1985 38.8% of respondents had only two adults on the farm, while in 1990 53.6% of respondents had only two adults on the farm. Over the five year period the number of adults per farm has remained fairly constant with 70% of farms having between two and four adults resident. Of interest is the 10% reduction in farms with three adults. This could be due to reduction in the employment of single farm workers.

The average number of children residing on the farm has also declined from an average of 2.85 children/farm to an average of 2.51 children/farm. In 1985 the most frequent number of children per farm was three. In 1990 this had fallen to two children per farm.

In any text on rural services, declining population is cited as the major reason for declining services (Packman, 1985). The survey results show a 8% decline in the surveyed farm population over the five year period. Nationally the rural population between 1981 and 1986 has risen by 4.8% (Fairweather, 1989). The conflicting results can again be traced back to the sample population used. Rural population increases tend to be on small intensive blocks close to an urban centre and where beneficiaries are taking advantage of cheap rural housing. The sample population of hill country farmers tends to be topographically unsuited to intensive development and also tends to be too far from an urban centre to attract the urban population out into the country. The potential for diminishing services due to declining population is clearly evident in hard hill country and more remote farming communities.

7.3 Education

Government's role in the provision of education has changed with the introduction of Tomorrow's Schools in 1989-1990. The introduction of Tomorrow's Schools has had a major impact on rural schooling. The following section on education has been included because of the importance of this rural service to any farming community.

Respondents were asked to indicate the number of children and at what stage of schooling their children were, the distance to the school from the farm gate and the means of transport to and from school.

Table 7.5 Characteristics of Rural Schooling.

Stage of Schooling	Total No. of Children Attending	Mean Distance from Farm Gate (minutes)	Means of Transport	
			Private	Public
Pre-school	10	27	5	5

Primary	33	18	17	16
Intermediate	5	45	3	2
Secondary	26	69	20	6

The table shows 84 of the total 131 children on the farms surveyed attend school. The mean distance to primary schooling is 18 minutes which shows most farms surveyed are relatively close to primary education. Only one child was more than 35 minutes away from a primary school and the child being two hours from the closest school was the only child being educated by correspondence.

The means of transport to pre-school, primary and intermediate was equally divided between private transport and public transport. Transport to secondary schooling on the other hand was predominantly by private means.

Table 7.6 Reasons why Children Board.

Reasons for Boarding	No. of Responses	Mean(1)
• To provide better learning environment	22	1.68
• Travelling distance to local school necessitates boarding	28	1.28
• Traditional for children to board	18	3.61
• To provide better overall development	22	1.91
• Special schooling required not available in local area	19	2.90
• To provide a more stimulating social environment	18	2.00

(1) Where 1 = very important while 4 = relatively unimportant

Of the children attending secondary school 90% boarded (Table 7.6). The main reason for boarding was due to the long travelling distance to secondary schooling. To provide a better learning environment, better overall development and a more stimulating social environment were other important reasons for boarding. A number of farmers did indicate they bypassed local secondary schools for these reasons. Of real concern to farmers was the increasing cost of sending their children to boarding school. Some respondents indicated that the high cost of education prevented married farmer workers from working on remote farms. The following table provides information on changes in the quality of local schooling over the period 1985 to 1990.

Table 7.7 "Changes" In The Quality of Schooling Over the Last Five Years.

Change	No. of Responses	Mean(1)
• Teacher to pupil ratio	51	2.92
• Number of teacher changes/year	50	2.44
• Scholastic achievement of pupils	45	2.53
• Time and effort devoted to (3 R's)	44	2.47
• Pupil motivation	46	2.60
• Pupil satisfaction derived from learning	45	2.64
• Availability and quality of learning resources	46	3.15

(1) 1 = severe decline, 2 = some decline, 3 = no change, 4 = some improvement, 5 = vast improvement

The results show that there has been minimal decline in the perceived teacher to pupil ratio. The greatest decline in schooling over the last five years was due to the number of teacher changes per year, although this decline again was

considered small. Other areas of decline were time and effort devoted to (3 R's), scholastic achievement of pupils, pupil motivation and pupil satisfaction derived from learning. On the positive side, respondents perceived some improvement in the availability and quality of learning resources.

7.4 Transport and Fuel

When an industry is controlled by licensing, entry into that industry is limited. After deregulation of the transport sector in 1984/1985 one would expect the volume of operators to increase due to new entrants. MOT records show this to be the case nationally (MOT, 1988). The following table shows the reverse to be true in the sample area which must be due to decreased profitability in the agricultural sector or to more farmers purchasing their own trucks.

Table 7.8 Availability of Farm Transport Operators.

		Number of Transport Operators			
		Before Deregulation		Currently	
Type of Transport Operators	No. of Responses	Mean	Total	Mean	Total
Livestock	68	3.4	240	2.8	187
General Freight	59	3.4	203	2.9	167

Respondents clearly perceived that the number of transport operators available to them have declined. Before deregulation farmers indicated that they had a choice between 3.4 livestock and general freight operators. Currently this choice has been reduced to choosing from 2.8 livestock operators and 2.9 general freight operators. The question is, can one value the loss of choice between 3.4 operators before deregulation and 2.9 operators after deregulation?

One easy way, is to enquire if farmers have encountered any problems in obtaining farm transport services since deregulation. Clearly this was not the case with 98% of respondents answering "no" to this question.

Table 7.9 Farm Transport Operators Current Performance as Compared with Five Years Ago.

	No. of Responses	Mean(1)
• Available when required	81	1.69
• Delivery when expected	80	1.86
• Damages to goods	73	1.73
• Reliability	79	1.68
• Security	74	1.65
• Door to door delivery	67	1.99
• Price	77	2.44

(1) 1 = very good, 2 = good, 3 = satisfactory, 4 = poor, 5 = very bad

The table compares the current performance of transport operators to that of five years ago. The question this refers to is "Has the quality of service diminished due to less operators in the industry?" In this regard the high score given to each category indicates farmers have not been disadvantaged by deregulation.

Fuel deregulation has seen 16% of respondents change their fuel purchasing policy. Some now purchase fuel from stock companies, while others have formed co-operatives to obtain cost savings through bulk purchasing.

7.5 Roading Services

Most farmers felt road access to their property had not deteriorated over the last five years, with only 25% of farmers indicating that the road had deteriorated

To quantify the on-farm impact, respondents were asked to indicate the percentage change in expenditure on vehicle maintenance and repairs between 1985 and 1990 that they attributed to the deterioration in the quality of roads. The mean percentage was 7%. Again the standard deviation is high at 16. Meat and Wool Board Economic Service figures show vehicle maintenance and repairs have decreased by $3,456, in real terms, for hard North Island Hill country farmer, over the five year period. Hence the amount attributed to deterioration in roads is $242 per farm or at the community level (25% of the farm population x $242) $13,552.

There are moves to return dead-end roads and bridges to the users. Farmers are resisting because they fear that once you closed the end of a road servicing one farmer the next stop is to close the road servicing the next farmer and so on. Many farmers indicated they would accept the closures if rates fell by the cost of maintaining that section of road. They reasoned they could do this cheaper than the local body. As to bridges, farmers wondered what insurance costs on the bridge would be and the likely impact on the farm's value.

At the time of this study the decision whether to repair bridges washed out by recent storms was being contemplated by Wanganui District Council. To this end Wanganui Council has declined a Waitotora Valley farmer's application for funding to repair a bridge destroyed by flooding.

7.6 Catchment Services

Farmers were asked if their on-farm works programme in soil conservation, flood control and drainage control had changed over the last three years. The following table summarises the results.

Table 7.10 Reasons for Reduced/Changed On-farm Works Programme.

	No. of Responses	Soil Conservation	No. of Responses	Flood Control	No. of Responses	Drainage Control
Reduced farm expenditure	22	44%	9	50%	12	55%
Reductions in local Catchment Board (Regional Council) subsidies	22	44%	2	11%	4	18%
No need for any works	6	12%	7	30%	6	27%

Table 7.11 Farmers Indicating They Had Changed Their On-farm Works Programme.

	Yes	No
Soil Conservation	41%	59%
Flood Control	19%	80%
Drainage Control	17%	83%

Soil Conservation

The results in Table 7.11 show that 41% of respondents had changed their on-farm works programme in the area of soil conservation. The main reasons cited for the changes (both of equal importance) were reduced farm expenditure and reductions in catchment subsides. (Table 7.10). The last reason was due to no need for any more work. Most farmers indicated that they maintained soil conservation work because the farm plan was started before 1984 and subsides covered the bulk of the cost.

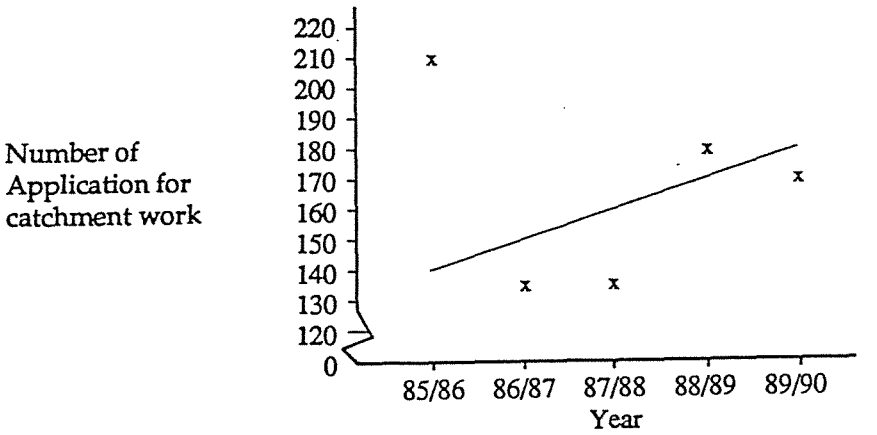
The following table shows the number of applications for catchment work. Because field staff evaluate the job before an application is made all applications are accepted.

Table 7.12 Applications for Catchment Work.

Year	Number of Applications
1985-1986	208
1986-1987	128
1987-1988	122
1988-1989	175
1989-1990	158

The artificially high number of applications in 1985-1986 was due to funding/subsidy changes due for implementation in 1987. Even given this, applications for catchment work have fallen by only 24% from 1985/1986 to 1989/1990. Removing the 1985-86 figures the trend is for the number of applications to be increasing.

Figure 7.1 Application For Catchment Work.



Flood Control

The area surveyed had been hit by a flood in late 1989, hence 11% of respondents indicated their on-farm flood programme had changed. The major reasons cited for changes in flood control work were reduced farm expenditure and no more need for any work (Table 7.10). Reduction in the availability of subsidies for such catchment work had minimal contribution to the decision to change on-farm flood control works.

Drainage Control

Drainage control work did change for 17% of respondents. Reduced farm expenditure and no need for any more work were the major reasons given for changes. Eighteen percent of respondents indicated that reduction in local catchment subsides had played a part in the decision (Table 7.10).

In summary, respondents indicated that soil conservation work is the only major development work to have suffered because of reduced government subsides. Regional Council data shows applications for catchment work has tended to increase since the artificial high of 1985/1986. Regional Council staff

did, however, feel that catchment work would decline with the phasing out of block grants in June 1990.

Water Rights

A water right was held by 12% of respondents. Of the respondents that held a water right, 73% indicated the cost of the right had increased over the last three years, while the remaining 27% thought the cost had remained the same. Discussion with Regional Council staff showed that the cost of a water right has increased. The application fee was up $40 to $200 and the renewal cost was $160 plus GST. Most respondents used the water for horticultural purposes.

7.7 Advisory Services

The introduction of user pays has had a dramatic impact on the importance of MAF as a source of advice.

Table 7.13 Changes in the Importance of Sources of Advice over the Last Five Years.

	Ranking			Means[1]	
	1985	1990	NET	1985	1990
MAF Technology	1	7	-6	1.76	2.06
Private Consultants	8	4	+4	2.09	1.85
Veterinarians	2=	1	+1	1.91	1.43
Accountants	4	2	+2	1.94	1.61
Lawyers and Solicitors	5=	5	0	2.00	1.86
Bank Managers and Financial Advisers	7	3	+4	2.02	1.66
Stock Agents and Fertiliser Agents	2=	6	-4	1.91	1.95
Catchment Board Staff	9	9=	0	2.13	2.32
Landcorp Staff	11	11	0	2.51	2.52
Forestry Consultants	10	9=	+1	2.28	2.23
Discussion Groups	5=	8	-3	2.00	2.15

(1) 1 = more important, 2 = no change, 3 = less important

In 1985 MAF was considered the most important source of advice by farmers, in 1990 MAF ranked seventh. Stock agents and fertiliser agents have also fared poorly moving from a ranking of second equal in 1985 to sixth in 1990. The loss of the extension services, i.e. discussion groups, provided by MAF was regretted by most farmers. The loss, however, was not considered great enough by farmers to pay for the service.

Private consultants, bank managers and financial advisers have benefited the most from changes over the last five years, both improving their rankings by four. Private consultants now rank three points ahead of MAF Tech Consultants.

The most important source of advice in 1990 was veterinarians, accountants, bank managers and financial advisers. The high rank afforded to accountants, bank managers and financial advisers is consistent with the increased emphasis on cash flow experienced by agribusiness firms in adapting to changes over the last five years.

Farmers commented "that they were willing to pay for advice but the quality of advice must be good."

7.8 Communication Services

Telephone

To evaluate the impact of changes in telephone charges farmers were asked to rank the changes in charges according to the magnitude of the change.

Table 7.14 On-farm Impact of Changes Since the Introduction of Telecom in 1987.

Charges	Mean (1)
Rental charges	1.96
Toll charges	2.69
Maintenance charges	2.12
Number of breakdowns	3.08
Frequency of use	2.65

(1) 1 = large increase, 2 = some increase, 3 = no change, 4 = small decrease, 5 = large decrease

Farmers perceive that rental charges, maintenance charges and toll charges have all increased. The perceived increase in toll charges is minimal. An interesting point is that the frequency of use of the telephone has increased. This may be due to the introduction of, say, the facsimile or because telephone communication is compensating more for face to face communication.

Most farmers thought the introduction of Telecom was an improvement on the old system, as the number of breakdowns had declined. Some felt new technology such as cellular phones had improved access to communication and was a way of reducing the need for telephone lines and hence the high cost of maintaining remote lines.

All farmers were appalled about having to pay additional costs to have the telephone repaired on the weekend. It was considered only a matter of time before someone died because of it.

Post

Of the 20% that had encountered problems with postal services since the introduction of New Zealand Post in 1987, most complained of slower delivery time in receiving mail, lost mail and the cost of Fast Post which was often slower than Standard Post.

The rural delivery system was perceived to have improved for those that had lost a private bag because of a post office closure. Overall communication services were considered by farmers to have improved over the last three years.

7.9 Weed and Pest Control

The condition of weed and pest control was considered to have deteriorated by 86% of farmers. The main reasons for the deterioration was reduced farm

expenditure, cited by 66% of respondents and reductions in Weed and Pest Board activities cited by 61% of respondents. Ten percent felt greater resistance to control methods caused the deterioration in weed and pest control.

The control of weeds and pests is now administered by Regional Councils. In 1990 the Manawatu/Wanganui Regional Council spent $640,000 on advisory/ extension/staff input, on noxious weed control and $1.7 million was spent on pest control. Regional Council dismissed the perceived deterioration in weed and pest control by council as an increased awareness of the problem and not an increase in the problem.

7.10 Loss of Services

Respondents were asked to identify the location of the nearest service, the frequency of use and to indicate how this use had changed over the period 1985 to 1990. Services listed included veterinary services, pharmacy, mechanic, doctor, banking services, maternity hospital, post office, grocer/butcher etc, farm suppliers/agents and emergency services. The table shows the frequently listed changes in the location of services used by the respondents. In all cases the changes in the location of services used by farmers is due to closures.

Table 7.15 Changes in the Location of Services and the Opportunity Cost.

	Change in Location 1985 to 1990		Extra Travelling Distance (Km)		Cost Per Single Journey ($) [2]	Aggregated Annual Cost	
			One Way	Return Journey		Frequency [1] Of Use/Yrs	Total Yearly Cost
Banking Service	Raetihi	Ohakune	10	20	4.12	4	16.48
	Waitotara	Waverley	10	20	4.12	4	16.48
Post Office	Fordell	Wanganui	12	24	4.92	4	19.68
	Mangamamahu	Wanganui	47	94	19.34	4	77.36
	Waitotara	Wanganui	17	34	7.00	4	28.00
	Waitotara	Waverley	10	20	4.12	4	16.48
	Okia	Wanganui	13	26	5.35	4	21.40
Maternity Hospital	Waverley	Wanganui	60	120	24.69	Once every 5 yrs [3]*	49.38
	Raetihi	Taumaranui	76	152	31.28	Once every 5 yrs	62.56
Mechanic	Waitotara	Waverley	10	20	4.12	12	49.44
	Maxwell	Wanganui	20	40	8.23	12	98.76
Farm Supplier	Ohakune	Raetihi	10	20	4.12	12	49.44
Grocer/ Butcher	Waitotara	Waverley	10	20	4.12	12	49.44

(1) Frequence of use is based on survey responses.

(2) Based on cost of running 2000cc car travelling at 80 km/hour.

(3) Assume ten trips involved.

The notable feature of the changes in location of services is the movement from smaller communities to larger communities. In this regard services tend to be localising in Wanganui, Waverley and Ohakune, away from smaller towns such as Fordell and Waitotara. Raetihi, while not a small town, has lost services to Ohakune.

To quantify the impact of the lost service the extra travelling time and lost working time must be calculated.

For this to be a realistic reflection of the extra cost the following must apply:

a) The location of the replacement service must require the farmer to travel further than was required before the service was lost.
b) The extra distance travelled must be solely to obtain the lost service.
c) Farmers compensate for the loss of the closest services by using the next closest service.

The results of the survey indicate that the frequency of use of services over the last five years has remained fairly constant and farmers do compensate for the loss of a service by travelling to the closest replacement service.

Since the closure of one service clearly now requires the farmer to travel further to obtain the service we can use the following formula to place an average cost on the extra journey.

Extra travelling cost due to lost services = Extra kilometres travelled x vehicle cost/km

+

Opportunity cost of time lost = 1/2 salary of farmer x time lost

To obtain figures for the variables in the equation one must make assumptions and use averages. Each farmer will differ in the size of the car she/he uses to travel the extra distance, the speed at which she/he travels and the opportunity cost of time lost. If the journey was combined with the need to obtain other services as well, the additional travelling cost to obtain the services would be less. All this aside, we can generalise the additional cost by using the following values:

1. The average salary (drawings) of a hard hill farmer is $26,081 per year before tax (MWBES 1988-1989) and therefore the opportunity cost of time is $4.35/hours or 7.25 ¢ / minute

2. Assume the average hard hill country farmers work 10 hours per day, six days per week for 50 weeks of the year, which equates to 3000 hours per year.

3 The average farmer travels at 80 km/h or 1.3 km/min.

4 The vehicle running cost per km for a 2000 cc car is 0.15¢/km (pers. comm Gorden, 1991).

For every additional kilometre the average farmer has to travel to obtain a lost service it costs him $0.21/km. This additional cost in travelling maybe partly offset by greater efficiency in the delivery of the service reducing the retail price to the farmer.

Table 7.15 shows that the loss of services such as a mechanic, that cannot be left until the next journey to town, can have a major impact in terms of extra cost. The extra cost of lost services (eg the bank and the farm supply merhant) to a Waimarino farmer would be $32.96/year. At the community level the additional cost of this loss is (118 farmers x 32.96) $3889.28 per year.

Using this method the loss of the Post Office at Mangamahu can be compared to the subsidy of maintaining the services. The subsidy to maintain the Mangamahu Post Office was $3385 (NZ Post Press Statement 1987). Given there are 45 farmers in the valley, farmers had to use the service each four more times per year to make the Post Office profitable.

Table 7.16 Location of Farmers Servicing Requirements Which Has Remained Unchanged Over the Period 1985 to 1990.

Town	Wanganui	%	Raetihi/Ohakune	%
No. of Farmers	42	47	19	21

The table shows that 47% of respondents always used Wanganui for all their services and have not felt any impact. A further 21% of respondents always used either Raetihi and/or Ohakune for all their services. Hence the change of availability of the farm supplies or banking services from Raetihi to Ohakune and vice versa would have minimal impact on these farmers. Only 32% of respondents had changed services due to changes in the location of services. This equates to 67 hill country farmers. Therefore, one third of hard hill country farmers had felt the impact of the closure of services. If this is applied nationally for all North Island hard hill country farmers, 1700 farmers have felt a significant increase in cost due to the loss of services.

Of the 32% of respondents that had changed services due to changes in the location of services, 11% now travelled solely to Wanganui to obtain all their service requirements. Hence, 58% of the population sampled now obtained all their services from Wanganui.

Given that a large number of farmers have always used only Wanganui for their service requirements it is then not surprising that 10% of respondents indicated that all services were "adequate". Other common comments by farmers were:

- "There is less choice because of less competition."
- "Doctors no longer visit rural patients."
- "Post Office closure has caused a big inconvenience."
- "Veterinary services, rural delivery, farm suppliers/agents and farm machinery mechanics are the only services which come to the farm, all service costs are rising rapidly."
- "All services are still available, but most are offering a reduced level of service and less choice of goods available to buy."

7.11 Changes in the On-Farm Cost of Rural Services

To gauge the direct on-farm impact (in terms of dollars) of changes in rural services over the last five years, farmers were asked to provide expenditure details for the years 1984/85 and 1988/89. The categories included freight and cartage, animal health, weed and pest control and electricity, which are categories used by the Meat and Wool Board Economic Services, and could therefore be used for comparison. Expenditure data on road user charges, advisory services, and rural delivery was also obtained.

By comparing the two surveys, one can test the validity of the results to see if the farmer survey is representative of North Island hard hill country. In table 7.17 the results show that for weed and pest expenditure and total expenditure the farmers survey is not representative of North Island hard hill country. The direction of change is the same but the magnitude of change is much greater in

the results of the farmers survey. This difference in weed and pest expenditure maybe due to the major gorse problem in the area surveyed and because of the greater total farm expenditure of these farms.

In table 7.18 net changes in farm expenditure from 1984/1985 to 1988/1989 are reported in both actual and real terms. In real terms, MWBES results show all costs have decreased. The farmers survey results show in real terms expenditure on animal health, weed and pest control, electricity, cartage and road user charges has declined, while the cost of advisory services has increased. This form of comparison while allowing for inflation does not allow for changes in stock units. To this end the per stock unit cost of animal health, wages, electricity, cartage, advisory services and road users charges have increased which shows farmers are running less stock. In summary the comparison of real expenditure reported in both survey's show the MWBES Survey with a decline in on-farm costs of $3,644 per farm and the farmers survey with a larger net decline in on-farm cost of $4,725 per farm. Total expenditure is down, in real and nominal terms in both surveys.

Table 7.19 shows some changes in service charges. The only service to lower its charges is Telecom down 18%. All other services cost have increased due to user-pays.

Table 7.17 Comparison of On-Farm Rural Service Costs.

	MWBES[1]			FARMERS SURVEY								
	1984/1985			1988/1989			1984/1985			1988/1989		
	Farm Expenditure	Per Stock Unit	%	Farm Expenditure	Per Stock Unit	%	Farm Expenditure	Per Stock Unit	%	Farm Expenditure	Per Stock Unit	%
Animal Health	5,673	1.00	4.7	5,772	1.13	5	5,590	0.89	4.5	6,419	1.08	4.61
Weed and Pest Control	1,027	0.18	0.9	767	0.15	0.7	7,390	1.10	6.0	5,862	0.95	3.7
Wages	12,812	2.26	10.7	12,057	2.37	10.5	-	-	-	-	-	-
Fuel	4,596	0.81	3.8	3,667	0.72	3.2	-	-	-	-	-	-
Electricity	1,168	0.21	1.0	1,355	0.27	1.2	1,337	0.21	1.2	2,018	0.33	1.4
Cartage	3,124	0.55	2.6	2,812	0.55	2.4	2,869	0.49	2.7	3,448	0.57	2.6
Advisory Service	-	-	-	-	-	-	1,361	0.19	0.2	1,856	0.28	0.1
Road User Charges	-	-	-	-	-	-	469	0.09	0.03	392	0.11	0.028
Total Farm Expenditure	119,453	21.03	100	115,201	22.02	100	155,878	-	100	137,738	-	100

(1) NI hard hill country sample of 77.

	MWBES				FARMERS SURVEY			
	Farm Expenditure Actual	Real (1)	Per Stock Unit (2)	% (3)	Farm Expenditure Actual	Real (1)	Per Stock Unit	%
Animal Health	99 (5)	-1657	0.13	-0.3	829 (5)	-898	0.19	0.1
Weed and Pest Control	-260	-559	-0.03	-0.02	-1,528	-3679	-0.15	-2.3
Wages	-755	-4381	0.11	-0.2	-		-	-
Fuel	-929	-350	-0.09	-0.06	-		-	-
Electricity	187 (5)	-491	0.06	0.2	681 (5)	-95.7	0.11	0.2
Cartage	-312	-937	0	-0.2	579 (5)	-52	0.08	-0.1
Advisory Services	-	-	-	-	495	109.5	0.09	-0.1
Road User Charges	-	-	-	-	-77	-210	0.02	-0.002
Total Farm Expenditure	-4,252	-38057	0.09	-	-18,140	-62254	-	-
Net Change Comparison(4)	-286	-3644	0.16	-0.28	561	-4725	0.23	-2.1
Net Change	-1,970	-8375	0.18	-1.3	979	-4825	0.34	-2.202

(1) Adjusted to Dec. 1988 values using farm input prices index (Source: NZ YearBook, 1985 and 1990).
(2) Expenditure per stock unit is reported in nominal values.
(3) Expenditure as a % of the Total Farm Expenditure, in nominal values.
(4) The comparison is made between expenditure items reported in both surveys.
(5) The sign on nominal and real change are not in the same direction. This shows actual expenditure has increased over the five year period.

Table 7.19 Changes in the Cost of Government Services from 1984 to 1989.

Expenditure	% Change
Telephone (1)	-18%
Advisory Services	100%
Meat Inspection Costs	66%
Rural Delivery (2)	33%
Water Rights (3)	160%

(1) Refers to consumption and maintenance costs (Source: Moore 1990)
(2) Change in cost, February 1991
(3) For Manawatu/Wanganui Local Govt Area, Renewal changes

The impact of the cost/price squeeze

To show the impact of the cost/price squeeze the following table compares changes in gross farm revenue and total farm expenditure for the period 1984/1985 to 1988/1989.

Table 7.20 Farm Income and Expenditure Per Farm ($) For N.I. Hard Hill Country Farmers.

Year	Gross Farm Revenue		Total Farm Expenditure		Net Farm Income	
	Nominal	Real[1]	Nominal	Real[1]	Nominal	Real[1]
84/85	162,279	206,906	119,453	152,303	42,826	54,603
85/86	129,098	175,315	104,358	141,718	24,740	33,597
86/87	139,261	189,116	104,543	141,969	34,718	47,147
87/88	142,738	182,276	107,450	137,214	35,288	45,063
88/89	145,275	172,296	115,201	136,628	30,074	35,668

(Source: The New Zealand Sheep and Beef Farm Survey's MWBES Adjusted using Producers Prices Outputs Index Values December 1989)

The table shows gross farm revenue has fallen by $17,004 ($34,610 real) while total farm expenditure has fallen by $4,252 ($15,675 real) over the five year period. If one assumes output and expenditure volumes are the same over the period and only prices change, the degree of the cost/price squeeze is shown by the $12,752 ($18,935 real) decline in net farm income. Clearly this assumption is not true as other factors have affected the change in net income as well, but it does show the trend. Referring back to table 6.18, the net decline in real farm expenditure of $8,375 (MWBES) and $4,825 (farmers survey) does not compensate for the $34,610 (MWBES) decline in gross farm revenue over the period 1984/1985 to 1988/1989. Hence a cost/price squeeze situation were income falls by more than expenditure.

7.12 Farm Expenditure

Farmers were asked to indicate whether they had purchased the following items over the last five years. The hypothesis behind the question was that the farmer would compensate for services by purchasing alternatives.

Table 7.21 Items Purchased Over the Last Five Years.

Items	No. of Responses	%
Fire and/or smoke alarm	17	19
Security system	13	15
Facsimile	4	4
Computer	12	13
PO Box	5	6
Alternative forms of power generation	3	3
Vehicle for farm use	66	74

The table shows that a relatively high percentage of farmers had invested in fire and/or smoke alarms and security systems. This could be to compensate for perceived reduced fire and police services.

Purchase of a PO Box number, facsimile or computer could be a way of compensating for lost communication services among other things. If the rural delivery service was scaled down facsimiles and PO Box numbers and possibly electronic mail in the future, would be available substitutes.

Following the same line of reasoning the cost of reticulated electricity has not forced many farmers to look at alternative forms of power generation although, 3% of farmers have. Overall, the adoption of new technology to compensate for lost/reduced services is low.

CHAPTER 8

DISCUSSIONS AND CONCLUSIONS

8.1 Introduction

In this chapter the results of the various surveys are integrated to obtain an overall picture of the changes that have taken place in the rural servicing industry between 1985-1990. In terms of the objectives outlined in the introduction, the initial aims were to identify, and quantify where possible, the changes and their impacts as well as gauge attitudes and responses of those affected. Most of this has been achieved through the surveys conducted. This in turn allows fulfilment of the final aims which are to discuss the likely implications on the rural sector, and on New Zealand of a continuation of the changes reported. This chapter concludes by identifying areas in need of further research and by recommending policy initiatives that could be considered in the national interest.

8.2 Discussion of the Findings

The impact of changes in rural servicing infrastructure can be assessed at two levels, the off-farm level and the on-farm level. At the off-farm level discussed are changes in rural communities and non-government services. At the on-farm level discussed is the impact on farmers. In these discussions the objective of the study is to quantify the impacts where possible. A discussion of the attitudes at the two levels to changes in rural services follows. To set the scene the major findings of the review of previous studies are outlined below.

8.2.1 Previous Studies

The review of previous studies was restricted to New Zealand studies only since, "care should be taken in using European/North American studies. Australia

and New Zealand do not replicate the northern hemisphere farming systems, where farming is a disguised welfare measure" (pers. comm Pomeroy, 1990). The review of the literature was indicative of what was to be expected. Clearly there have been trends over the last few decades of diminishing farm profitability, a declining rural population and a reduction in rural services.

The impact of policy changes since 1984 has been to accelerate this trend by increasing the cost price squeeze. The result has been, less farm input usage, less rural employment and reduced farm investment. These impacts have been felt the most by more remote farms. Rural services have reacted by increasing their efficiency by cutting services no longer in demand and by increasing the efficiency of the remaining services through rationalisations.

8.2.2 Off-farm Impacts

In assessing the impact at the off-farm level we are interested in impact of changes in rural services at the non-government and community levels.

Impact at the Community Level

To determine the impact of changes in rural services at the community level the two towns of Raetihi and Ohakune were analysed. The results showed that ten services were lost from both communities. (Table 8.1)

Table 8.1 Services Lost from Raetihi and Ohakune Since 1987.

Shearing services	(R) [1]
Livestock contract nec	(R)
Groundspread spraying	(R)
Noxious animal control	(R)
Huge reduction in hospital and maternity services	(R)
Postal/courier services	(R)
Private vet practitioners	(R)
Downgrading of banking service	(R)
School Bus Contractor	(R)
Dental service	(O) [2]

(1) Raetihi
(2) Ohakune

The distributional impact of changes in rural services is highlighted by the 30% decline in the availability of rural services in Raetihi. Ohakune unlike Raetihi is not so dependent on hill country farmers for income. The diverse income base of market gardening, tourism and farming has seen Ohakune increase its rural service infrastructure by 16%.

One of the impacts of a lost/changed service was the need, by the farmer, to travel further to obtain the lost service. One must question if, given the additional travel cost now facing the farmers because of a 'rationalisation' of rural services, a greater level of efficiency has been attained nationwide.

Non-Government

An analysis of the impact of changes in government policy on services not provided by government was considered pertinent to this study given

government's movement away from it's role in the provision of rural services. It also addressed the important question of "has government created a new economic environment favourable to the private supply and demand of rural services?"

The following is a summary of the regional analysis of changes in private rural services over the period 1987 to 1990.

General

- 8% decline in private rural servicing firms
- 10% increase in employment; by private rural services
- Trend toward fewer but larger private rural services.

Structure (Environment) (1)

Unfavourable	Favourable
- Reduced expenditure by farmers (30-40% Anon, 1985)	- Elimination of price controls on the firm's products
- Reduced subsidies paid to farmers	
- Deregulation of financial services	

Conduct (Strategies) (1)

- Increased emphasis on cashflow
- Reduction in drawings paid to owner(s)
- Changes in pricing policy

Performance

- Decline in profitability
- Trend in sales towards non-farming sectors
- The increased cost of goods and services obtained from SOE's is reported to have reduced profits by 2.9% (2)
- 2.5% reduction in profit from the introduction of user-pays (2)

(1) In order of importance.
(2) The low response rate does not allow the placing of much weight on these results.

In answering the question, "is the environment more favourable", one can say that profitability in the industry is clearly down and that there are trends towards fewer but larger firms and a movement in sales away from the farming sector. This movement in sales away from traditional markets has been enhanced by less government provision in supply of services opening up new markets for existing firms. An example is that of an agricultural weed sprayer now contracted to Transit New Zealand to spray roadsides. Private rural services see the outlook for their business over the next ten years as fluctuating, no worse/no better.

8.2.3 On-Farm Impact

The following is a discussion of the on-farm impact in dollar terms of changes in rural services which fulfills part of the second objective of this study.

Opportunity cost of time and travel

Direct questioning of farmers identified services totally lost from 1985 to 1990. To quantify the impact of the cost, lost working time and extra travelling distance were evaluated. The problem one encounters with such a method is that each farmer's opportunity cost of time is different and their travelling cost will vary

depending on the c.c. rating of the car they travel in and the speed at which they travel.

The results show the impact of lost services such as a mechanic that could not be left until the next journey to town, is great and that for each additional kilometre the average farmer has to travel to obtain a lost service, it costs him $0.21/km. Using such a method it was shown that each farmer had only to use the Mangamahu Post Office four more times per year to make the post office profitable. Conversely it is possible to show that an economic gain may result if the retail cost of the substitute service is less that the additional cost of the extra journey. For example it is feasible that the retail saving of travelling from Waitotara to Waverley to obtain the lost grocer/butcher service would be greater than the cost of the journey of $4.12. hence an economic gain (See table 7.15). Referring back to the Mangamahu post office example, the saving from the closure of the post office was the yearly subsidy of $3,385. The sum of the increased cost now facing the community is the cost of travelling to Wanganui times the number of families in the valley making that journey i.e. $19.34 x 60 = $1,160.40 assuming each family now has to make one special journey to Wanganui to use the post office. Clearly this assumption is unlikely as the need to use the post office would be incorporated into a regular trip to Wanganui. Hence, the exact cost to the community is difficult to evaluate without interviewing all those affected by the closure of the post office.

Change in property values due to changes in rural services

The average value of properties surveyed declined by $61,349 ($211,240 in real terms) over the period 1985 to 1990 (see section 6.1.2). Of the decline in property values 7.66% was attributed to changes in rural services by farmers. Given the difference in property values between 1985 and 1990, 7.66% equates to a cost of $4.699 ($16,181 real) per farm. At the community level this equates to $1,057,275 ($3,640,725 real) and at a national level to $23,964,900 ($82,523,100 real).

Changes in the cost of services at the on-farm level

The previous section evaluated the on-farm cost of lost rural services. This section evaluates the on-farm impact of changes in the cost of services. Changes in the cost of services has come about through the introduction of user-pays, the formation of SOE's and selling of government assets, local government reform and industry deregulation.

To obtain this information farmers were asked to indicate the cost of rural services in 1984/85 and 1988/89. This data was then compared to available data from MWBES farm surveys for the same period.

One would expect the data to show initial increases in the cost of services to farmers from the application of user-pays. The slow removal of cross-subsidisation in the area of communications and electricity will bring efficiency gains overall (investment) but the distributional impact is likely to increase the cost of these services to farmers. The deregulation of industries should improve the efficiency of these industries and hence reduce the cost of these services to farmers.

Table 8.2 Farm Expenditure Changes per farm from 1984/85 to 1988/89.

	MWBES $	Rural Services Survey $
User-Pays		
Advisory Services	-	110 (495)
SOE		
Electricity	-491[1] (187) [2]	-95.7 (681)
Deregulation		
Cartage	-937 (-312)	-52 (579)
Fuel	-350 (-929)	-

(1) Adjusted to Sept 1989 values using farm input prices index, (Source: NZ Yearbook 1990)

(2) Actual Reported Values

By categorising the changes under User-pays, SOE's and Deregulation we get some idea of the on-farm impact of each policy change. As expected the introduction of user-pays has increased the cost of services to farmers. The mean respondent spent an additional $110 (real) on advisory service. The cost of electricity has increased in nominal terms, but it has declined in real terms. The deregulation of fuel and cartage has seen the cost of these services decline.

In reporting the changes in expenditure there is a large discrepency between electricity and cartage as reported by the MWBES survey and the rural services survey. Given that the sample sizes are relatively close a possible explanation for the differences is that the MWBES survey of North Island hard hill country

farmers includes more areas than the areas of Wanganui, Waitotora and Waimarino surveyed in the rural services survey. Hence electricity costs may vary between the two survey areas due to different local electricity charges. Transport expenditure may differ due to difference cost structures in the sample areas.

Aggregation of the changes, in costs according to the survey results reported in Table 7.18, shows a mean on-farm decrease of $4825/farm. At the community level this is an decrease of $1,085,625 per year (225 farmers x $4825). Nationally for all 5100 North Island hard hill country farmers this equates to $24,607,500. This assessment doesn't include changes in all rural service costs. Not reported are the impact of changes in the cost of telephones, wages, fuel, meat inspection charges, financial charges and education.

Changes in the Location of Services

The notable feature of changes in the location of services is the movement from smaller communities to larger communities. In this regard services tend to be localising in Wanganui, Waverley and Ohakune, away from smaller towns such as Fordell and Waitotara. Raetihi, while not a small town, has lost services to Ohakune, which stresses the need for communities to have a diverse production base. To this end Raetihi has potential in river tourism and forestry in the future.

In the following table all changes in the location of services identified from the farmers survey are enumerated. The table shows that not many services have been lost, but there was a trend to obtain all services from Wanganui i.e. of the population sampled 58% now obtained all their services from Wanganui, an increase of 11% from 1985 to 1990.

Table 8.3 Changes in the Location of Services.

	1985	1990
Banking Service	Raetihi	Ohakune
	Waitotara	Waverley
Post Office	Fordell	Wanganui
	Mangamahu	Wanganui
	Waitotara	Waverley
	Okia	Wanganui
Maternity Hospital	Waverley	Wanganui
	Raetihi	Taumaranui
Mechanic	Waitotara	Waverley
	Maxwell	Wanganui
Farm Supplier	Ohakune	Raetihi
Grocer/Butcher	Waitotara	Waverley

One third of hard hill country farmers indicated that they had felt the impact of lost services. This equates to 1700 North Island hard hill country farmers. Assuming, from the opportunity cost of travel results, that it costs a farmer an extra $50/year due to extra travel and lost time, the community impact for Wanganui local government area is $3,750. At national level the loss of services for North Island hard hill country farmers is $85,000.

8.2.4 The Attitude of the Farmers and Local Community to Changes in Rural Services

The third objective was to determine the attitude of the farmers and local community to these impacts and changes. To this end the overall feeling one gets from talking to farmers and reading the postal surveys is that farmers have accepted recent change as a "necessary evil". Comments like "we did not use the lost service", "it's a waste of money to maintain services hardly anyone uses" and "I obtain all my rural service needs in Wanganui", were common. Farmers as businessmen know the value of money therefore they agreed with the rationalisation, where the provision of a rural service was clearly a waste of money or where no funds were available to maintain that level of provision of the service.

The attitude of farmers to change has been moulded by the last five years. They have come to accept change as inevitable and something they can do nothing about. Farmers' attitude to changes in rural services over the period 1985 to 1990 is exemplified by the following example.

Talk of returning uneconomic roads has created real concern among Wanganui farmers. Wanganui Federated Farmers have responded by forming a Farmers' Task Force to take up the issue with council. After the initial meeting with council the leader of the Farmers' Taskforce commented "that since Transit NZ has cut their funding for marginal rural roads to the council, council now doesn't have the money to maintain 'uneconomic roads'. It's a natural response to reduce rural road maintenance if you don't have the money to pay for it, or maintain it but then someone has to pay for it."

This example shows how farmers have accepted user-pays/no rural support as a fact and they consider there is little they can do about it but accept it.

Non-Government Services

Farmers expressed real concern that private rural services will develop monopolistic powers and hence increase the cost of rural services. For example, the deregulation of the transport sector has seen the availability of livestock and general carriers to farmers decline, contrary to what theory would predict. This trend, combined with the fact that most rural services, telephone, electricity and roading, have natural monopolies, paints a bleak scenario for the future cost of rural services. Most farmers believe that in the future all services will be available but at an increased cost e.g. transport, education, telephones and electricity to name a few. This is an area that government should monitor to ensure that monopolistic practises do not develop in the supply and pricing of rural services. The case for such monitoring would be warranted based on the market failure argument.

The Possible Removal of Cross-Subsidisation of Electricity, Telephones and Rural Delivery

The likelihood that the cost of rural delivery, telephones and electricity would increase was compared to putting the last nail in the coffin for hill country farmers. All farmers believed that access to these services and education at a reasonable cost was a basic right. Any talk of increasing the cost and/or reducing access to these services was considered inequitable.

If steps are taken to remove cross-subsidisation of these services, New Zealand would be the only country in the world with such a policy. Overseas cross-subsidisation of these services is maintained to discourage urbanisation. The cost of increased urbanisation is perceived to be greater than the cost of indirect subsidies such as cross-subsidisation of rural services to discourage urbanisation.

In New Zealand there is already a trend for more remote farming families to move into town and treat the farm as a 9 to 5 job. Any increase in the cost of rural service and/or reduced access to service will compound this trend.

Government must therefore weigh the savings from less cross-subsidisation of rural services against increased social cost caused by increased urbanisation.

Given New Zealand has had a sustained policy of cross-subsidisation, the anticipated subsidy (or loading) will have been capitalised into the value of the asset they service, namely, the factor of production, land (Thomson and Walsh, 1981). The initial owners at the time of any change in subsidy or surcharge will enjoy either a capital gain effect, or suffer what amounts to a "capital levy" (Hicks, et al, 1941). Subsequent purchasers of the asset will in an unrestricted market and with prior knowledge of these pricing arrangements, build the subsidy or surcharge into the price they are prepared to pay for the property. Hence if the above assumption holds true any removal of cross-subsidisation will be reflected in lower land values penalising current land owners.

General Change

There was criticism of the high levels of protection still afforded to the manufacturing sector and labour markets. Farmers felt restructuring in these sectors was occurring too slowly, giving manufacturing an unfair advantage. Inflexibilities in labour markets were considered to be forcing up the cost of rural services.

Farmers say they will be cautious to respond to future calls for increased productivity. Some indicated that they are now short-term planners, planning solely for cashflow from year to year. Long term investments such as soil conservation, drainage and development work now have a low priority in the farm plan.

Outlook for Rural Services

Farmers see the outlook for rural services over the next ten years as fluctuating, no worse/no better. In the Mangamahu Valley only 20% of farmers would

encourage their sons to takeover the farm when they retired. This compares to 85% at the time of the Kaplan study in 1978. Most farmers indicated that they would now encourage their sons to attain professional qualifications other than farming.

Ad Hoc Intervention

Some farmers regret the discounting of rural bank loans to relieve financial pressures in 1988. They felt that inefficient farmers benefited most and were then allowed to go out and purchase more land to increase their inefficiency. Clearly ad hoc intervention in the new environment can create resentment and uncertainty about the environment farmers operate in.

Quantification of Non-Market Impacts

The following is a discussion of the two non-market techniques used to try and value some of the indirect cost of changes in rural services.

1. Contingent Valuation of Ambulance services

The situation whereby a second ambulance officer did not always accompany the driver in an emergency in the Mangamahu Valley provided the perfect opportunity to test the feasibility of the contingent valuation approach to quantify a non-market cost imposed on the people of the valley.

The results showed the mean willingness to pay (WTP) per resident for a second ambulance officer was $141/year. At the community level the total willingness to pay was $28,266/year. The value of $141 per resident per year is quite high. One possible explanation is that the WTP impact reflects the respondents value of life. An interesting observation was that the WTP tended not to increase as the distance of the respondent from the city increased. Theory predicts the opposite to occur (Sinden, 1978).

This application proved that the contingent valuation method can be an excellent tool in quantifying the impact of a lost/changed rural service. Successful applications of Contingent Valuation tend to occur where the respondent is familiar with the hypothetical market (Carson and Mitchell, 1986). This familiarity is often the case in evaluating lost or improved rural services.

2. Hedonic Pricing

The hypothesis underlying the hedonic pricing approach is that property values are affected by rural services. The approach requires two geographically different communities, one which had not lost services from 1985 to 1990 and one which had. By isolating differences in property valuations between the two communities the implicit price of rural services can be identified. Unfortunately the approach proved to be infeasible because of the lack of enough market transactions in two such communities.

To overcome this problem one could have used government valuations. However, 1990 government valuations were not available at the time of the study. Government valuations did allow for changes in rural services (pers. comm Henshaw, 1990). The application of hedonic pricing to rural services was theoretically possible. Farmers surveyed however, proved that the hedonic price would have been under estimated as the assumption of full information did not hold true.

The timing of this study made the hedonic pricing application infeasible in terms of data requirement. However the method does have real potential in New Zealand in valuing the benefits of avoiding or incurring the costs of loss from a natural hazard. A recent study in Auckland successfully evaluated consumer behaviour under conditions or risk and uncertainty where the source of risks was from the possibility of a gas pipe line exploding. (Kask and Maani, 1989) Clearly the benefits of a flood protection scheme or irrigation, to control drought, for example, could be valued using hedonic pricing.

8.3 Trends in the Changes in Rural Services and the Implications for Farmers and Local Community of a Continuation of these Trends

The fourth objective was to identify trends and their implications. The following summarizes the findings:

Trend 1

The move from government conduct and funding in the provision of many rural services to private conduct and funding has meant agriculture is no longer protected from the risk of price and supply changes in the provision of rural services.

Implication of 1

- The supply of rural service will more closely reflect the demand for rural services.
- The cost of services to farmers will increase with the transfer of funding from taxpayers to users, and with the possible removal of cross-subsidisation.

Trend 2

There is a greater tendency for farmers to obtain servicing requirements from main urban centres to the detriment of small rural communities.

Implications of 2

- Less demand for small community services.
- The closure of more rural services and the slow demise of rural towns dependent mainly on farming for an income.

Trend 3

There are increasing numbers of beneficiaries moving out into the country and rural towns where housing is cheap. Coupled with this, is the decline of the "rural population", mainly farm workers making houses vacant.

Implications of 3

- Changes in the composition of the rural communities.
- Demand for new/different types of services.
- This is a short term trend as these houses have a relatively short life span and many are already old. New houses are not being built in rural communities to replace the old ones.

Trend 4

Changes in ownership of farms to urban-based and non-residing owners. Increased numbers of "the 9 to 5 farm".

Implications of 4

- In more remote areas the lack of services have and will force more farmers to move to town so their families have access to services.
- Greater distinction between the family unit and the farming business.
- Increase in the non residing urban farmers with the capital to purchase a farm.
- Less rural population, hence less services as non-residing farmers become more common.

Trend 5

There is greater risk and less profitability in farming partly brought about by the move from taxpayer funding of rural services to user funding of rural services.

Implications of 5

- The average age of the farmer is increasing. Many farmers want to retire but cannot afford to sell their farm to their sons or outside buyers. Farmers wanting to retire commented they cannot retire because the farm and their sons need all the labour units they can get.
- The increasing age of the average farmer implies that development work will be given a lower priority, ie less weed and pest control, less afforestation and less demand for advisory services.
- Farmers are now short term planners, planning more for cashflow and there is less long term on-farm investment.
- Due to the health implications of a higher retirement age there will be a higher demand for rural medical services.
- As the profitability of farming declines, demand, and therefore supply of rural services, will decline. The reverse is also true.

8.4 Conclusion

The deregulation of the agricultural sector has meant demand for farm services has declined. This decline was occurring prior to 1984 and has been accelerated by agricultural reform since 1984. The decline in the demand for services has meant the closure of some services, but all are still available even if it means greater cost and travel. Changes in government provision of rural services has seen the cost of rural services move from the taxpayer to the user. The implications are higher costs for most services, the exception currently being telephone services. Most farmers have accepted the changes to date as a gain in

efficiency, even though the distributional impact of the efficiency gains tends to favour the urban consumer. Farmers resent the possible removal of cross-subsidies in the provision of postal, electricity and phone services as they feel it is a basic right to have such services available at a reasonable price.

When Should Government Intervene

An important issue which arises in examining the current environment for the provision of rural services is the issue of when should government intervene. Traditionally government intervention in the provision and pricing of services has been warranted on the grounds of equity and market failure. In section 3.2 the conditions needed for there to be market failure were discussed. It will show there are some grounds for intervention in the provision and pricing of rural services as they tend not to be pure public goods and as such the market system can provide them efficiently. Hence, historically equity considerations have prevailed, with government treating rural services as merit goods, justifying it's intervention in the supply and pricing of rural services.

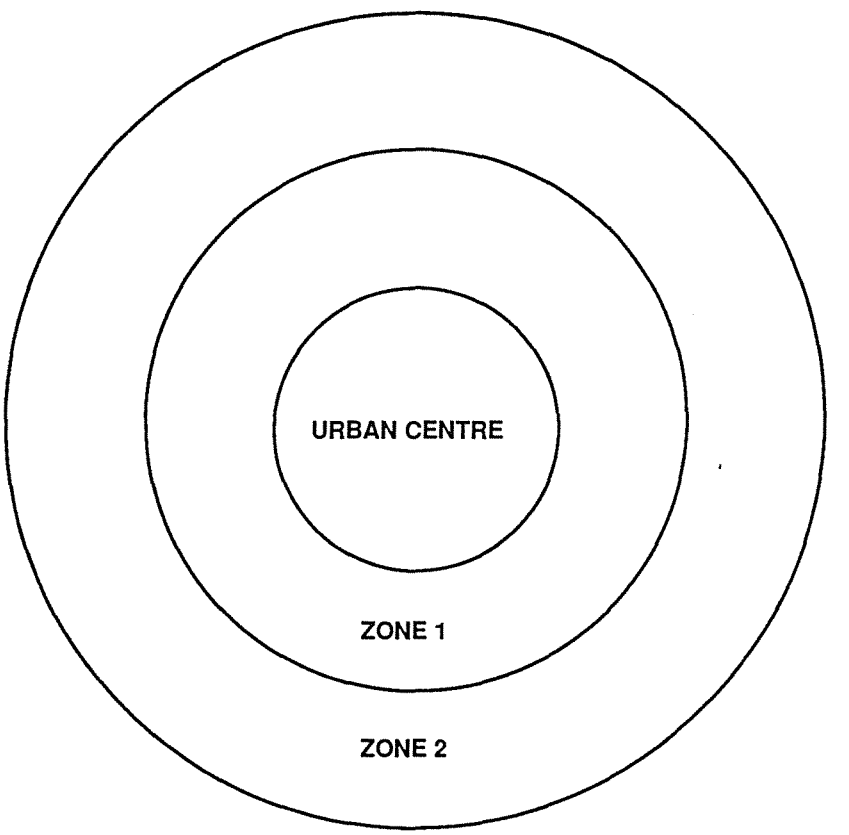
Recent government policies place little weight on equity considerations and we have seen government distance itself from the provision and pricing of rural services favouring private involvement instead. This thesis shows that less government intervention in the provision and pricing of rural services has had no adverse distributional impacts, to date. Following from this and given current policy, future government intervention in the provision and pricing of rural services should only be warranted if a case of market failure can be proven.

The Future Environment for the Provision of Rural Services

The changes and trends in rural services and their implications are all interrelated. The following scenario best describes the future environment for the provision of rural services.

Change in rural services and its impacts can be classified into two distinctive zones around an urban centre.

Figure 8.1 The New Environment for the Provision of Rural Services.



Zone one is close to an urban centre where the topography of the land allows intensive land use through diversification and flexible planning laws. In this zone the rural population is increasing, the average farm size is decreasing and their dependence on rural services is minimal. This is due to the close proximity to the urban centre where all services are available.

In the second zone the distance from an urban centre is great, the topography of the land allows less diversification and planning laws tend to be inflexible and restrictive. In this zone the rural population is declining, the average farm size

is increasing and there is great dependence on rural services, which however are disappearing because of reduced use.

The Implications

- Rural services such as primary schools, will tend to be based more in Zone 1 in the future.
- All services will be available to Zone 1 from the Urban Centre.
- The 9 to 5 farm will become common in Zone 2. There will be a movement away from the family farm to corporate non-residing owners.
- The availability of rural services such as electricity, schooling, rural delivery and telephone as we know them today, will be minimal in more remote areas of Zone 2, as will be demand.
- Farming in Zone 2 will be more extensive and low labour input, resulting in lower productivity in the zone.
- The likely impact of reduced productivity in Zone 2 is that demand for replacement stock, mainly produced in Zone 2, will force the price of replacements up. Zone 2 farmers may respond by supplying more replacements, hence increasing productivity. This situation of increased profitability in Zone 2 may stem from the about mentioned implications.

8.5 Recommendations

If other considerations permit, policy initiatives in rural services should be to correct market failure outlined in chapter 2, by stimulating the environment in which rural services are provided. To this end the following recommendations address the broad issues of improving the environment in which rural services are provided.

1. If other objectives permit, government needs to create confidence in the farm community to encourage long-term investment in the industry. By creating confidence, resources will be attracted back to rural communities. To this end current talk of removing cross-subsidisation in the provision of telephone, post and electricity services doesn't create any confidence in the industry.

   Cross-subsidisation involves charging prices which are below cost for consumers in the low population density areas but above cost for consumers in high density areas, hence penalising urban consumers of electricity. The redistributional effects of cross-subsidisation may mean some of the customers in low-cost areas are required to pay more to support consumers in high cost areas, even though they may have less private income and wealth than many of the high cost consumers. The allocative effects of cross-subsidisation involve the issues of externalities of welfare cost associated with the form of subsidisation provided. The historical argument for cross-subsidisation has been based on the allocative effects, in which all consumers should have equal availability/access to all basic services. Given many farmers have access to basic services and now have low-incomes there is a good argument for maintaining cross-subsidisation due to the redistributional affects. Also, natural monopolies such as post, telephones and electricity, currently subsidised, in a free environment can charge unreasonable prices, which government should protect consumers against. Hence there is a case for government maintaining cross-subsidies, but changing the means of finance to funding the subsidy through general taxes. By financing rural services from general tax revenue, equity would be improved by spreading the cost of the subsidy more evenly over society.

   Further research should be conducted on the exact magnitude of the cost impact to farmers if cross-subsidisation is removed. But irrespective of the magnitude it became obvious from the survey that any possible

removal has a strong emotional impact and reduces farmers confidence to be able to continue to go on farming.

Recommendation One

THAT GOVERNMENT INVESTIGATE MAINTAINING CROSS-SUBSIDIES BY FINANCING SUBSIDISED RURAL SERVICES FROM GENERAL TAX REVENUE.

2. While changes to Regional and Local Government were not directly addressed in this report, it became clear, while interviewing farmers and reviewing the literature, that Local Government Reform has been a disaster for farmers and rural communities and their services. The amalgamation of borough and city councils has seen the political voting power of the rural community slashed. Urban councillors are currently aware of rural concerns about amalgamations and have gone out of their way to please rural ratepayers to maintain the new system. This is a short term trend as most councillors and voters are urban based, hence political clout will eventually favour the urban ratepayer. In this environment resources will be transfered from rural to urban areas. The situation identified in this report whereby district councils are already contemplating reduced funding for rural roads and bridges is an example of likely resource transfers.

For rural communities to survive in the current agricultural environment they must have greater control over their resources and must have the ability to plan for their own future. To achieve this, rural communities need to have more say in the allocation of their rates and in the rural planning process to allow diversification into new land uses and encourage new industries.

Recommendation Two

THERE NEEDS TO BE AN INVESTIGATION INTO THE IMPACT OF LOCAL GOVERNMENT REFORM ON RURAL COMMUNITIES AND THEIR PROVISION OF RURAL SERVICES.

3. The government should refrain from ad hoc intervention in the environment in which rural services are provided. Such intervention can create uncertainty and may send the wrong signals to farmers. The example given in the report was the Rural Bank's discounting scheme. This intervention may well have saved some farmers financially, however many farmers felt the scheme was unfair enabling poor inefficient farmers to then go and expand their operations, while efficient farmers with low debt were penalised.

Recommendation Three

GOVERNMENT SHOULD TAKE CARE THAT AD HOC INTERVENTION IN THE ENVIRONMENT IN WHICH RURAL SERVICES ARE PROVIDED, DOES NOT ARTIFICIALLY SUSTAIN INEFFICIENCIES.

4. Examined in this report was the problem of quantifying the impact of changes in rural services so that policy makers have some measure to assess the benefits or the costs of a policy change. To this end the application of the contingent valuation method proved successful in quantifying the impact of a reduced service. The method was proved to be relatively quick and easy to apply.

Recommendation Four

THAT THE CONTINGENT EVALUATION METHOD BE CONSIDERED MORE BY POLICY MAKERS TO ASSESS THE BENEFITS OR COSTS OF A PROPOSAL CHANGE IN RURAL SERVICES.

Appendix (a)

MASSEY UNIVERSITY

Department of Agricultural Economics and Business

RURAL SERVICES QUESTIONNAIRE

Questionnaire Instructions

(a) For all questions please place a tick or appropriate number in the boxes provided unless otherwise directed.

(b) If the question is not relevant to you please enter N/A.

(c) At the end of each section are a number of lines for any general comments you may have.

A. **GENERAL**

1. What is the total effective size of your property?
(1 acre = approx 0.4 hectares) hectares ☐

2. Do you reside on the property?
(Please tick appropriate box) Yes ☐ No ☐

If yes, for how many years? ☐ years
If no, how many years have you operated the property? ☐ years

3. Please state any land acquisitions and disposals that have occurred over the last five years? (If none please continue.)

Acquisitions

Land acquired (including purchases, leases, return of land previously leased to others etc.).

Area acquired ☐ ha

in .....county

from (full name).....

of (address & phone).....

.....

Main motivation for acquisition

.....

.....

Please indicate nature of acquisition(s)

Bought ☐ ha Leased ☐ ha

Other *(please specify)*.....☐

Disposals

Land disposed of (including sales, leased, returned to lessor, etc.)

Area disposed of ☐ ha

in .....county

to (full name).....

of (address & phone).....

.....

Main motivation for disposal

.....

.....

Please indicate nature of disposal(s)

Sold ☐ ha Leased ☐ ha

Other *(please specify)*.....☐

4. Please complete the table below by entering the numbers of stock on your property at June 1984 and June 1989.

Type of stock		Stock number 1984	Stock number 1989
Sheep	- Ewes		
	Lambs		
	Rams		
	Hoggets		
Cattle	- Dairy cows		
	Beef cows		
	Bull		
Deer	- Hinds		
	Stags		

Others *(please specify)*.....

.....

.....

5. Please state the Government Valuation (Capital Value) and estimated market value of your property in the following years:

	Govt Valn	Est. Market Value
1985 (or closest G.V. to that year. Please indicate year if not 1985 .....)		
1990 (or closest G.V. to that year. Please indicate year if not 1990 ....)		

What % of the difference in estimated Market Values between 1985-90 would you attribute to changes in Rural Services?

☐ %

6. How many full time residents are there on your property now as compared with five years ago. (Please include farm workers, etc.):

	1985	1990
Adults		
Children		

B. EDUCATION

1. Please complete the following table on schooling:

Stage of schooling	No. of children attending	Name and location of school	distance from farm gate km's	hrs	Means of transport
Pre-school					
Primary					
Intermediate					
Secondary					
Other *(please specify)*					

2. If children are boarding away from home please indicate how important the following reasons were in making that decision; where 1 = very important while 4 = relatively unimportant.

Reasons for Boarding

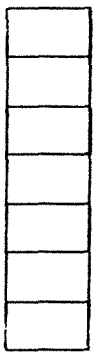
- To provide better learning environment
- Travelling distance to local school necessitates boarding
- Traditional for children to board
- To provide better overall development
- Special schooling required not available in local area
- To provide a more stimulating social environment
- Other *(please specify*.....

3. Please rank the following in terms of the "changes" you have noticed in local schooling over the period 1985 to 1990?

1 = severe decline
2 = some decline
3 = no change
4 = some improvement
5 = vast improvement

Changes over 1985-1990

- Teacher to pupil ratio
- Number of teacher changes/year
- Scholastic achievement of pupils
- Time and effort devoted to (3 R's)
- Pupil motivation
- Pupil satisfaction derived from learning
- Availability and quality of learning resources



Any general comments on changes in Education over the last five years:

.....

.....

.....

C. SERVICES

1. In the following table please indicate the location of the nearest services/amenities; the frequency of use and whether telephone contact with that service requires a toll call.

Service	Location of nearest service				Frequency of Visits 1=once a year 2=twice to five times a year 3=more than five times a year		Telephone contact requires a toll call	
	1985		1990		1985	1990	1985	1990
	Location	Distance km's Time(hrs)	Location	Distance km's Time(hrs)			Yes = 1	No = 2
Veterinary Service								
Pharmacy								
Mechanic								
Doctor								
Banking services								
Maternity Hospital								
Post Office								
Grocer, Butcher, etc.								
Farm suppliers/agents								
Police, Ambulance & Fire brigade								

Do you have any comments about the adequacy or quality of these services?

D. TRANSPORT AND FUEL

1. Please indicate the number of farm transport operators available to you before and after deregulation of the transport sector in 1984/85.

Type of transport operators	Number of Transport Operators	
	Before Deregulation	Currently
Livestock		
General Freight		

2. Have you encountered any problems in obtaining farm transport services since transport deregulation?

Yes ☐ No ☐

If yes, how have you overcome the problem?

.....

3. How do you rate Farm Transport operators current performance in the movement of your major output (wool, livestock, etc.) as compared with 5 years ago:

1 = Very good 2 = Good 3 = Satistactory 4 = Poor 5 = Very bad

- Available when required ☐
- Delivery when expected ☐
- Damages to Goods ☐
- Reliability ☐
- Security ☐
- Door to Door delivery ☐
- Price ☐

4. Have you changed or are you planning to change your fuel purchasing policy as a result of fuel deregulation (1987-1988).

Yes ☐ No ☐

If yes, how?.....

.....

Any general comments on changes in transport and fuel over the last five years?

.....

.....

.....

E. ROADING SERVICES

1. Has road access to your property deteriorated over the last five years?

Yes ☐ No ☐

If yes, please comment:.....

2. What % of the change in expenditure on Vehicle Maintenance and Repairs between 1985 and 1990 would you attribute to deterioration in the quality of roads:

☐ %

Any general comments on changes in Roading services over the last five years?.....

.....

.....

F. CATCHMENT

1. Do you have a Water Right Yes ☐ No ☐

If yes, has the cost of your Water right changed over the last three years?

Increased ☐

Decreased ☐

Stayed the same ☐

2. Over the last three years has your on-farm works programme changed for the following:

(a) **Soil Conservation** Yes ☐ No ☐

If yes, please indicate why by ticking the appropriate box(es):

Reduced farm expenditure ☐

Reductions in local Catchment Board (Regional Council) subsidies ☐

No need for any works, i.e. less erosion etc. ☐

Increased *(please specify)*:..... ☐

(b) **Flood Control** Yes ☐ No ☐

If yes, please indicate why by ticking the appropriate box(es):

Reduced farm expenditure ☐

Reductions in local Catchment Board (Regional Council) subsidies ☐

No need for any works, i.e. less flooding,etc. ☐

Increased *(please specify)*:..... ☐

(c) **Drainage control** Yes ☐ No ☐

If yes, please indicate why by ticking the appropriate box(es):

Reduced farm expenditure ☐

Reductions in local Catchment Board (Regional Council) subsidies ☐

No need for any works, i.e.less drainage problems etc. ☐

Increased *(please specify)*:..... ☐

Any general comment on changes in Catchment Board operations over the last three years:.....

.....

.....

G. ADVISORY SERVICES

1. Please indicate how the importance of the following sources of advice have changed over the last five years?

1 = more important
2 = no change
3 = less important

	1985	1990
MAF Tech		
Private Consultants		
Veterinarians		
Accountants		
Lawyers and Solicitors		
Bank managers and Financial advisors		
Stock agents and Fertiliser agents		
Catchment Board staff		
Landcorp staff		
Forestry Consultants		
Discussion groups		

Any general comment on changes in advisory services over the last five years?.....

.....

.....

H. COMMUNICATIONS

Telephone

1. What has been the on-farm impact of the introduction of Telecom in 1987.
   1 = large increase 2 = some increase 3 = no change
   4 = small decrease 5 = large decrease

Charges	Impact
Rental Charges	
Toll Charges	
Maintenance Charges	
Number of Breakdowns	
Frequency of use	

Post

1. Have you encountered any problems with the postal services since the introduction of NZ Post in 1987?

   Yes ☐ No ☐

   If yes, please comment:.....

   .....

   Any general comment on changes in communication services over the last five years?.....

   .....

   .....

I. WEED AND PEST CONTROL

1. Has the condition of weed and pest control in your area deteriorated over the last five years?

Yes ☐ No ☐

If yes, what would you attribute the deterioration too? (Please tick appropriate box(es)):

Reduced farm expenditure ☐

Weeds & Pests more resistant to control methods ☐

Reductions in Weed & Pest Boards activities ☐

Other *please specify*:..... ☐

How are you coping with the problem?.....

.....

.....

J. FARM EXPENDITURE

1. Have you purchased any of the following items over the last five years? Please tick the appropriate box(es).

Fire and/or smoke alarm ☐

Security System ☐

Facsimile ☐

Computer ☐

P O Box ☐

Alternative forms of Power Generation ☐

Vehicle for farm use ☐

Vehicle for private use ☐

2. To assess the impact of changes in Rural Services you can help us with detailed information on changes in on-farm costs. Please indicate approximate expenditure on the following items. The information will remain completely confidential.

Expenditure	1988/89 $	1984/85 $
Freight and cartage		
Animal Health		
Weed and Pest Control		
Electricity		
Road user charges		
Meat inspection charges		
Advisory services		
Water rights		
Rural Delivery		
Total Farm Expenditure (all expenses not only the above)		

3. What do you see as the outlook for Rural Services over the next ten years?

1 = optimistic, improving
2 = pretty good, quite reasonable
3 = Fluctuating, no worse/no better
4 = Dismal, gloomy, at a critical point

☐

If for some reason I need to clarify any of the information you have given, may I contact you again?

Yes ☐ No ☐

Thank you for your cooperation. You have now completed the questionnaire. All information will remain confidential. Please send the completed questionnaire back to me in the stamped addressed envelope.

(b)

MASSEY UNIVERSITY
Department of Agricultural Economics and Business

NON-GOVERNMENT QUESTIONNAIRE

Questionnaire Instructions

(a) For all questions please place a tick or appropriate number in the boxes provided unless otherwise directed.

(b) If the question is not relevant to you please enter N/A.

(c) At the end of each section are a number of lines for any general comments you may have.

---

1. Please indicate the nature of your business (i.e. shearing contractor, fencing etc.)

   Nature of Business:.....

2. Is the business actively trading Yes ☐ No ☐

   If no when did the business cease trading and please indicate why?

   ☐ year

   reason why .....
   .....

3. Please rank the following changes in terms of the percentage impact on your firms gross profits due to economic liberalisation over the last five years. (Please use a negative sign to indicate a reduction in profits and a positive sign to indicate an increase in profits.)

Economic changes	**% impact on profits**	
	%	**sign**
- Reduced subsidies paid to farmers		
- Reduced Expenditure by farmers		
- Increased cost of goods and services obtained from government departments under user pays		
- Increases in the prices charged for goods and services obtained from state-owned enterprises		
- Changes to tax laws		
- Elimination of price controls on the firms product		
- Deregulation of Financial Services		

- Other *(please specify)*:

.....

.....

4. Please indicate how important the following strategies were to your business in adjusting to economic liberalisation that has occurred over the last five years.

0 = not applicable 1 = Not Important 2 = Somewhat Important
3 = Important 4 = Very Important

Adjustment	Ranking
- Increased emphasis on cash flow	
- Reduction in drawings paid to owner(s)	
- Sale of Assets	
- Reduction in borrowed funds	
- Increase in borrowed funds	
- Reduction in the number of employee(s)	
- Increased labour input by owner(s)	
- Mergers and/or acquisitions, i.e. expansion	
- Adoption at labour saving techniques	
- Changes in inventory policy	
- Improvement in service quality	
- Changes in pricing policy	

- Other *(please specify)*

.....

.....

5. To assess the impact of changes in rural services over the last five years we need detailed information on changes in service industries performance. Any information you may have to give us will remain completely confidential.

Year	**1985**	**1986**	**1987**	**1988**	**1989**
a) **Gross Profit**					
b) **Net Sales**					
c) **% of sales to farmers**					

6. General Comment: *Please feel free to make any comments on the impact of economic liberalisation on your business over the last 5 years.*

.....

.....

.....

7. What do you see as the outlook for your business over the next ten years:

1 = optimistic, improving
2 = pretty good, quite reasonable
3 = fluctuating, no work/no better
4 = dismal, gloomy, at a critical point ☐

Thank you for your cooperation. You have now completed the questionnaire. All information will remain confidential. Please send the completed questionnaire back to me in the stamped addressed envelope.

(c)

MASSEY UNIVERSITY
Department of Agricultural Economics and Business

PERSONAL INTERVIEW QUESTIONNAIRE

1 Were you involved in the 1978 survey of the Mangamahu Valley?

if yes, has your land use changed
i) Has your S.U. increased?
ii) Have you acquired or disposed of any land?
iii) Have you diversified into new types of land use?

2 What services available to you in 1985 are not available to you now?

Service	Where was it	How are you coping	Extra distance travelled		Hours per month in lost working time
			km	hrs	

3 Over the last five years there has been a rationalisation of rural services offered. Can you identify services available in 1985 that are still available today but are a reduced service or require you to travel further to obtain that service?

	in what way reduced	**extra distance km/hrs**	**hours/per month in lost working time**
Banking Services			
PO			
Doctor			
Dentist			
Maternity, Hospital			
General Hospital			
Vet			
Mechanic			
Shearing			
Fert			
Farm supply mer			
Ag Contractors			
Schooling			

Have they improved?

4 Government liberalisation has seen the reduction/ loss of subsidies and grants in the provision of many rural services. What has been the on-farm impact of those changes:

	Impact using less/more/seeking alternative	$	km	hrs
Catchment Boards				
Weed & Pest Control				
MAF Advisory Services Landcorp Forestry	(are you seeking the same amount of advice now as before the introduction of user pays?)			
Roading Contributions by Transit NZ				

It is possible than the provision of rural mail services, electricity and the telephone service could be priced to reflect the cost of delivering that service to your farm. Do you have any comments?

Do you have an afforestion programme? ☐ Yes ☐ No

If yes, ☐ Ha's
☐ When planted

	ha's
Did you plant any trees in 1985	
1986	
1987	
1988	
1989	
1990	

Do you have more than 20 ha (50 acres of ploughable land)? ☐ Yes ☐ No

What do you think will happen to the farm when you retire? .....

.....

.....

How many farm workers resided on your property in 1978, 1985, 1990? .....

.....

.....

Can you get the calibre of/and enough farm workers?.....

.....

.....

The following questions are hypothetical and are designed to put a $ value on how strongly you believe in what is adequate manning of an Ambulance.

A special trust fund is to be set up by the residents of Mangamahu to insure that an ambulance officer accompanies the ambulance driver when you call for an ambulance.

What are you willing to pay per year into the trust fund to insure an ambulance officer accompanies the ambulance driver when you call for an ambulance? $ [ ]

If yes,

What is the maximum amount you would be willing to pay per year to secure an ambulance officer accompanies the ambulance driver when you call for an ambulance.
$ [ ] /year

If answered no or zero to the above question please specify why? .....

.....

- Do you wish to pay between $0 and $20 ☐

- Do you believe you would not benefit from an ambulance officer accompanying the driver. ☐

- Can you not afford to pay anything. ☐

- Do you think you should not pay. ☐

How old are you?

☐ Under 25, ☐ 25 - 34, ☐ 35 - 44, ☐ 45 - 54, ☐ 55+

What is your gross annual household income (before tax)

☐ 15,000 to 30,000

☐ 30,000 to 45,000

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FACULTY OF
AGRICULTURAL
AND
HORTICULTURAL
SCIENCES

DEPARTMENT OF
AGRICULTURAL
ECONOMICS
AND BUSINESS

6 November 1990

Dear

Rural Services Survey

I am writing to ask for your help with a masterate project I am doing at Massey University. My topic is the on-farm impact of changes in Rural Services over the last five years.

I am receiving financial support from MAFTech and will be supplying them with the aggregated results and conclusions of my study. My supervisor is Associate Professor Anton Meister of the Agricultural Economics and Business Department. We are surveying only a small sample of rural services in the Wanganui, Waimarino and Waitotara areas and therefore the success of our research is very dependent on your response.

Enclosed please find a questionnaire that contains a few questions and should take only 15 minutes to complete. If you wish to receive a summary of the results of my research please indicate so on the questionnaire.

All information you may care to give me will be treated in the strictest confidence and you and your responses will not be identifiable in any reports that I provide.

Yours sincerely,

Dr A.D. Meister
Assoc.Prof. in Natural Resource Economics

Murray Rabel
Researcher

Encl.

(d)

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FACULTY OF
AGRICULTURAL
AND
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SCIENCES

DEPARTMENT OF
AGRICULTURAL
ECONOMICS
AND BUSINESS

October 1990

Dear Survey Respondent,

Rural Services Survey

I am writing to ask for your help with a masterate project I am doing at Massey University. My topic is the on-farm impact of changes in Rural Services over the last five years.

I am receiving financial support from MAFTech and will be supplying them with the aggregated results and conclusions of my study. My supervisor is Associate Professor Anton Meister of the Agricultural Economics and Business Department and Mr J. Dryden of Federated Farmers is aware of my project and has given Federated Farmers approval. We are surveying all hill country farmers in the Wanganui, Waimarino and Waitotara areas.

Enclosed please find a questionnaire that at first sight may appear daunting, but should not take more than an hour to complete.

You will find the questionnaire contains sections on stock units, expenditure and land values and you may wish to have your annual accounts for 1984/85 and 1988/89 handy.

All information you may care to give me will be treated in the strictest confidence and you and your responses will not be identifiable in any reports that I provide.

Yours sincerely,

Dr A.D. Meister
Assoc. Prof. Natural Resource Economics

Murray Rabel
Researcher

Encl.

(e)

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ECONOMICS
AND BUSINESS

26 November 1990

Dear

Rural Services Questionnaire - Follow-up letter

By now you should have received a copy of a questionnaire that looks at changes in rural services over the last five years.

As yet we have not received a reply from you. I am therefore offering my services to assist you in completing the questionnaire. If you need any help please do not hestiate to contact me at the above address or phone my home (063) 551 465.

Your reply is very important to us as the success of the research is very dependant on your opinions and experiences.

Thank you for your cooperation.

Yours sincerely,

M. J. Rabel

Murray Rabel
Researcher

(f)

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ECONOMICS
AND BUSINESS

26 November 1990

Dear

Re Surveying the Mangamahu Valley

In doing my research on rural services I became aware that similar work was carried out in the Mangamahu Valley twelve years ago. Given that this past work is highly relevant to my research and some of you in the valley have expressed concern about the future for the Valley it is proposed to survey the Valley again.

This would require a personal interview with all the farmers in the Valley. The interview would require approximately half-an-hour of your time to complete and will look at:

(i) changes in tenure and landuse;

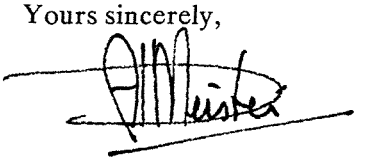
(ii) changes in availability and quality of services and labour;

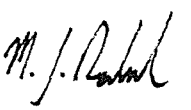
(iii) the impact of SOE's, government reform and user pays.

I am aware that this is a very busy time of the year with shearing etc, so I will be phoning you over the next week to arrange a suitable time for an interview.

To reduce the time of the personal interview I would appreciate it if you would complete the enclosed rural services questionnaire and return it in the stamped addressed envelope. Some of you have already completed it so please ignore this section.

Yours sincerely,





Dr A.D. Meister
Assoc.Prof. in Natural Resource Economics

Murray Rabel
Researcher

APPENDIX F

The Concepts of Willing to Pay and Willingness to Accept

The concept of WTP and WTA were described in section 3.2, however due to disparity between willingness to pay (WTP) and willingness to accept (WTA) compensation applications, it is important to examine their derivation and hence, the theoretically correct application. The concepts both relate to asking consumers appropriate questions to derive the values they place on supporting a given economic change (or prosposal) or opposing a given economic change (Kirkland, 1989).

In assessing a change in economic welfare it was generally accepted that WTP or WTA methods acted equally. It was conceded that income effects drive a "small" wedge between measures of WTP and WTA (Randall and Stoll, 1980). However, given the assumed equivalance between the two measures, most researchers use WTP measures. The reasons cited to justify the use of WTP measures are that WTP measures are "easier" (Knetsch, 1985) and that they correspond more closely to people's market exchanges and hence are more familiar.

Randall argues that for a fairly wide range of contingent market designs, one can confidently expect that reported WTP and WTA measures will respectively understate and overstate an individuals' true valuation. The familiarity issue raised by Freeman (1986) tends to eliminate use of WTA measures in a New Zealand content, where compensation is unfamiliar to most subjects.

Results from CV applications almost always demonstrate large differences between average WTP and WTA. The following table shows the result of fifteen CVM experiments by eight groups of researchers. The results show WTA values consistently three to five times larger than the WTP measures.

Table 1 Measures of WTP and WTA*

Study		WTP	WTA
Hammack and Brown (1974)	(1)	$247.00	$1044.00
Banford, Knetsch and Mauser (1977)	(2)	43.00	120.00
		22.00	93.00
Sinclair (1976)		35.00	100.00
Bishop and Heberlein (1979) (1)		21.00	101.00
Brookshire, Randall and Stoll (1980)	(1)	43.64	68.52
	(2)	54.07	142.60
	(3)	32.00	207.07
Rowe, d'Arge and Brookshire (1980)	(1)	4.75	24.47
	(2)	6.54	71.44
	(3)	3.53	46.63
	(4)	6.85	113.68
Coursey, Schulze and Hovis (1983)	(1)	2.50	9.50
	(2)	2.75	4.50
Knetsch and Sinden (1984)	(1)	1.28	5.18

(1) Carson and Mitchell (1984) re-estimated Bishop and Heberlein's results with contrary conclusions. *Note:* All figures are in year-of-study dollars. The numbers in parentheses refer either to the number of valuations received or the number of trials (in experiments) conducted.

Why the difference? We know income effect may produce small variations, but income differences between groups of subjects are generally not sufficiently large to warrant such large discrepancies. Researchers have been unable to explain in any definitive way why. Cumming et al (1986) argue that such observed disparities between WTA and WTP may be attributed to cognitive dissonance, but based on the Coursey et al (1983b) experiment, Freeman, Bishop and Heberlein in Cummings et al (1986) question this attribution.

Recent literature promotes two types of choice behaviour which could explain the large disparities between the two measures:

1) People evaluate changes primarily in terms of gains and losses from some neutral reference point rather than as comparisons between final states, as is usually assumed.

2) Losses from this reference point often appear to be more important than commensurate positive changes.

These concepts are based in the theory of consumer surplus and the various associated Hicksian forms. Following Kerr (1986), Sinden (1978), Gluck (1975) and Kirkland (1988), the models developed by Randall and Stoll (1980) are examined below to clarify the basis and correct approach required.

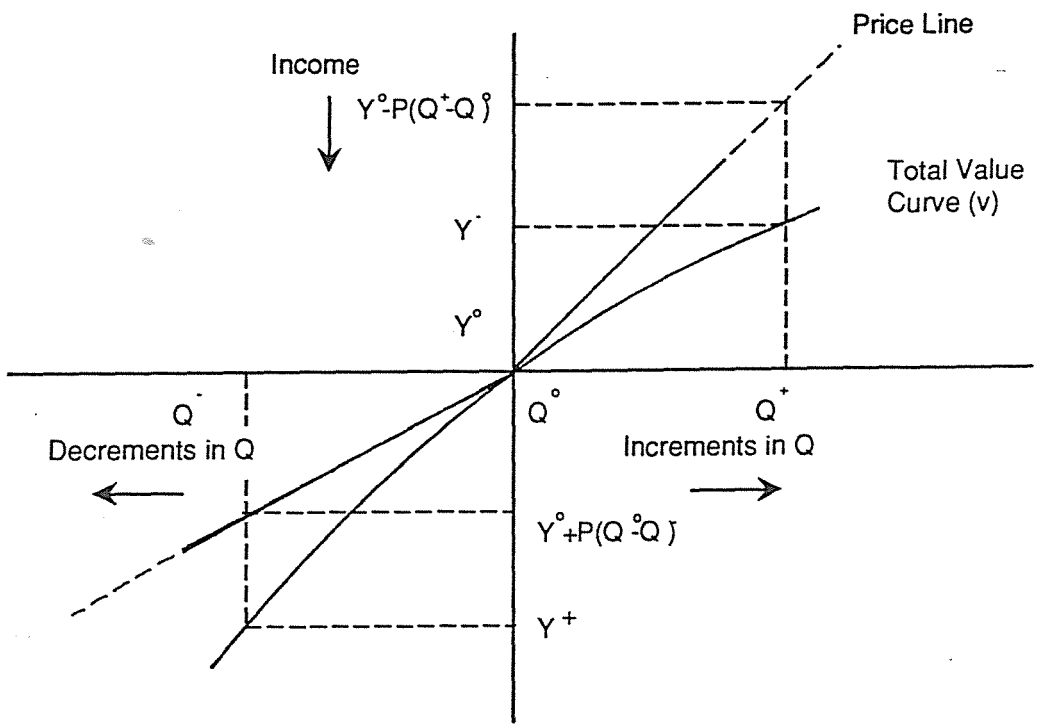
Firstly we focus on an individual and the effect on his welfare of a proposed change in the level of a service or commodity (good). Consider an individual who currently enjoys some specified level, Q, of a service. In addition he enjoys a given quantity of the Hicksian "all other goods" numeraire, Y, which for convenience is called income. Thus, his level of utility is dependent upon his income and quantity of the particular service upon which we focus.

$$\text{i.e.} \quad U = U(Q,Y)$$

The individual is thus at the origin (figure 1) which defines his level of welfare in the "without project" situation. Examining the axis we see the level of provision at Q to the individual increases with movements to the right of the origin and decreases to the left of the origin. A movement up the income axis from the origin indicates a decrease in income, while a movement down indicates an increase in income. The total value (TV) curve, or bid curve is of positive slope, given that the service is a commodity and the individual is not satiated in the range under consideration. The TV curve is an indifference curve, passing through the individual's initial state,

$$\text{i.e.} \quad U(Q,Y) = U(Q^{-},Y^{+}) = U(Q^{+},Y^{-})$$

Figure 1 The Total Value curve for increments and decrements is Provision of a Service, Q.



Starting at the origin, Y^o Y^- is the individuals willingness to pay (WTP) to obtain an increase in the level of provision of the service from Q^o to Q^+. Willingness to accept (WTA) $Y^+ - Y^o$ is the amount of money which would induce the individual to accept voluntarily a decrease in the level of provision of the service from Q^o to Q^-. Thus, WTP is the total value to the individual of an increment from Q^o to Q^+ and WTA is the total value to the individual of the decrement from Q^o to Q^-.

$$\text{i.e. } U(Q^o, Y^o) = U(Q^-, Y^o + WTA) = U(Q^+, Y^o - WTP)$$

In a traditional market WTA and WTP bear the following relationship to value. If $Q^+ - Q^o$ is a one-unit increment in Q, WTP is equal to the buyer's best offer for the increment. If $Q^o - Q^-$ is a one-unit decrement, WTA is equal to the seller's

reservation price for that decrement. If a market existed in which the individual could purchase the increment $Q^+ - Q^0$ for some amount less than his WTP he would purchase and enjoy a gain in trade. Similarly, if a market existed in which he could sell the decrement $Q^0 - Q^-$ for some amount more than WTA, he would sell and again enjoy a gain from the transaction (Brookshire, Randall and Stoll, 1980).

Hicksian Measures of Consumer Surplus

Hicks identified four measures of consumer's surplus, none of which is conceptually identical to the Marshallian measure (see Table 2). The four measures defined are:

(i) **Equivalent Surplus:** The amount of compensation, paid or received, which would bring the consumer to his subsequent welfare level if the change did not take place.

(ii) **Equivalent Variation:** Similar to (i) but calculated after the consumer has made optimising adjustments in his consumption set.

(iii) **Compensating Surplus:** The amount of compensation, paid or received, which would keep the consumer at his initial welfare level if the change did take place.

(iv) **Compensating Variation:** Similar to (iii) but calculated after the consumer has made optimising adjustments in his consumption set.

Table 2 Hicksian Surplus Measures for Private and Public Goods

	A. Private goods		B. Public goods[a]		
	Own	Not own		Individually held	Collectively held
Use	CS_{WTA} (decrease)[b]	ES_{WTP}	Level currently accessible	CS_{WTA}	CS_{WTP} (decrease)[b]
Do Not Use	ES_{WTA}	CS_{WTP} (increase)[b]	Level not currently accessible	CS_{WTP}	CS_{WTP} (increase)[b]

a For public goods which require annual payments (or their equivalents) to maintain a given level of the good.

b Indicated measure for a decrease (increase) in the amenity

Hicksian Welfare Measures for Contingent Valuation Surveys

	WTP	WTA
Quantity increase	CS	ES
Price decrease	CS;CV	ES;EV
Quantity decrease	ES	CS
Price increase	ES;EV	CS;CV

Definitions:

WTP - willingness to pay

WTA - willingness to accept

CS - compensating surplus

CV - compensating variation

ES - equivalence surplus

EV - equivalence variation

WTP is the amount of money an agent would be willing to give up to obtain a change and still be as well off as with his previous entitlement.

WTA is the amount of money which would have to be given to an agent, with a specified entitlement, to forgo a change and still be as well off as if the change had occurred.

Compensating measures assume that the agent is entitled to his current level of utility, or, alternatively, his status quo endowment of property rights.

Equivalence measures assume that the agent is entitled to some alternative level of utility, or, alternatively, to a set of property rights different from those currently held.

Surplus measures constrain the quantity of the good being considered at the quantity which would be purchased at the new (old) price in the absence of compensation for the compensating surplus (equivalence surplus).

Variation measures do not constrain the quantity of the good the agent would purchase.

The Hicksian compensating and equivalent measures of consumer's surplus are both measures of the welfare impacts of changes, but they differ with respect to the reference level of welfare. The compensating measure, by using the initial welfare level as the reference level, measures the welfare impact of changes as if the individual had a right to his initial level of welfare (that is, as if he had the choice of keeping what he has or voluntarily trading for changes). The equivalent measure, by using the subsequent welfare level as the reference level, treats the individual as if he had only a right to his subsequent level of welfare (that is, as if he must accept his subsequent situation or seek to trade his way back to his initial situation).

In deducing what is the theoretically correct measure, one must consider if:

(a) Adjustment in the consumption set is possible which is dependent on the nature of the goods e.g. indivisible, lumpy goods such as water quality, will allow no intermediate adjustments in commodity holdings therefore the Hicksian surpluses are pertinent.

and if

(b) The reference level of welfare is the initial level or the subsequent level. i.e. if initial level then is a compensating value, and if a subsequent level then it is an equivalent value.

Having examined the measurement values we now have information to decide which measurement value to use given the change and population we are surveying. Next we must decide which one of the four measures is correct for decision-making in cost-benefit framework.

The Kaldor-Hicks criterion (of Pareto-improvement) which indicates that for a change to be worthwhile, it should be possible to transfer income so that no-one is made worse off after a change and some one is made better off, is consistent with the Hicksian compensating measures. For losers to be no worse off they must remain on their original utility curves.

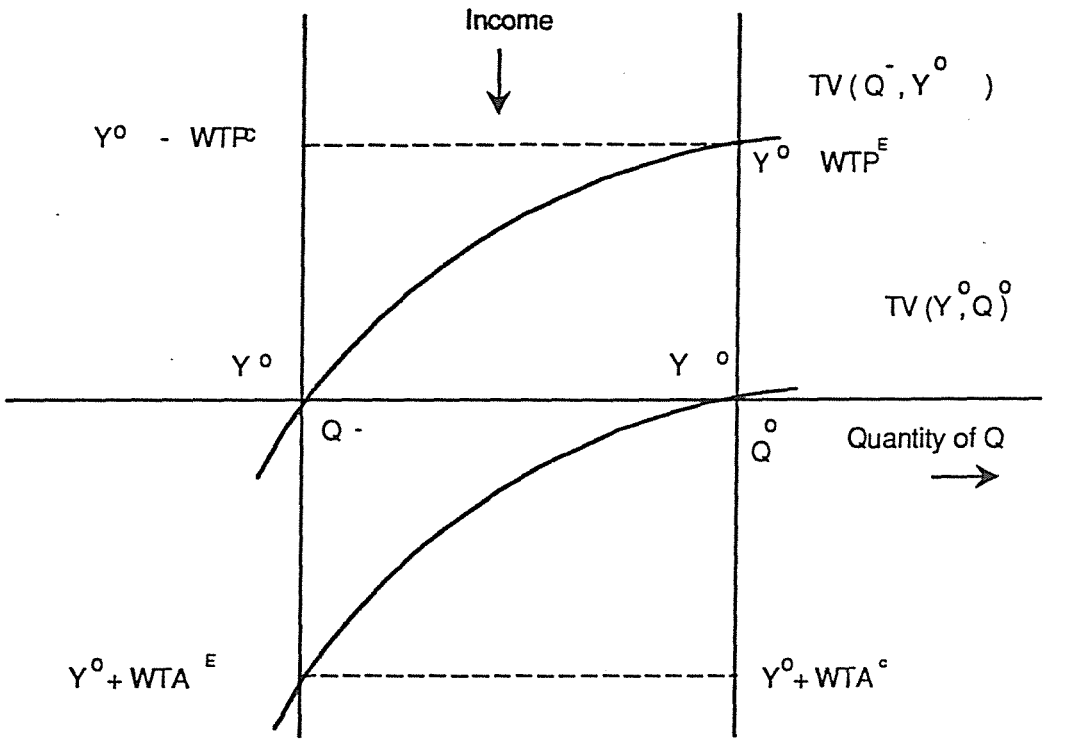
To clarify the relationship between Hicksian compensating and equivalent measures of value, WTA and WTP and the total value curve introduced in figure 1, consider changes in rural services. The loss of a service or the reduction in the availability of a service, results in the loss of value currently enjoyed by an individual. Therefore one needs to know, among other things, the value of the loss which would be suffered by an individual. In the "without project" situation the individual has the utility level U (Q^o, Y^o), and assuming the individual gains no benefits from the project his "with project" utility level would be U (Q^-, Y^o). The level of Q, either in the "without project" level Q^o or in the "with project"

level Q^-, is predetermined so that optimising adjustments are impossible. The following are possible ways to value the welfare impact of the proposed change using the various Hicksian measures:

WTA^c Situation

The superscript C indicates that this is a Hicksian compensating measure of value. Q^o, Y^o, indicates the individual's reference level of welfare (or his presumed right), while Q^- indicates the level of provision of rural services the individual would enjoy after he has accepted the compensation and the change in rural services. If he is compensated with an amount exactly equal to his WTA, his after compensation income would equal $Y^o + WTA^c$. This would be a measurement of an individual WTA compensation for the right to enjoy a service (see figure 2).

Figure 2 The Relationships Between WTP and WTA, and Hicksian Compensating and Equivalent Measures of Consumer's Surplus.



WTP^E Situation

Using figure 2 we use another value measure to estimate the individual's loss i.e. the amount of money he would be willing to pay to avoid a reduction in the provision of rural services. It is assumed that the individual must accept the less preferred situation, or pay to avoid it. Thus the reference level of welfare is not the initial situation but the proposed or subsequent welfare level. This second

measure is denoted WTP^E. The superscript indicates that it is a Hicksian equivalent measure of value. The reference level of welfare (the individual's presumed right) is taken to be Q^-, Y^o, while the initial level is Q^o,Y^o. After the individual has paid, he will be permitted to enjoy the Q^o level of amenities; if he pays exactly his WTP, his final income will be Y^o - WTP^E.

To illustrate how the other Hickson measures fit into the model, consider a different project, that is one where it is proposed to increase the level of rural services from Q- to Q^0. Therefore, following our previous format.

WTP^c Situation

The pair of total value curves in figure 2 can enable us to estimate the value to the same individual of a different project, a project which would increase the level of provision of rural services from an initial level Q^- to a "with project" level Q^o. The individuals initial situation is Q^-, Y^o. His willingness to pay for the increment in rural services the project would provide is WTP^c.

WTA^E Situation

The individual's willingness to accept compensation in lieu of a promised increment in rural services from Q^- to Q^o can be illustrated as WTA^E. It is an equivalent measure since the reference level of welfare is not the same as the individual's initial welfare level. It cannot be estimated from the total value curve passing through the individual's initial welfare level, Q^-, Y^o, but must be estimated from a new total value curve passing through the individuals reference welfare level, Q^o, Y^o.

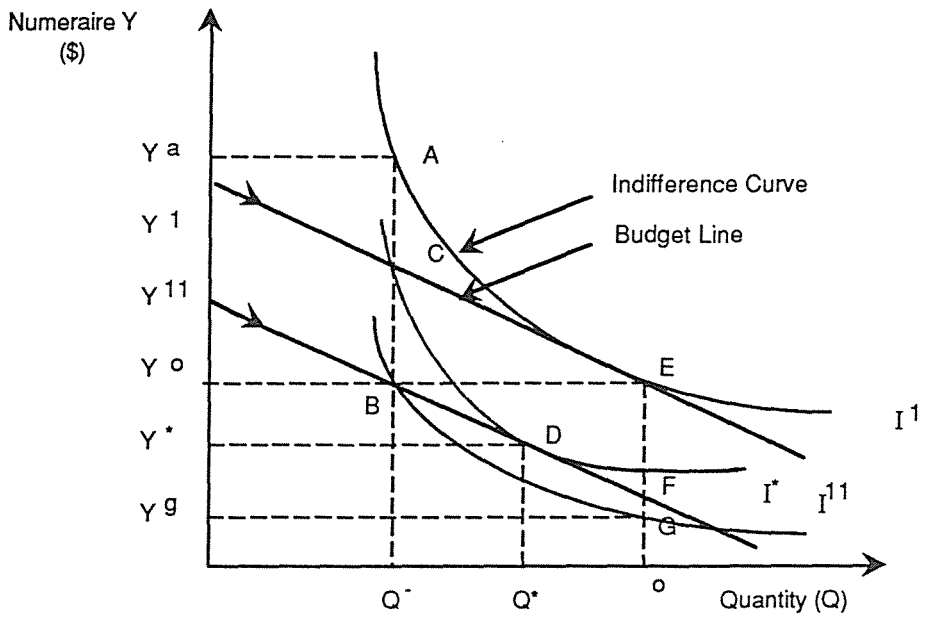
The difference in reference welfare levels explains the distinguishing feature between the Hicksian equivalent and compensating measures.

The situation depicted in figure 2 is relevant when comparing two alternative levels of provision of a service. It suggests that in comparing a pair of alternative levels of a service $WTP^C = WTP^E$ and $WTA^C = WTA^E$. And as a rule $WTP < M < WTA$ where goods are indivisible or lumpy, where M is the Marshallian Consumer Surplus, and that WTP = WTA only in very restrictive circumstances where quantities of perfectly divisible goods are traded in infinitely large, frictionless markets.

Having examined the different measures of consumers' surplus, the question is, which is the correct value to apply to the loss of a rural service? Clearly the loss of a service takes the individual from an initial level Q^0 to a Q^- level. The situation facing an individual is a loss/reduction in provision of a service. The service is still available but at an increased cost.

Choice between variation and surplus measures is dictated by the nature of the goods involved. If the government is considering regulation to improve air quality or water quality, then consumers of these goods (everyone) have no option in choosing the amounts consumed so surplus measures are relevant. However, if some services, say an entrance fee to a forest park was being considered, the users would be able to decide on how far to travel or how many trips they wished to make and then variation measures are appropriate. In this case the increased price simulates a decline in the ability to purchase the good and we have the Hicksian variation concept where consumption adjustment is allowed after the proposed change. This is the situation facing farmers when the cost of a rural service increases. Diagramatically the situation is shown below in Figure 3.

Figure 3 Derivation of Value Measures with Consumption Adjustment.



Of concern is the welfare impact of changes in the levels of goods, services, or amenities provided, rather than changes in price levels. The examination of consumer surplus so far has analysed surplus measurements and since the loss of a service can allow adjustment the examination of Hicksian variation follows.

In Figure 3 we see the situation whereby a rural service has been reduced from Q_o to Q^- while leaving the individual's Y at the same level, Y^o. Initially the welfare level of the individual is reduced from 1' to I" by the movement from E to B. This temporary loss in utility would be eliminated by the individual trading along his new budget line until he maximises utility at D achieving a welfare level of I*. By having the ability to trade the individual attains services of Q* which is greater than the Q^- situation facing him in a surplus measurement. The variation measurement are:

WTP^E	(equivalent variation)	=	EF (i.e. to avoid the less preferred level)
WTA^c	(compensating variation)	=	BC (i.e. amount to accept the less preferred level)

Assuming frictionless markets (no transaction costs) perfectly divisible goods and infinitely large markets $WTP^E = WTA^c = Y'Y''$. If the goods are indivisible or lumpy i.e. only held in amounts of Q^0 or Q^- surplus measures are the pertinent ones. The figure also shows the surplus measurement:

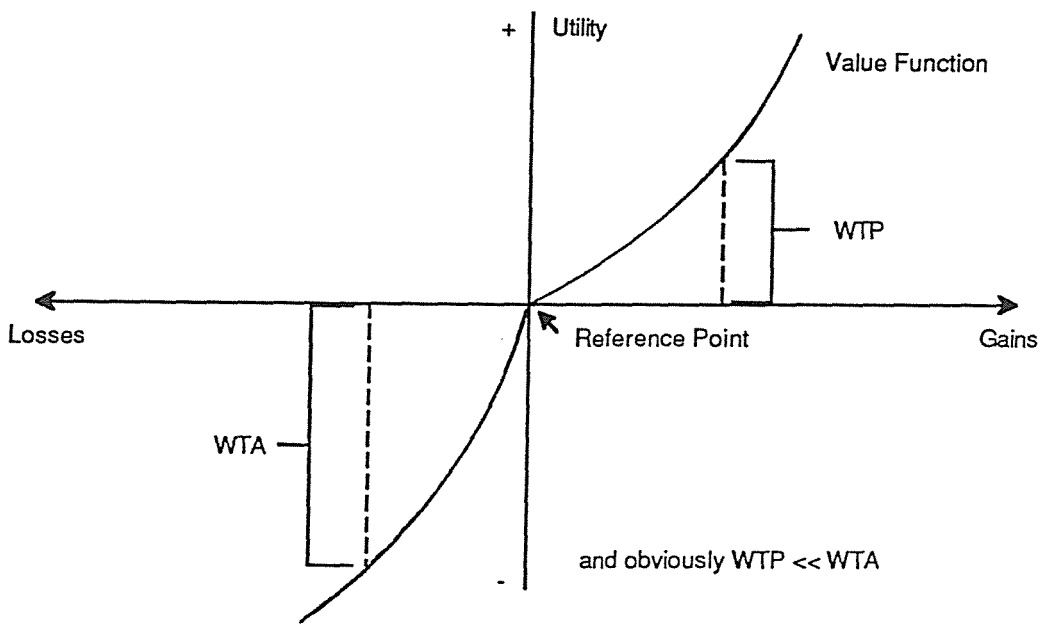
WTP^E	(Equivalent surplus)	=	EG (or Y^oY^g)
WTA^c	(Compensating surplus)	=	AB (or Y^oY^a)

Note that the WTA^c is larger in absolute terms than the WTP^E, particularly as the convexity of the indifference curves increase. Also, the surplus terms are larger than the variation values. The more convex the indifference curve the greater the association with unique resources. Goods with ready substitutes may have less convex curves, Sinden (1978). Following this line of reasoning the loss of a service to an isolated individual (farmer) would be characterised by a more convex indifference curve than the individual closer to readily available substitutes. The implication of this is that remote individuals may be willing to sacrifice large amounts of money for the first unit or require greater and greater amounts (compensation) for the withdrawal of more and more units of these resources, hence an increasing difference between WTP and WTA as the distance to rural service increases.

Consistent with this type of argument is Kahneman's "prospect theory" which provides a descriptive framework for analysing preferences. The significant feature of the theory is that in its evaluation function, outcomes are expressed not in terms of final asset positions (as in utility theory) but in terms of the gains or losses that they represent from some neutral reference position (Kirkland, 1989). Note the similarities to Randall et al's model.

The prospect theory assumes the value function is steeper for losses. The value function is steeper for losses than gains because of a phenomenon Kahnemans and Tvorsky called "loss aversion" eg comparing the intensity of the pain of losing $50 to the pleasure of finding $50. As a result, the theory predicts the WTA will be greater than WTP, where WTA deals with a potential loss with the latter deals with a gain.

Figure 4 Illustration of Kahneman's "Prospect Theory".



This argument strongly suggests that there is a "kink" (see Figure 4) in the value function at the reference point. The theory assumes that individuals value losses disproportionly higher than identical gains. Hence it predicts that WTA will be greater than WTP, where WTA deals with a potential loss while the latter deals with a gain.

Given the above discussion regarding the correct measures of consumer surplus and the disparity between WTP and WTA values, theory shows that compensating measures are the ones which satisfy the Pareto-optimality criteria i.e. WTA^c or WTP^c. To this end most rural services, not being pure public goods,

with consumption adjustments resulting in a proposed change in theory should be valued using Hicksian variation measures of consumer surplus i.e. WTA^C or WTP^E. The CV study of the ambulance service used in this thesis is an exception to this rule. Kerr (1986) points out in practice it may not be possible to find the theoretically correct measure (i.e. compensating) and either consumer surplus or equivalent measures are used. Since consensus in literature favours the use of WTP measurements (Cummings et al) the appropriate Hicksian measure of value in this study of a reduced rural service would be WTP^C. The theoretical framework presented above shows that the differences between the measures of WTP^E and WTP^C are insignificant. This situation does not apply to differences between WTP and WTA measures and until disparities between WTP and WTA can be explained, theory will tend to treat WTA measures with skepticism.

BIBLIOGRAPHY

ANON (1985) When the Farm Money Doesn't Come to Town. New Zealand Journal of Agriculture Oct, 13-14.

ARTHUR-YOUNG (1987) An Assessment of the Extent of Cross-Subsidisation Between Domestic and Non-Domestic Energy Consumers. Report to the Ministry of Energy, Wellington.

BARKLEY, D W (1988) The Effects of Deregulation on Rural Communities. American Journal of Agricultural Economics, 1091-1096.

BELL, P and CLOKE, P (1989) The Changing Relationship Between the Private and Public Sectors: Privatisation and Rural Britain. Journal of Rural Studies, Vol 5, No 1, 1-15.

BENTKOVER, J D, COVELLO, V T and MUMPOWER, J (1986) Benefit Assessment: The State of the Art. Reidel Publishing Company, The Netherlands.

BLYTH, C (1987) The Economists' Perspective of Economic Liberalisation. Pp 3-24. In Economic Liberalisation in New Zealand. Edited by Bollard, A and Buckle, R. Allen and Unwin, New Zealand.

BOLLARD, A (1987) More Market: The Deregulation of Industry. Pp 25-45. In Economic Liberalisation in New Zealand. Edited by Bollard, A and Buckle, R. Allen and Unwin, New Zealand.

BOYLE, K J and BISHOP, B C (1988) Welfare Measurements Using Contingent Valuation: A Comparison of Techniques. Amercian Journal or Agricultural Economics 63 (3), 478-488

BROOKSHIRE, D S, RANDALL, A and STOLL, J R (1980) Valuing Increments and Decrements in natural Resource Service Flows. Amercian Journal of Agricultural Economics 63 (3), 478-488

CAMPION, M H, GARLAND, P M and MORRIS, J D (1988) The Road to Mangamahu. Wanganui Newspapers Ltd, Wanganui.

CORBO, V and J DE MELO (1985) (eds) Scrambling for Survivial - How Firms adjusted to the recent reforms in Argentine, Chile and Uruguay. World Bank Staff Working Paper 764, World Bank, Washington D.C.

CUMMINGS, R G, BROOKSHIRE, D S and SCHULZE, W D (1986) Valuing Environmental Goods: An Assessment of the Contingent Valuation Method. Editors. Published by Rowman and Allenheld, New Jersey.

DEPARTMENT OF STATISTICS (1985, 1987, 1988, 1989 and 1990)
- New Zealand Business Patterns. Wellington.
- Agriculture Statistic. Auckland. (1988)
- New Zealand Official Yearbook (1985 and 1990)

DILLMAN, D A (1978) Mail and telephone surveys: the total design method. Wiley, New York.

DOBSON, W and RAE, A (1990) How Agribusiness Responded In Farming Without Subsidies New Zealand's Recent Experience, (eds) Sandry, R and Reynolds, R. GP Books, Wellington.

DUE, J H and FRIEDLAENDER, A F (1977) Government Finance Economics of the Public Sector. 6th Edition. Richard D Irwin Inc, USA.

EVELEENS, W, REYNOLDS, R and MOORE, W (1989) Effects of Liberalisation on the Provision of Government Services to Agriculture. Discussion Paper 3/89, Policy Services MAF Corp.

FAIRWEATHER, J R (1987) Farmers' Responses to Economic Restructuring: Preliminary Analysis of Survey Data. Agribusiness & Economics Research Unit, Research Report No. 187, Lincoln College.

FALLON, J H and MARSHALL, D W (1990) Nationals Policy on Agriculture. NZ National Party.

FINLAYSON, S (1990) Personal Communication. Agricultural Consultant, Ministry of Agriculture and Fisheries, Wanganui.

FREEMAN, A M (1979) The Benefits of Environmental Improvement. John Hopkins, Baltimore.

FREEMAN, A M (1979) The Hedonic Price Approach to Measuring Demand for Neighbourhood Characteristics. Resources for the Future Washington D C.

GLENDINING, D (1978) "Why did they leave Eketahuna?" Wairarapa Education and Rural Services Committee, Masterton.

GORDEN, P (1991) Personal Communication. AA, Palmerston North.

GRAY, D I, NICHOLLS, J R, FRASER, P A G and WRIGHT, A (1989) Farming in the Pongaroa Region - A Report on a 1989 Survey of Farm Adjustment Strategies. Department of Agricultural and Horticultural Systems Management, Massey University.

HAMLETT, C A and BAUMEL, C P (1990) Rural Road Abondonment Policy Criteria and Empirical Analysis. American Journal of Agricultural Economics.

HARGREAVES (1990) Personal Communication. Valuation Lecturer, Massey University.

HARRISON, D (1990) Personal Communication. Manawatu/Wanganui Regional Council.

HENSHAW, M (1990) Personal Communication. Valuation New Zealand, Wanganui.

HUGHES, J (1990) Personal Communication. Ag/Hort Prod. Syst Lecturer, Massey University.

JOHNSON, R W M (1989) The Agriculture Sector in a Deregulated Economy. Agricultural Policy Paper No 15, Centre for Agricultural Policy Studies, Massey University.

JONES-LEE, M W et al (1985) The Value of Safety Results of a National Sample Survey. The Economic Journal 95, 49-72.

KAPLAN, P F (1970) Social Aspects of Productivity: Hill-Country Sheep-Beef Farms in the Mangamahu Valley. Department of Sociology. Massey University.

KASK, S B and MAANI, S A (1989) Risk and Information. A Hedonic Price Study in the New Zealand Housing Market, Work papers in Economics, University of Auckland.

KERR, G N (1986) Introduction to Non-Market Valuation: Theory and Methods. Studies in Resources Management No 1, Lincoln College.

KERR, G N and SHARP, B M H (1987) Valuing the Environment Economic Theory and Applications. Studies in Resource Management No 2, Lincoln College.

KNIGHTON, G D and MEISTER, A D (1984) Rural Smallholdings in the Wairarapa: Desirability and Land Use Issues. Discussion Paper in Natural Resource Economics No 9, Massey University.

KIRKLAND, W T (1988) Preserving the Whangamarino Wetland - An Application of the Contingent Valuation method. Thesis, M. Ag. Sc., Massey University.

KNETSCH, J L (1985) Values, Biases and Entitlements. The Annals of Regional Science, 2, 1-8

KOLSEN, H M (1983) Effective Rates of Protection and Hidden Sectoral Transfers by Public Authorities. Australian Journal of Agricultural Economics, Vol 27, 104-113.

Le HERON, R (1990) Personal Communication. Geography Lecturer, Massey University.

MEAT and WOOLBOARD ECONOMICS SERVICE (1984, 1985, 1986, 1987, 1988 and 1989) The New Zealand Sheep and Beef Farm Surveys, Wellington.

MILLARD, M (1991) Personal Communication. Manawatu/Wanganui Regional Councillor.

MINISTRY OF EDUCATION (1991) Rural School Rolls, Wellington.

MINISTRY OF TRANSPORT (1988) A Review of the Licensed Transport Industry. Discussion Document, Wellington.

MISHAN, E J (1975) Cost-Benefit Analysis - An Informal Introduction. Second Edition. George Allen and Unwin, London.

MOORE, W (1989) Impacts of Changes in Government Services to Agriculture. Policy Services MAF Corporate Services Ministry of Agriculture and Fisheries, Wellington.

MOORE, W B (1990) Changes to Post, Phone and Electricity Services. Policy Services MAF Corporate Services, Ministry of Agriculture and Fisheries, Wellington.

MUSGRAVE, R A (1959) The Theory of Public Finance. McGraw-Hill Inc, New York.

NEILD, J (1990) Personal Communication. Agricultural Consultant, Ministry of Agriculture and Fisheries, Palmerston North.

OFFICE OF THE POSTMASTER-GENERAL (1987) Press Statement. Wellington.

PACKMAN, J (1985) Bridging the Gap - A Study of Rural Services in New Zealand. Town and Country Planning Directorate, Ministry of Works and Development, New Zealand.

POMEROY, A (1986) A Sociological Analysis of Structural Change in Pastoral Farming in New Zealand. Thesis Ph.D., University of Essex.

POTTINGER, G, et al (1990) Submission to Ministry of Education. Wairarapa Primary Schools. BOT's sub-committee on Rural School Buses.

REYNOLDS, R, CHIO, Y S, and ROBINSON, B (1986) Macroeconomic Policies and Agricultural Sector Responses. Paper Presented to Australian Agricultural Economics Society, Lincoln College.

SANDRY, R and REYNOLDS, R (1990) Farming Without Subsidies: New Zealand's Recent Experience. GP Books, Wellington.

SANDRY, R (1990) The Regulatory Environment. In Farming Without Subsidies New Zealands Recent Experience, (eds) Sandry, R and Reynolds, R. GP Books, Wellington.

SAVAGE, J (1990) "Rural Employment and Labour Adjustments. In Farming Without Subsidies New Zealands Recent Experience (eds) Sandry, R and Reynolds, R. GP Books, Wellington.

SHEPHERD, A A, ARTHUR-WORSOP, M (1980) Factors Affecting Agricultural Production from a Group of Hill Country Farmers Comprising Akitio Country. Proceedings NZ Branch of Australian Agricultural Economics Society. R W M Johnson and P G Bushnell (Eds). 43-62.

SINDEN, J A (1978) Estimation of Consumers Surplus Values for Land Policies. Australian Journal of Agricultural Economics, Vol 22, No 3, 173-193.

SINGER, N M (1972) Public Microeconomics. Little, Brown and Co Inc, USA.

MUSGRAVE, R A (1959) The Theory of Public Finance. McGraw-Hill Inc, New York.

NEILD, J (1990) Personal Communication. Agricultural Consultant, Ministry of Agriculture and Fisheries, Palmerston North.

OFFICE OF THE POSTMASTER-GENERAL (1987) Press Statement. Wellington.

PACKMAN, J (1985) Bridging the Gap - A Study of Rural Services in New Zealand. Town and Country Planning Directorate, Ministry of Works and Development, New Zealand.

POMEROY, A (1986) A Sociological Analysis of Structural Change in Pastoral Farming in New Zealand. Thesis Ph.D., University of Essex.

POTTINGER, G, et al (1990) Submission to Ministry of Education. Wairarapa Primary Schools. BOT's sub-committee on Rural School Buses.

REYNOLDS, R, CHIO, Y S, and ROBINSON, B (1986) Macroeconomic Policies and Agricultural Sector Responses. Paper Presented to Australian Agricultural Economics Society, Lincoln College.

SANDRY, R and REYNOLDS, R (1990) Farming Without Subsidies: New Zealand's Recent Experience. GP Books, Wellington.

SANDRY, R (1990) The Regulatory Environment. In Farming Without Subsidies New Zealands Recent Experience, (eds) Sandry, R and Reynolds, R. GP Books, Wellington.

SAVAGE, J (1990) "Rural Employment and Labour Adjustments. In Farming Without Subsidies New Zealands Recent Experience (eds) Sandry, R and Reynolds, R. GP Books, Wellington.

SHEPHERD, A A, ARTHUR-WORSOP, M (1980) Factors Affecting Agricultural Production from a Group of Hill Country Farmers Comprising Akitio Country. Proceedings NZ Branch of Australian Agricultural Economics Society. R W M Johnson and P G Bushnell (Eds). 43-62.

SINDEN, J A (1978) Estimation of Consumers Surplus Values for Land Policies. Australian Journal of Agricultural Economics, Vol 22, No 3, 173-193.

SINGER, N M (1972) Public Microeconomics. Little, Brown and Co Inc, USA.