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LAND USE CONSTRAINTS TO INCREASING  
HORTICULTURAL PRODUCTION IN THE  
WESTERN BAY OF PLENTY

A thesis presented in partial fulfilment  
of the requirements for the degree of  
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in Horticultural Economics and Marketing at  
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## ABSTRACT

The Western Bay of Plenty, because of its climate, resources, and infrastructure, is an ideal place for the development of horticultural enterprises.

The development of the horticultural industry, and especially Kiwifruit, over the last 10 years, has resulted in dramatic changes in land use. These changes have been particularly noticeable in Tauranga County. In contrast the rate of horticultural development in Whakatane County is still very small compared to total land in agriculture.

The beneficial effects of the changing patterns of land use, i.e. increased economic activity, labour opportunities, and rural re-population seem to outweigh the costs in terms of social friction, effects on dairy companies, and land speculation.

In the period from 1972 to 1979, Tauranga County District Planning Schemes were found to have restrained horticultural development within the area. However in the present second review of the Tauranga County District Scheme, the Council was found to have liberalized its attitude towards land subdivisions for horticulture. Although land for horticultural uses, especially in the county's Rural B zone, must satisfy certain conditions as set out in the code of ordinances.

In the Whakatane County, with little demand for horticultural lots, horticultural subdivisions have been based on the productive capacity of the land. Subdivision plans are approved on merit.

An economic analysis of three orchards in the Tauranga County revealed that fruit production, especially Kiwifruit growing, is a profitable use of land. Orchard net farm incomes increase as orchard sizes increase and as orchards become more specialized. Financial benefits are accruing to the orchard owners through both income and property value appreciation. Small areas used for orcharding, e.g. 1 hectare of Kiwifruit, can be more profitable than 48 hectares used for dairying.

In 1983, the total area in horticulture in the Western Bay of Plenty could exceed 7,000 hectares. Kiwifruit plantings will comprise 68 per cent of this area. Ninety per cent of these expected plantings will occur in Tauranga County and the balance in the Whakatane district.

Tauranga County has 38,500 hectares of land potentially suitable for horticulture. The majority of this land is in the County's Rural B zone. The ordinances regulating horticultural subdivisions in this zone will be amended to encourage further horticultural development when horticulturalists and farmers demand change.

In 1990, the financial benefits from the region's proposed horticultural plantings to 1983, at current prices and costs, could reach \$319 million. In the period from 1980 to 1990, the casual labour requirements for Kiwifruit pruning and training in the Western Bay of Plenty is expected to increase by 1370 persons. The numbers of fulltime persons (this includes working owners and/or managers) will increase by 1330 persons. Casual labour for Kiwifruit harvesting and packing will increase by 10,000 persons.



## CHAPTER 1

### INTRODUCTION

#### 1.1 STUDY BACKGROUND AND OBJECTIVES

"In scarcely more than three years, New Zealand horticulture has soared from Cinderella to fairy queen of the farming industry", wrote John D. Green in the New Zealand Economist (December 1979) and no-one is more aware of this than the people living in the Bay of Plenty. Although horticulture has always been an important part of the total industry in this area, the developments of the last five years have gone beyond anyone's expectations.

Few areas in New Zealand have experienced such rapid changes in land use and socio-economic climate as those experienced in the Western Bay of Plenty. It is with these changes and the associated impacts that this thesis concerns itself.

In this thesis the results of research conducted in the area over the period January-December 1980 are presented.

The aim of the research was to:-

- (a) describe the changes that have taken place in the area;
- (b) describe the impacts that these changes have had on the socio-economic climate;
- (c) identify constraints that have been and still may be hindering the development of the horticultural industry in the area (especially the place and role of district schemes);
- (d) determine the profitability at the farm gate of horticultural farming, (namely orcharding), and compare this profitability with traditional pastoral farming;
- (e) make recommendations on the formulation and use of district schemes; and

- (f) given the above findings build up a scenario of what could happen in future years.

From earlier work in the area it had become evident that land use planning, administered through district schemes, was one of the major factors that would aid or hinder the development of the horticultural industry in the area. Therefore, research emphasis has concentrated on the place and role of district schemes.

Most of the research findings are subjective. The time was not available to do extensive survey work to determine the details of changing land use patterns or the magnitude of the socio-economic parameters. The findings are based on interviews held with a large number of people. During discussions attempts were made to cover a wide spectrum of interests such as growers, councillors, directors of the dairy companies, planners, surveyors, town clerks, lawyers, bankers, input suppliers, processors, school teachers, and other people living in the rural areas and in the towns.

Because of the subjective nature of the results, it is acknowledged that personal biases will have crept in. However, the author believes that this report gives a fair description of what has occurred in the Bay of Plenty.

The thesis is divided into seven chapters.

In Chapter 2 the physical, economic and social characteristics of the Western Bay of Plenty are described and statistical and other information is presented to indicate the changes in the above three variables that have occurred.

Chapter 3 deals with the role that the district schemes have played in controlling land use. This section starts with a general introduction on land use planning in New Zealand and ends with a critical review of the Tauranga and Whakatane county district schemes.

In Chapter 4, three orchards are analysed for profitability. The three orchards have been chosen on the basis of their being representative of what new growers would like to achieve in ten years time. This section also compares the net farm incomes of the three orchards with those of a dairy farm, sheep and beef farm, and a sheep, beef, deer enterprise. Orchard profitability as a guide to land use is discussed.

Chapter 5. Using the findings from Chapter 4, Chapter 5 critically reviews land use planning in the Tauranga County and the attitudes of the Councils.

Chapter 6 deals with future land use trends in the Western Bay of Plenty. An estimation is made of the potential land area which could be available for horticulture in Tauranga County. Given this, the future financial benefits from the region's present and proposed plantings of Kiwifruit, Avocados, and Citrus Crops are determined. The labour requirements for the region's Kiwi-fruit plantings are also determined.

Chapter 7 contains conclusions and recommendations which are based upon the research findings of this thesis.

## CHAPTER 2

THE WESTERN BAY OF PLENTY: PHYSICAL,  
ECONOMIC AND SOCIAL CHARACTERISTICS

## 2.1 DESCRIPTION OF THE AREA

The Tauranga and Whakatane Counties are situated in the Bay of Plenty region, on the north east coast of the North Island of New Zealand (Figure 1.1).

Together the two districts have a combined coastal boundary of 130 kilometres and an area of 602 600 hectares.

The Tauranga County occupies a western position in the Bay of Plenty coastal region. The County extends from the Ohinemuri County boundary in the north-west, 80 kilometres east along the coast, to the Whakatane district boundary in the south-east. The County surrounds, but does not include, the City of Tauranga and the Boroughs of Mount Maunganui and Te Puke. The County extends some 10 kilometres inland to the Kaimai Range in the south-west and 30 kilometres inland to the Rotorua district boundary in the south. The County boundary follows approximately the ridge line of the Kaimai Range from the Mountain of Te Aroha in the west, and extends eastwards along the northern edge of the Volcanic Plateau, turning north to the sea east of Maketu. The Tauranga County has an area of 182 100 hectares.

The Whakatane district is in the central Bay of Plenty. The district extends 50 kilometres along the coast, from the Tauranga County boundary in the north-west, to the Opotiki district boundary in the eastern Bay of Plenty. The Whakatane district extends 70 kilometres into the central North Island's volcanic plateau forests, while much of its south-eastern area makes up the rugged country of the Urewera National Park. The total area of the Whakatane district, including the Urewera National Park is approximately 420 000 hectares.

The Whakatane district surrounds, but does not include, the Boroughs of the Whakatane, Kawerau and Murpara townships.

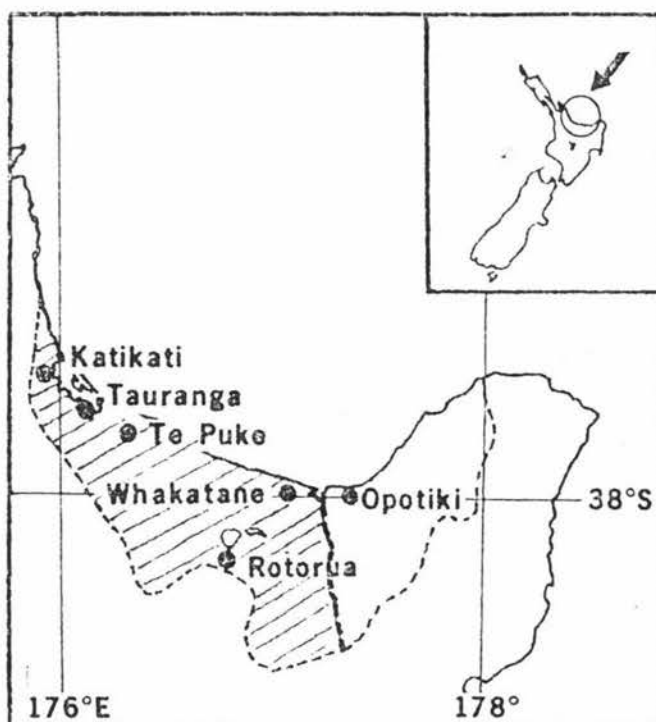


Figure 1.1 Location of the Bay of Plenty region.

### 2.1.1 Topography

The Western Bay of Plenty consists of broken contour, with areas of flat land on the coast, rising inland to over 600 metres in the Kaimai Ranges. Large areas of flat land are scattered in small pockets amongst the broken contour.

The numerous streams and rivers which drain the eastern slopes of the Kaimai Ranges have carved deep gorges in the land surface. Nearer the sea in the coastal lowlands the streams are less deeply incised and they open out into swampy estuaries and mudflats around the Tauranga Harbour. In the eastern County there are extensive coastal swamps. The Kaituna River drains the lakes of Rotorua and Rotoiti into the sea at Maketu.

Running inland, south of Tauranga City and the township of Te Puke, are several plateaus containing hundreds of hectares of flat land lying between deep gorges. To the east of Te Puke, in the Paengaroa, Pongakawa, and Pukehina districts there are large areas of flats as well as coastal swamps. Further east the Whakatane and Rangitaiki plains contain extensive areas of flat land.

The Whakatane County has a diverse topography. The County includes a combination of rugged coastline and long sweeping beaches backed by extensive flat plains. There is rugged and heavily dissected hill country in the east, and an extensive elevated plateau towards the west and south. Mount Edgecumbe (821 metres a.) is a prominent landform on the Rangitaiki plains.

The Whakatane and Rangitaiki rivers flow from the hinterland out to the coast. These rivers, because of the nature of their catchment areas and gentle gradients of their lower reaches are subject to flood risk.

### 2.1.2 Climate

The climate throughout the region is mild with above average (New Zealand) annual sunshine hours (2200 hours).

RAINFALL: The average annual rainfall varies from 1350 mm per year for the Western Bay of Plenty to over 1300 mm per year in the Whakatane district. Further inland, average rainfall reaches over 2500 mm per year in the hill country and Kaimai Ranges.

TEMPERATURE: Temperatures vary from a mean daily maximum in January of 25°C to a mean daily maximum in July of 14°C. Droughts are not uncommon in the coastal areas in the warm summer months of January and February.

WIND: Wind velocities are moderate but shelter is necessary for protection against winds prevailing from the south-west. Coastal areas can also be exposed to strong winds from the north and east.

### 2.1.3 Soils

The soil pattern of the Bay of Plenty region has been influenced by the numerous volcanic ash and pumice deposits which overlie the area. The most extensive ash cover is that of the Kaharoa Ash (approximately 100 A.D.) with Tarawera Ash deposits (1886) overlying much of the south-east of the region.

The western ranges of the Tauranga County are made up of andesite, basalt, and quartz. The rest of the hill country in the Tauranga and Whakatane districts consist of more recent Pleistocene volcanics, ignimbrite, rhyolite and ash showers which originated in the Rotorua-Taupo area. The mineral constituent of the soils on the coastal lowlands is derived mainly from the volcanic material eroded off these ranges and hills, and then deposited by the many streams. The soils are also the products of relief, for example, the thin skeletal soils of the higher hill country, peaty loams in low lying, poorly drained areas, and sandy soils along the coast.

At altitudes below 250 metres the mild climate is favourable for plant growth. The soils are friable, free draining and easily worked. Above 250 metres, where the climate is cooler and wetter, the soil tends to be lower in fertility and the annual growth of plants is less. These



soils, however, respond readily to fertilizer application.

Moisture limitations to plant growth can occur on the sandy soils near the coast and on the coarser soils of the low lying terraces and flats.

#### 2.1.4 Land Use

Dairying is the main farming enterprise on the coastal plains. Further inland sheep and beef farming are predominant in areas not undergoing horticultural development.

A recent innovation in land use has been the introduction of deer farming.

Native bush, unimproved scrub, and exotic forests cover large areas of the Tauranga and Whakatane Counties. Approximately 30 per cent of the area of Tauranga County is inhabited hill country. The major areas being in the Kaimai Ranges, the upland areas west of Te Puke, and the Kaharoa plateau.

Large areas of the eastern and central hill country in the Urewera National Park are not considered suitable for grazing or commercial forestry, because of the possible erosion hazards.

In the last 15 years, in response to overseas and internal market demands, there has been a rapid development towards horticulture. The Bay of Plenty region is now an important source of citrus, subtropical fruits and vegetables for local and overseas markets.

The main fruit growing areas are situated on the plateaus and pockets of flat land scattered throughout the western and eastern Bay of Plenty. Land sloping to the north and north-east is preferred for horticultural development. These areas offer protection from the cold and strong winds which come from the south and west.

The flat coastal and inland areas around the Te Puke and Whakatane districts are more susceptible to frosts and cold



winds. Horticultural development is taking place in these areas but many are not yet fully proven, e.g. the Maketu district, east of Te Puke.

In the Tauranga County there are approximately 24 200 hectares classified as Maori land. This represents 13 per cent of the whole county. The land is in blocks of varying areas and locations. Whilst some of the land is high country forest, much of the area has a potential for agricultural or horticultural production.

There is a growing interest by Maori owners to develop the horticultural potential of their land. Development has begun on areas within the Tauranga district.

Table 1.1

Land Use by Counties (hectares) - June, 1979

Classification	Whakatane		Tauranga	
	Area	%	Area	%
Grassland and lucerne	99,687	39.5	96,753	55.2
Fruit, grain, crops, vegetables	2,429	0.9	6,998	3.9
Exotic tree plantations	40,813	16.1	15,741	8.9
Other land on holding	109,956	43.5	56,005	32.0
Total area of holdings	252,885	100.0	175,497	100.0

Reference: Department of Statistics (1980).

Table 1.1 shows that Tauranga (the smaller county) has a greater proportion of its land in grassland and fruit crops, compared with Whakatane. Similarly, both counties have 32 to 43 per cent respectively, of their holdings classified as 'other'. 'Other' in this context includes land occupied by buildings, domestic gardens and orchards, hedges, stands of native timber, and all idle and unused land.

### 2.1.5 Population

The Bay of Plenty region is rich in Maori history. Maori occupation of the district, according to tradition, dates back to the 11th and 12 centuries. Maketu, Tauranga, and Whakatane

remain important historical sites of early Maori settlement.

The first European emigrants settled in the region in the 1830's but the first intensive settlements were not established until the 1880's.

The geographic populations of the Tauranga and Whakatane districts are shown on the following page. In the period 1971-76, the population of Tauranga County showed an increase of 20.1 per cent compared with an increase of 6.2 per cent for the Whakatane County. The figure for the Tauranga County is indicative of the rapid development which has been occurring in the Western Bay of Plenty. In the same period Tauranga County was one of six counties in New Zealand with population gains exceeding 3700.

During the period 1971-1991 the populations of the Tauranga and Whakatane Counties are expected to increase by 86 per cent and 17 per cent respectively. The population growth for the Whakatane County is only an estimate and the figure could be much higher.

The main impetus of growth in the Bay of Plenty region has been in the Tauranga County. Resources specific to this region will be discussed. Reference will be made to those resources which are also applicable to the Whakatane County.

Table 1.2 Geographic Populations of the Tauranga and Whakatane Districts

	1966	1971	1976	1981	1986	1991	% Increase	
							1971-76	1971-91
Tauranga County	14,584	15,655	18,801	19,600	24,400	29,200	20.1	86
Tauranga City	24,010	28,188	33,672	39,500	46,500	54,000	19.5	91
Mt Maunganui B.	6,815	8,771	10,108	13,500	13,500	13,500	15.2	53
Te Puke B.	3,024	3,406	3,810	4,350	4,850	5,400	11.9	58
TOTAL	48,433	56,020	66,387	76,950	89,250	102,100		
Whakatane County <sup>1</sup>	16,567	14,590	15,491	-	-	-	6.2	17
Whakatane B.	8,776	9,864	11,542	12,800	14,300	15,800	17.0	60
Kawerau B.	5,845	6,687	7,743	9,400	10,700	12,000	15.8	79
Murupara B.	2,670	2,760	2,961	2,950	3,050	3,150	7.3	14
TOTAL	33,858	33,901	37,737					

Reference: Department of Statistics, 1976 Census of Population and Dwelling Vol.1A.  
Population Forecasts 1971-91, Ministry of Works Town and Country Planning Division,  
pp.35-36.

<sup>1</sup> From Whakatane County District Scheme 1973:

	<u>1974</u>	<u>1979</u>	<u>1988</u>
Whakatane County	16,950	17,050	17,150

## 2.2 RESOURCES

### THE PORT OF TAURANGA

The Port of Tauranga is the focal point for the main cargo transport throughout the region to and from overseas.

Since 1953, when construction first commenced, the port has grown to a stage where it is now New Zealand's largest export port. The total through-put handled in 1977/78 was 3.2 million tonnes. The basis of the port's trade is centred predominantly around the export of forestry and dairy products. Imports through the port include fertilizer, fuel and chemical products.

In 1979, the Bay of Plenty Harbour Board purchased a multi-purpose crane to improve cargo handling efficiency. The crane, together with 21.8 hectares of land reserved by the Harbour Board in the immediate vicinity of the Port, should ensure that facilities are available for future container port development.

### AIRPORT

The only commercial airport in the Western Bay of Plenty is the Tauranga Airport. Air New Zealand operates a scheduled air service for passengers and freight at the airport. In addition, the airport is used by operators of light aircraft.

There is an aerodrome at Whakatane, but it handles limited freight and passenger cargoes.

### RAILWAYS

The eastern and western Bay of Plenty areas are serviced by the East Coast Main Trunk Railway (ECMT). The ECMT line runs south-east from Apata through Tauranga, and follows the coastline parallel to State Highway No. 2, to termini at Te Teko and Taneatua in the Whakatane County.

In 1978, with the opening of the Kaimai tunnel deviation the north-west section of the ECMT line from Apata-Katikati-Waihi was closed.

The present railway system connecting the Waikato-Tokoroa area through the Kaimai tunnel, and the ECMT line to the central Bay of Plenty, services the Port of Tauranga for overseas exports, imports, and the coastal shipping trade.

#### ROAD TRANSPORT

The major road in the region is State Highway No. 2 which runs from the Ohinemuri County in the west, through both the Tauranga and Whakatane Counties. State Highway No. 29 runs south-west from Tauranga City over the Kaimai Ranges to the Waikato. Further east State Highway No. 33 connects with State Highway No. 2 near Paengaroa and services the Rotorua and Taupo districts. The three State Highways mentioned, service the Port of Tauranga for the transportation of timber and primary produce.

## 2.3 INDUSTRY

Industry in the area, and in the immediate hinterland, is related to primary products. Dairy, meat, and forestry are the biggest industries, but the horticultural industry is rapidly expanding.

### THE DAIRY INDUSTRY

The Bay of Plenty Co-operative Dairy Company Limited operates factories at Katikati and Te Puke. The Te Puke factory is used for fat processing and spray powder manufacture. The Katikati factory is concerned with casein production.

In addition to dairy processing the company is involved in extensive retailing operations, and also operates two veterinary services.

The Rangitaiki Plains Dairy Factory at Edgecumbe services the Whakatane County. In 1978/79, total production from both the Bay of Plenty and Rangitaiki factories exceeded 19 million kilograms of milkfat. Both companies are among the top seven dairy producers in New Zealand.

### MEAT SLAUGHTERING FACILITIES

The Auckland Farmers Freezing Co-operative operates a meat slaughterhouse 8 kilometres south-east of Te Puke, at Rangiruru, near State Highway No. 2.

### FERTILIZER

Fertilizer is supplied to the region by the New Zealand Farmers Fertilizer Co-operative Company at Sulphur Point in Mount Maunganui. Average annual production is around 300 000 tonnes. The ex works price for superphosphate is the lowest in the country. In the 1978/79 season the margin for superphosphate was \$4.10 per tonne in the case of the nearest competitor, and \$11.25 per tonne for the highest competitor.

## FRUIT PROCESSING

Private and co-operative packing sheds and coolstores are continually being built to service the rapidly expanding horticulture industry.

In 1980, during the six week harvesting period from May to June the Bay of Plenty Co-operative Packhouse at Te Puke packed 1.48 million trays of Kiwifruit. This was the highest throughput of any single Kiwifruit packhouse in any one season.

There are currently five main fruit processors in the Western Bay of Plenty, including the Citrus Marketing Authority premises in Tauranga. Processed citrus, subtropical fruits and vegetables supply local and export markets.

## FORESTRY

The Bay of Plenty region has some of the major forest resources and industries in New Zealand. Three process mills, Tasman, Caxton, and the Whakatane Board Mills are situated in the Whakatane district. The three mills are a major source of employment for the local population. In 1977, the mills employed a total of 3814 people. The Tasman mill is the largest single employer with 2714 people.

At the present time the mills are dependent on the state forests such as Kaingaroa and Rotoehu for supplies of logs. This situation will continue until private woodlots throughout the region, and company plantings at Tarawera and Rotoiti mature.

## FARM SERVICES

The Western and Central Bay of Plenty regions are serviced with agricultural contractors, engineering, and transport firms. Three stock and station firms and the New Zealand Fruit Growers' Association also service the region.

In March 1980, the Rural Banking and Finance Corporation of New Zealand officially opened an office in Tauranga. The Rural Bank services the Western Bay of Plenty from Tauranga, and the central region from Rotorua.



## 2.4 MAJOR CHANGES IN LAND USE

### 2.4.1 Agriculture

It was not until after World War II, that Tauranga County experienced extensive development of its rural areas into grassland farming. This development is described by Stokes (4), in 'A History of Tauranga County'.

In the late 1940's, under the postwar rehabilitation scheme large areas of unimproved Crown and Maori land, covered mainly in scrub, fern, and rough pasture, were made available to ex-servicemen. The Government was prepared to pay the high initial costs of land development. By 1960, in the Tauranga County, 9162 hectares of land had been developed by the Department of Lands and Survey into 32 dairy and 15 sheep units. Development of settlement blocks continued throughout the 1960's.

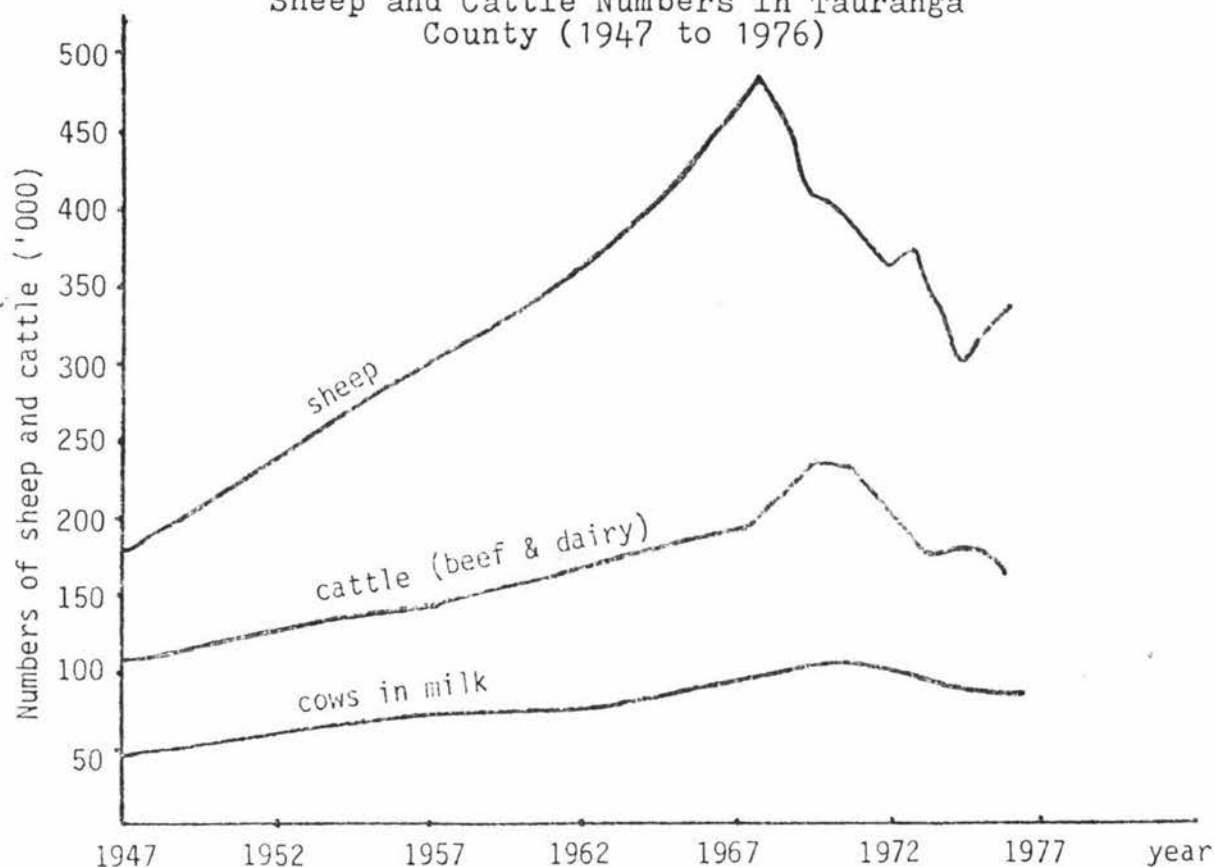
The low lying areas in the valleys and estuaries opening into the Tauranga Harbour and coastal swamps in the eastern Bay of Plenty proved difficult to drain and develop. During the 1920's and 1930's extensive river control and drainage works were carried out throughout the region. Today this work is continued by the Bay of Plenty Catchment Commission, the Ministry of Works, and the Tauranga County Council.

The transformation of scrub, unimproved land, bush and swamp into pasture since the second world war is reflected in the increased stock numbers in the county. In the 25 year period from 1947 to 1972, cattle numbers rose by 97 per cent. Sheep numbers rose by 113 per cent and the number of cows in milk rose by 59 per cent. These statistics are shown graphically in Figure 1.2.



Figure 1.2

Sheep and Cattle Numbers in Tauranga  
County (1947 to 1976)



Reference: Ministry of Agriculture and Fisheries

In the late 1960's to 1977, there was a downward trend in livestock numbers. This was due to the diversification of land away from traditional farming to horticulture. The price boom for agricultural products during 1972-74 temporarily slowed this trend.

The expansion of horticulture, cropping and forestry is expected to restrict the scope for increased livestock numbers in the area. Overall sheep numbers are expected to increase but dairy and beef cattle numbers are expected to decrease. Livestock forecasts for the period 1976-82 are shown in Table 1.3.

Table 1.3

Livestock Forecasts (1976-1982)

	June 1976 (actual)	June 1982 (forecast)	% Change 1976-1982
TAURANGA			
Total sheep	334,000	380,000	13.7
Total dairy cattle	110,800	100,000	-9.7
Total beef cattle	75,800	55,000	-24.4
WHAKATANE			
Total sheep	240,000	255,000	6.3
Total dairy cattle	106,500	110,000	3.7
Total beef cattle	51,000	47,000	-7.8

Reference: Ministry of Agriculture and Fisheries,  
June 1978. New Zealand Livestock Forecasts  
1976-1982.

2.4.2 Dairy Production

Over the period 1950-75 dairy production increased from 7,417 tonnes to a total of 26,216 tonnes. In the 1978/79 season 25,866 tonnes were produced, valued at approximately \$25 million.

The growth in dairy production resulted from improved economic conditions, increased fertilizer inputs, and increased quality of livestock and pastures. Stokes (4) describes the development of dairying in Tauranga County as follows:

"During the 1960's, the tanker collection of milk was introduced. Consequently, the skim milk fed to pigs was no longer available, and many farmers gave up pig farming. The Katikati and Tauranga dairy factories were amalgamated into the Kaimai Co-operative Dairy Company. This company was then incorporated with Te Puke to form the Bay of Plenty Co-operative Dairy Association Limited with headquarters at Te Puke. In the early 1970's, the Bay of Plenty Co-operative Dairy Company was receiving milk from over 700 suppliers. The old dairy factories at Tauranga and Katikati were eventually closed down and existing facilities were updated."

During the 1970's milk volume was maintained despite the acceleration of land use away from dairy farming. In the period from 1970 to 1980 milkfat production dropped from 10.7 million kilograms to 9.1 million kilograms. The Bay of Plenty Co-operative Dairy Company forecasts that by May 1983 the total

milkfat production from the Western Bay of Plenty will be around 8.5 million kilograms. Using 1977/78 milkfat production figures, this output would place the Bay of Plenty company among the top seven dairy companies in New Zealand.

#### 2.4.3 The Poultry Industry

The poultry industry showed a large development in the period from 1950/75. In 1950 the Tauranga Egg Marketing Co-operative (TEMCO) handled 262,030 dozen eggs; by 1975 this had increased to 5,758,885 dozen. Chicken carcasses processed increased from 411,077 to 522,000, and egg production dropped from 5,738,885 dozen to 5,472,000 dozen.

#### 2.4.4 Forestry

Forestry is an important land-use. Since World War II the milling of indigenous forests has decreased and the development and utilization of exotic forests has increased.

The NZ Forest Service manages the state forests of Athenree, Rotoehu, Te Matai, Otanewainuku, Oropi, Puwhenua, Mangatotara, Aongatete and Katikati. The latter three forests are in the Kaimai-Mamaku State Forest Park which comprises 37,141 hectares. A large area of this park is in the Kaimai Range within the Tauranga County. The park is managed for the protection of indigenous forests, soil and water conservation, wildlife, scientific, and recreational purposes.

Within the County 120 forestry encouragement grants have been approved, covering some 2000 hectares. With the continued development of orchards, areas of land in grass unsuitable for orchards, will become available for tree planting, and thus will provide both shelter and timber.

#### 2.4.5 Horticulture

Fruit farming was first established around Tauranga and Te Puke as early as 1910, however, extensive development of the subtropical fruit industry did not begin until the 1950's.

Citrus growing was well established in the 1940's with lemons and grapefruit being the predominant fruit. There were heavy plantings of lemon trees in 1947-51 with subsequent increases in lemon production in the mid 1950's. During the 1950's old lemon orchards were not replaced. New citrus orchards were planted in oranges, mandarins, and tangelos. Total citrus production rose from 3,011 tonnes in 1963 to 9,233 tonnes in 1978.

The development of the Kiwifruit industry has caused the most dramatic change in land use. Over the years Kiwifruit production has increased rapidly from 265 tonnes in 1963 to 9,616 tonnes in 1978.

The extent of horticulture development within the Tauranga County is indicated by the following statistics in Table 1.4, obtained from the Ministry of Agriculture and Fisheries 1978 orchard survey. The figures show that in the intervening years between the 1973 and 1978 orchard surveys there has been a dramatic expansion of citrus and subtropical fruit plantings.

Table 1.4

Citrus and Subtropical Fruit Plantings in Tauranga County

<u>Production</u>	<u>1978</u>		<u>1973</u>	
	Area hectare	Production (tonnes)	Area hectare	Production (tonnes)
CITRUS				
NZ grapefruit	311	2807.4	384.1	3000
Wheeny grapefruit	3	67.6	2	100
Standard lemons	106	2013.6	118.6	1900
Meyer lemons	3	43.6	1.4	50
Mandarins	126	583.9	164.1	540
Oranges	154	1204.9	115.1	640
Tangelos	282	2502.0	192.2	1020
Other citrus	-	10.1	-	-
TOTALS	985	9233	977	7250
SUBTROPICAL FRUITS				
Kiwifruit	1900	7344	748	3500
Avocados	100	37	1	-
Feijoas	30	278	-	70
Passionfruit	10	86	16.5	140
Tamarillos	120	263	74.4	610
TOTAL	2160	8008	840	4320

Throughout New Zealand the total number of citrus trees and the number of Kiwifruit vines have increased by 51 per cent and 132 per cent respectively. The Bay of Plenty contains 45 per cent of the total number of citrus trees and 67 per cent of all subtropical fruit plantings. The majority of these plantings are in the Tauranga County. The exception are the passionfruit plantings which are centred around Opotiki in the eastern Bay of Plenty.

Passionfruit plantings are expected to remain at present levels. Tamarillo plantings are expected to increase due to the upsurge in demand for yellow Tamarillos for processing. There has also been a dramatic increase in avocados and feijoas with 79 per cent and 69 per cent respectively of plantings being in the Bay of Plenty.

Records of new citrus plantings and tree removals in 1978, taken after the national survey was completed, have shown a slowing down in citrus plantings. In contrast plantings of Kiwifruit are expected to continue in many areas of New Zealand. In the 1978 national survey, 83 per cent of all Kiwifruit plantings recorded were in the Bay of Plenty.

During the last five years Kiwifruit has become the most important of all citrus and subtropical fruit crops to the local and national economies. In 1972 export earnings were worth \$750,000; in 1976, \$9 million; and in 1979, \$30 million. By the early 1980's export earnings from Kiwifruit in the western Bay of Plenty could exceed local earnings from dairy products.

#### 2.4.6 Land Going Out of Farming into Horticulture

The total area in horticulture in the Tauranga County is indicated by the following statistics obtained from the Ministry of Agriculture and Fisheries.

Table 1.5

#### Area in Horticulture (Tauranga County)

	1963	1972	1974	1977	1978
Fruit	area (hectares)				
Citrus	191	722	786	984	900
Kiwifruit	33	720	800	1370	1900
Tamarillos	24	128	85	78	120
Avocados	*	*	9	58	100
Passionfruit	11	67	16	22	10
Feijoas	*	*	*	52	30
Pipfruit	*	101	101	*	50
Stonefruit	*	*	*	*	10
Berryfruit	*	370	370	23	20
Vegetables	*	*	*	405	250
TOTAL	259	2108	2167	2992	3390

\* Complete statistics are not available but the above table indicates a trend.

In the period from 1963-78, 3,390 hectares have been diverted away from traditional farming enterprises to horticulture.

No estimates were obtained on trends in land conversion in Whakatane County. However, the following information shows that horticultural development is increasing.

In 1980 approximately 107 hectares of Kiwifruit were planted. The minimum area in horticultural crops is 200 hectares.<sup>1</sup> The area planted by 1988 is estimated to be 1,200 hectares. Meanwhile the rate of subdivision is increasing for all purposes. Between April 1979 and February 1980 the following subdivisions were approved:

Number created 231, of which;

34	were for Kiwifruit,
12	" " berryfruit,
19	" " stonefruit,
126	" " general horticulture,
13	" " deer farming,
8	" " dairying,
3	" " forestry,
16	" " miscellaneous.

The total area involved is 3,238 ha.

The number of subdivision scheme plans presented to the Council have been running at 10-15 per month.<sup>2</sup>

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<sup>1</sup> Economics Divisions (Ministry of Agriculture and Fisheries).

<sup>2</sup> This information was obtained from personal communication with John Mandermaker (Planner, Whakatane County).



## 2.5 SOCIAL IMPACTS OF THE CHANGING LAND-USE PATTERNS

Rapid changes in land use, as have occurred in the western Bay of Plenty during the last decade, are bound to affect the region's social environment. If these changes are accompanied by large differentials in earning potentials one would expect the impacts to be greater.

An analysis of the social implications of the 'Kiwifruit boom' falls outside the scope of this **thesis**. What is attempted in this section, is simply to summarize some of the impressions gained, from talking to people in the area.

The change in the social environment has been distinct. However it is difficult to isolate and evaluate these changes in real terms, without considering the effects of inflation and the general decrease in moral standards.

Tauranga City with a larger population and wider industrial and commercial sector than any town in the Bay of Plenty already has an affluent group within its community. The city is also a favourite retirement centre for many people who, when they retire, bring their money with them.

Katikati, in the western Bay of Plenty is just beginning to develop into a major horticultural district and has not felt the full effects of increased prosperity.

The increase in wealth is more noticeable in the Te Puke district than in any other areas of the County. This is understandable as the original commercial Kiwifruit orchards in Te Puke are more than 30 years old. The population of the town and surrounding district is approximately 7,500. An increase in wealth in the area would be difficult to hide. Therefore, the following discussion will concentrate on the social aspects as they concern Te Puke.



### 2.5.1 Beneficial Impacts

While many towns and especially rural towns in New Zealand are experiencing an economic recession, Te Puke shows the reverse. The commercial centre in Te Puke is prospering, shops are being renovated, a new supermarket has been built, banks are expanding and two garages have been renovated.<sup>3</sup> Four fresh fruit exporters have established premises in the town and the three stock firms have increased their range of products to service the expanding horticulture industry. A local transport operator, who in 1972 operated two trucks, now operates 15 trucks plus trailer units. Saw millers in the area have increased business supplying posts and fruit bins.

The change from dairy to horticulture has created new labour opportunities. The local co-operative packhouse (Bay of Plenty Fruit Packers Ltd) employs casual labour during the six weeks picking season, beginning May. This season the packhouse employed 580 casual employees and paid out \$400,000 in wages. The people employed range from housewives to secondary job employees, students and the unemployed. People travel daily from Tauranga and Mt Maunganui to work at the packhouse.

Seasonal work (pruning, spraying and picking) although limited, is available throughout the year. Many orchardists prefer to employ family as permanent staff rather than orchard cadets, but job opportunities are expected to increase as orchard production increases. As yet no labour shortages have been experienced in the area.

The benefits however, are spread much wider. In the rural area, once occupied by dairy farms, there are now 5-10 orchards for each farm. This means there are more people in rural areas, and at places this has returned some aspects of rural community life. Other rural areas in New Zealand would like a similar change to occur in their region.

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<sup>3</sup> Some retailers expressed the view that they had expected business to increase more than it had. The reason for this is the close proximity of Tauranga with its greater choice of shops and products. Also Tauranga offered an opportunity to combine shopping with a day and evening out.

Further, agricultural contractors throughout the county are employed contouring land in preparation for planting. Processing industries have also developed in Tauranga. The building industry is erecting coolstores and the NZ Railways are shipping extra cargo to Auckland through the Kaimai Tunnel.

All these developments are the direct effects of the development of horticulture in the area.

### 2.5.2 Costs

Where changes are rapid, costs are incurred. These costs have not been great and are simply costs of adjustment. Many people were interviewed, from school headmasters, solicitors, the Town Clerk, to the general public, but it was difficult to find facts about the costs of change. One woman mentioned that the most serious cost was that no longer would she see dairy cows and she was sick of seeing Kiwifruit vines.

CRIME: At present the town's two policemen service an area of 1,000 km<sup>2</sup> and a population of 12,000 people. In 1979 the ratio of policemen per head of population was approximately 1 to 600. The number of arrests and criminal offences in the district has not increased but the opportunity for crime has. People are becoming more careless, for example, leaving cars unlocked and expensive equipment unattended.

The use and cultivation of drugs is on the increase, but the offenders are difficult to detect. In 1979, there were 86 arrests. Some offenders were arrested more than once.

The major problems within the district are management rather than social, for example, the policing of hotels and social functions.

DAIRY COMPANIES: The reduction in milkfat need not have a serious impact if the dairy companies make appropriate adjustments. The factory in Te Puke is considering diversification strategies and no lay-offs are envisaged. The Katikati branch of the co-operative may have to close in the future. However, this has

been expected and with the increasing labour opportunities in the Katikati district this should cause no major problems.

The Rangitaiki Plains Dairy Co-operative at Edgecumbe foresees no major problems resulting from the encroachment of horticulture in the dairying area. A director of the company stated that if 1,000 hectares was diverted from dairy to horticulture, a 3 per cent increase in production by remaining suppliers would maintain present milk production.<sup>4</sup>

SOCIAL BEHAVIOUR: Discussions with people revealed that there was a conscious recognition of a growing disparity of wealth between the working and upper class people. The development of a 'nouveau-riche' class has created some resentment.

The difference in affluence is noticeable amongst both school children and working adults. There have been isolated incidents which have made people more aware of the income differentials. For example, the police apprehended a high school student who broke into a shop for money because his friend frequently had \$10.00 to spend, while he had nothing. There has been the incident of an orchardist who bought four new cars, one for each member of his family. There is also the example of an orchardist, who after developing his orchard, could not manage his annual income of \$100,000. The existence of some competition between orchardists in the purchasing of new cars and the building of new homes is apparent.

The Social Welfare Department does not consider there are specific social problems relating directly to the horticultural industry.

Although the so-called moral decadence associated with wealth is apparent, the social implications are minimal. Long term social problems may become apparent when more orchards

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<sup>4</sup> These figures were supplied by Mr K. MacDonald at a Rangitaiki Plains Dairy Co-operative field day at Edgecumbe.

start producing and established orchards are handed down from family to family.

ACCOMMODATION: There has always been a steady demand for housing within the County. House and section values are now higher than in many other areas of the country.

In Te Puke, rental accommodation is difficult to obtain. This shortage has been accentuated in recent years with the growth of the horticulture industry.<sup>5</sup> For example, the number of horticultural cadets within the County has increased from 10 to 136 in three and a half years. Horticultural cadets are required to find their own accommodation. In contrast, Farm Cadets usually live on the job and are provided with board by their employers.

The shortage of suitable accommodation is of major concern to the region. Provisions have been made in the recommended Tauranga County District Scheme to increase the number of dwellings per subdivided lot in the Rural B, C and D zones.<sup>6</sup>

SPECULATORS: Any enterprise that promises the earning of big money will attract people. In Chapter 3, on land use planning, syndicates and speculators will be discussed. Both create effects that some call undesirable. Syndicates take away the family farm concepts and together with speculators, they develop land for a quick capital gain.

In conversation there was talk of bad and good syndicates, and about inexperienced people attempting Kiwifruit production without success.

Although some of these aspects are undesirable, there is little that can be done (or should be done) if we believe in a free enterprise society. The alternative to a free-market is a regulated society where people are told what they can or cannot do. This will destroy the entrepreneurial spirit which

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<sup>5</sup> See Appendix A, page 103.

<sup>6</sup> See pp.41-42, Submissions and Objections to the Second Review.

has made the Bay of Plenty what it currently is. However, measures should be taken to avoid individuals destroying the productive potential of the land, for example, through poor land contouring.

SPRAYING: There is no evidence of a build-up of toxicity levels from spray residues in people involved in the horticultural industry within the Te Puke district.

Orchardists may take blood tests to determine any build-up of organophosphates within the body. Doctors in Te Puke suggest there are greater dangers from mercury in fish and the emission of lead from car exhausts, or the smelling of glue by children. One doctor suggests that fears of chemical spraying are derived from the recent national concern regarding sprays and from an anti-Kiwifruit element in Te Puke.

## 2.6 CONCLUSION

The benefits from the change in land use far outweigh the costs. The costs are minimal and are due to the rapid changes that have occurred in the last decade. The fact that a group of people have become rich should be accepted. We live in a country where the entrepreneur is encouraged to try new ideas and to take risks. When he does, and he prospers, we then should not lament because the wealth may cause social problems.

With time, many costs of adjustment will disappear as the region adjusts to the new land use patterns and to the associated changes in the socio-economic environment. The coming of the horticultural era in the Bay of Plenty has done much for the people, the towns and the rural area. The overall effect has been an increase in the economic activity in the area. This is an effect that few people would begrudge.



## CHAPTER 3

LAND USE PLANNING (IN THE WESTERN BAY OF PLENTY)  
TAURANGA AND WHAKATANE COUNTY DISTRICT PLANNING SCHEMES

## 3.1 LAND USE PLANNING (CONTROL): AN INTRODUCTION

From the early days in New Zealand, Central and Local Government authorities have been involved in the area of physical planning. As immigration increased and towns developed, territorial local authorities (Borough and County Councils) were established and assumed functions such as road maintenance. Other ad hoc authorities were established to deal with specific functions such as electric power distribution, river control, hospitals and other specialised activities.

The first Town Planning Act in New Zealand was introduced in 1926. Although never enforced, the Act initiated comprehensive planning by introducing the concept of zoning. The Act was later amended in 1929 to make provision for regional planning schemes. However, this legislation was not mandatory.

The depression of the 1930's, parochialism among local authorities, and the Second World War postponed further progress in urban and rural planning. After the war there was a revival of interest in planning. In 1946, the Land Subdivision in Counties Act was passed. The control of rural development was placed in the hands of the Minister of Lands who could ignore the desires of a County Council if he so wished.

From 1926 to 1948, the Department of Internal Affairs was responsible for town planning in New Zealand. In 1948, under the Town Planning Amendment Act the Minister of Works replaced the Minister of Internal Affairs as the Minister responsible for the administration of town planning. In 1953, the Land Subdivision in Counties Amendment Act and the Town and Country Planning Act were introduced. The former Act related subdivision in rural areas to the planning schemes which County Councils were required to prepare under the new Town and Country Planning Act. Subdivision in Counties required the

consent of the Minister of Lands, but with the Counties Amendment Act 1961, this approval was transferred to County Councils.

The zoning of land; the designation of land for reserves; the provision of public works and utilities; the control of building development; the minimizing of objectionable elements (such as noise, pollution, smoke and smell); and many matters relevant to health, welfare, and convenience of people in each area; all became the responsibility of Local Territorial Government under the 1953 Act. However, moves to give local bodies the strength to exercise their wider powers under this new legislation proved ineffective. Regional planning schemes were seen only as a guide to local councils and were not mandatory. Furthermore, representatives of councils on regional planning authorities could not always agree.

Throughout the 1960's and 70's, changes in regional planning, to prevent the encroachment of urban sprawl on productive farmlands, to strengthen local governments, and to avoid the duplication of services, were recommended by various Local Government Commissions.

Regional planning was formally made mandatory under the Town and Country Planning Act 1977. Under the 1977 Act, regional planning has two objectives. The first is to achieve the pattern, character and rate of development chosen by the region as being the most feasible and desirable. The second objective is to link the allocation of regional resources with national planning and policy. For the first time, approved regional planning schemes must be adhered to by the Crown and by every local and public authority.

Since the introduction of town planning, district planning schemes have attempted to provide guidelines for priorities in local development. Such schemes, have worked, more by the placement of prohibitions for example by zoning and direct control, rather than through incentives or by encouraging best use.

The present and past attitude of many planners (and councillors) toward land use planning, has been shaped by the matters of 'National Importance' as stated in the Town and Country Planning Act.<sup>1</sup> Often, matters dealing with the protection of land of high value for food production (d) and the sporadic subdivision and urban sprawl (e & f) have been over-emphasized and sometimes misinterpreted.

Besides the Town and Country Planning Act, there are several other Acts which deal with the use of land, water and natural environment.

In the remainder of this chapter, the effects of rural planning on the changing land use patterns in the western Bay of Plenty, will be discussed.

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- <sup>1</sup>
- (a) the conservation, protection and enhancement of the physical, cultural and social environment;
  - (b) the wise use and management of New Zealand's resources;
  - (c) the preservation of the natural character of the coastal environment and the margins of lakes and rivers and the protection of them from unnecessary subdivision and development;
  - (d) the avoidance of encroachment of urban development on, and the protection of, land having a high actual or potential value for the production of food;
  - (e) the prevention of sporadic subdivision and urban development in rural area;
  - (f) the avoidance of unnecessary expansion of urban areas into rural areas in or adjoining cities;
  - (g) the relationship of the Maori people and their culture and traditions with their ancestral land.
- (Town and Country Planning Act, 1977, Sect. 3, page 9).



### 3.2 LAND USE PLANNING: TAURANGA COUNTY

#### 3.2.1 Planning World War II to 1976

In Chapter 1 it was shown that the western Bay of Plenty, since World War II, has experienced a rapid increase in economic growth and agricultural production. The resultant demands of increasing population, changing land use, and industrial expansion have put continued pressure on government and local authorities for land subdivisions, roads and utility services.

In 1944, the establishment of a planning authority to coordinate regional planning within the district was considered. However, this idea never eventuated due to lack of support. Although various ad hoc committees comprising representatives of local authorities were established throughout the 1950's and 1960's, to deal with particular problems, little was achieved in terms of coordinated regional planning.

For practical purposes, the respective local Councils for Tauranga City, Mount Maunganui Borough, Te Puke Borough, and Tauranga County produced separate District Planning Schemes as was required under the Town and Country Planning Act 1953 and Amendments.

Under the 1969 Tauranga County District Planning Scheme, all land within the County was zoned into rural, residential, commercial, industrial and rural (airport protection) zones.

The objectives of the Tauranga County District Planning Scheme were: to promote the orderly development of the expanding district by confining further urbanisation to approved areas; the consolidation of existing built-up areas and the preservation of good farmland from urban sprawl.

The Council's policy as to zoning was to avoid the indiscriminate mixture of incompatible uses whilst maintaining the stability of individual property values.

Under the 1969 Tauranga District Scheme one zone covered all the rural land within the County. The permitted agricultural

uses ranged from farming of any kind to rural industries, e.g. butter factories, timber mills, to licensed hotels and stalls for the sale of farm and garden produce. Residential uses were also permitted if the site was capable of being used as an independent economic unit for a farming use. The minimum standard area into which rural land could be subdivided was 4 hectares.

The implementation of the one rural zone with few restrictions permitted a rapid increase in the number of 4 hectare subdivisions. Many of the 4 hectare lots were used for horticultural purposes, and during the period 1968-72, the area in horticulture increased from 670 to over 2,100 hectares. The Council was responsible for bringing the County roads servicing the subdivisions up to standard. Quoting from the 1972 Amendments to Part IV, Land Subdivision of the District Scheme: (6).

"For a period time, Council has been concerned at the number of 'ten acre' (4 hectare) subdivisions that have occurred in the County. While there have been instances that a genuine rural use has followed the subdivision, in many cases the land has been used basically for residential uses with little, if any, dependence on the land for a livelihood. In some cases the sale and resale of the properties for purposes other than for rural uses has inflated land prices to such an extent as to prejudice a genuine rural use of the land.

It is of further concern to the Council that in a number of applications the design criteria of 'ten acre' (4 hectare) lots have been based on area and frontage standards alone, with little or no regard to topography, soil type, and other matters relevant to agricultural uses."

In June 1972, to avoid further lots being created on inadequate design standards and to conserve land for permitted uses, the minimum lot sizes that did not require Council consent for subdivision were increased to those lots exceeding 40 hectares in area and 100 metres in frontage. Proposed lots below 40

hectares came within certain classifications and standards listed in the Code of Ordinances. These classifications covered conditions relating to economic land use and the provision of services, i.e. power, telephone, access and roading.

The control of subdivisions to suit a wide variety of land uses within the County concerned the Council. At the following review of the District Scheme, the Council intended to introduce a number of zones within the present rural zone. This, the Council believed, would assist in the development of the region.

### 3.2.2 Tauranga County District Scheme (1st REVIEW) 1976

Under the 1976 review, the planning objectives of the 1969 District Scheme were extended to include: the protection of the Kaimai Ranges and foothills for water and soil conservation purposes, the protection of the coastline and harbour, and the upgrading of roads and bridges. Two new zones, a marae community, and harbour zone, were introduced. The one general rural zone of the 1969 District Scheme was extended into four specific zones.

In the period from 1969/76, the population of the County had increased by over 4,000, and the total geographic population by 15,000. The area in horticulture had doubled to nearly 3,000 hectares. The Council was concerned about the increasing intensification of land use and the increasing pressure on rural and coastal land for recreation and urban development. The Council wanted to preserve land best suited for pastoral purposes from the increased pressures of subdivision for horticulture. This policy was intended to preserve the traditional pastoral character of the district, i.e. the dairy industry, and its important role in servicing overseas and national market demands.

The planning policies for the newly introduced rural zones are described in the scheme statement of the first review ( 5 ). The policies for the rural zones included the following:

- (1) The control of land uses to avoid incompatible uses, and to allow farming, including forestry, to be the dominant land use.
- (2) Subdivision standards would be enforced in order to prevent establishment of small, uneconomic lots.
- (3) Access to and from existing properties and new rural subdivisions, must be of a satisfactory standard.
- (4) Underground power and telephone services would be encouraged in new horticultural subdivisions.
- (5) Intensive horticultural uses, e.g. glasshouses may be permitted in some areas adjacent to residential zones.
- (6) Buildings associated with the processing of primary production, and buildings resited in the country, would be permitted.

A summary of the Rural Zones of the First Review are in Table 3.1.

Table 3.1

The Rural Zones (First Review)

<u>Zone</u>	<u>Purpose</u>	<u>Land Use</u>	<u>Subdivision</u>
A	To protect watershed and coastal areas from erosion	Agriculture in appropriate areas; forestry and associated industry, e.g. wood processing plants; quarries producing stone for roads and buildings; recreation grounds and associated buildings.	Minimum area 200 hectares
B	Farming to continue	Farming, and associated service industries; Forestry; park and scenic reserves; churches; taverns; camping grounds. Horticulture may be permitted by way of a specified departure. No more than two residential buildings on each conforming site, additional residential buildings by way of a conditional use.	Minimum area 50 hectares
C	Horticulture	Farming, and associated services; forestry; orcharding; packing sheds; beekeeping; churches; taverns; residential buildings, one per site. Additional buildings by a conditional use.	Minimum area 6 hectares
D	Intensive horticulture within County town boundaries	Farming; horticulture; bulbs; glasshouses; nurseries; beekeeping. One residential building per site, same as for Rural C.	Minimum area 1 hectare.

### 3.2.3 Tauranga County District Scheme (2nd REVIEW) 1979

Under the Town and Country Planning Act 1977, District Schemes must be reviewed every 5 years. The Tauranga County Council, because of demand for horticultural land and the large number of requests for specified departures, brought forward the second review of its District Scheme by two years from 1981 to 1979.

In the recommended second review, the planning objectives of the 1976 review were extended to include the encouragement and development of community facilities. One new zone, rural residential, was also introduced. The four rural zones of the 1976 review were maintained.

The major changes in the recommended second review, as described in the scheme statement included the following: (1)

**FUTURE POPULATION GROWTH.** The Council would continue its policy of refusing to transfer land of high agricultural or horticultural potential to municipalities. Increases in county population would be accommodated by permitting extra houses on rural lots, and by encouraging growth in rural townships. The council is also zoning land at Papamoa for urban purposes.

**RURAL RESIDENTIAL.** Land at Minden, 77 hectares, is set aside for rural residential. The Minden area is located approximately 10 kilometres west of Tauranga City.

In past years the Council has been aware of a demand for rural residential living. Council policy would not allow this form of land use to compete for land to the detriment of farming. As a consequence, the Minden area is chosen because the area is of low agricultural potential and consists of steep, broken terrain.

**THE RURAL ZONES.** Cottage industry is included as a land use in the rural zones. The number of residential dwellings in the Rural C zone are also increased from one to two for each conforming site and one for each non-conforming site.



The major change in land use, since the first review, has been the development of horticulture in the Rural B zone. During the period 1976-79, the area in horticulture increased by 948 hectares.<sup>3</sup> In the 1976 review, land suitable for horticultural purposes could only be subdivided by way of specified departure. To meet the increasing demand for horticultural land, the ordinances for the Rural B and C zones are amended to permit the subdivision of land for horticultural and intensive horticultural use.

GENERAL CONDITIONS FOR HORTICULTURAL USE. In the recommended second review, the criteria under which land would be considered eminently suitable for horticulture are as follows:

- (1) The altitude of land shall not exceed 250 metres above the mean sea level;
- (2) The contour of land shall be such that it will be no steeper than grades 1 vertical to 8 horizontal (1:8). Land that has been recontoured to meet this criteria by means of earthworks must be approved by a qualified geologist.
- (3) The water table during winter shall be more than one metre below ground level.

The subdivision of land eminently suitable for horticulture shall also comply with the following criteria: Each new boundary shall be located in accordance with the topography of the area; the minimum area of each lot shall be six hectares; land that fails to meet the criteria for eminently suitable land shall not exceed 20 per cent of the land being subdivided. (This criterion applied only to land in the Rural B zone); each lot must have an adequate water supply.

INTENSIVE HORTICULTURE. The Council may approve a scheme plan of subdivision comprising lots of less than six hectares of eminently suitable land when it is satisfied that certain criteria can be met. The criteria include the following:

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<sup>3</sup> See page 105, Appendix A.

- (1) there are bona fide purchasers for each lot with sufficient knowledge in the proposed field of operation;
- (2) the prospective purchaser has the necessary finance to develop the lot;
- (3) a satisfactory economic feasibility study indicates that each proposal will provide an adequate financial return;
- (4) The soil quality, topography, drainage, and water table conditions are appropriate for the proposed use.

Intensive horticulture in this context means the growing of flowers, orchids, mushrooms, plants in nurseries, vegetables and berries, but excludes orchards and the growing of fruit and nuts. No minimum area is specified, but the use must already exist as an economic unit, or it must be established to the Council's satisfaction that the proposed use is feasible.

If the Council already considers there are sufficient small holdings already in the locality and that these could be used for intensive horticulture in preference to creating additional small lots, the Council would refuse to approve a scheme plan of subdivision pursuant to the provisions of Section 274 of the Local Government Amendment Act 1978.

In the recommended second review, the minimum lot size of 50 hectares for pastoral land in the Rural B zone is retained. (The practical effect of this provision is that if a pastoral farmer subdivides part of his farm into horticultural lots, the balance must have an area of not less than 50 hectares or be amalgamated with an adjoining pastoral lot).

In the Rural C zone pastoral farming is permitted but the minimum lot size for pastoral land did not apply. This zone is predominantly for horticulture use. The minimum lot size being 6 hectares. There is no restraint on subdivision because of land unsuitable for horticulture.

The Council is particularly concerned that land should not become fragmented into small lots that could be susceptible to economic market fluctuations. The Council would not permit the subdivision of land to create lots for a particular use until such time as the particular use is operational and has been



proved to be an independent economic use. This policy applies particularly to land use in the Rural B zone, and to intensive horticultural lots.

#### 3.2.4 Submissions And Objections to the Second Review

The Tauranga County Council received 197 objections to the recommended Second Review. These objections were heard, together with 54 cross objections before Council in July 1980. The objections covered a diversity of issues ranging from policy decisions, land use, to clarification of scheme statements.

The ordinances governing subdivision of horticultural land came under severe criticism. The major objections to these ordinances were with the conditions set down for general horticultural and intensive horticultural use. In essence the objectors wanted a more flexible approach to planning. The objectors believed that the ordinances governing the subdivision of land were too restrictive. The objectors wanted subdivisions to be taken on merit.

In response to the objections received, the ordinances governing horticultural use and land subdivision were amended as follows:

#### GENERAL CONDITIONS FOR HORTICULTURAL USE

- (1) The altitude of the land shall not generally exceed 300 metres above mean sea level. Land above 250 metres shall have a northerly aspect.
- (2) In the Rural B zone the contour of the land shall be no steeper than grades of one vertical to eight horizontal (1:8) except that there may be some small areas within a lot with grades no steeper than one vertical to six horizontal (1:6). In the Rural C zone the contour of the land shall be no steeper than one vertical to six horizontal (1:6). Land that has been recontoured to meet this criterion must require geologist's report. This applies if the recontouring has involved cuts and/or fills greater than 1 metre.

- (3) The land shall be free from flooding or ponding after heavy rainfall and the soil shall be free draining for a depth of at least one metre.

The criteria regulating subdivisions for horticulture were amended to permit the following:

- (1) A VARIETY OF LOT SIZES. A minimum area of 2 hectares is now allowed. But for each lot less than 6 hectares in area, one lot must exceed 6 hectares in area. The average area of the proposed lots shall exceed 6 hectares.
- (2) The minimum or average lot size can be made up of three eminently suitable areas that are not contiguous but are contained in one lot.
- (3) In any subdivision in the Rural B zone, land that fails to meet the criteria for eminently suitable land shall not exceed 25 per cent of the land being subdivided. In such a computation land that is to be amalgamated with another title and/or land that the Bay of Plenty Catchment Commission recommends should be retired from grazing; or land that is steeper than a grade of 1 vertical to 1.5 horizontal (1:1.5); or land that is established in indigenous forest, or in exotic forest that is at least 4 years old; will be excluded from the calculation.

No changes were made to the conditions governing the subdivision of land for intensive horticulture.

LOTS FOR RESIDENTIAL USE. To meet the demand for more rural accommodation, the Council consented to the creation of residential lots in the Rural B and C zones. These lots must meet criteria which include the following; not more than one residential lot is to be created from any one title; the utilization of the land will not affect the viability of the balance of the land; the proposed lots are suitable for residential use; there is a need for labour in the locality; the residential lots are topographically separate from adjoining lots.

In September 1980, the Katikati branch of Federated Farmers and Others, placed an appeal before the Planning Tribunal. The appellants were not satisfied with the amended ordinances of the second review and sought changes. This appeal is discussed in Appendix C, page 109. The appeal was heard in May 1981. The appellants were successful in changing the slope factor to 1 in 6, in both the Rural B and C zones. Other changes sought by the appellants were dismissed by the Planning Tribunal.

A summary of the purpose and permitted land uses in the Rural zones of the proposed second review is shown in Table 3.2.

Table 3.2

The Rural Zones of the Proposed Second Review

<u>Zone</u>	<u>Purpose</u>	<u>Land Use</u>	<u>Subdivision</u>
A	To protect water shed and coastal areas from erosion	Agriculture in appropriate areas; forestry and associated industry, e.g. wood processing plants; quarries producing stone for roads and buildings; cottage industry; recreation facilities; farming accommodation.	Minimum area 200 hectares
B	Agriculture to continue including pastoral and horticultural farming	Agriculture; horticulture; associated service industries by way of a controlled use. Forestry; cottage industry; reserves; churches; taverns; recreation facilities; schools; cool-stores; packing sheds. Two dwellings for each conforming site; one additional dwelling permitted on a conforming and non-conforming site by way of a controlled use; elderly accommodation. Intensive horticulture is permitted, i.e. flowers, orchids, mushrooms, nurseries, vegetables, and berries on areas less than 6 hectares. Orchards and the growing of fruit and nuts are excluded.	Pastoral use; minimum area 50 hectares. Horticultural use; minimum area 2 hectares, average area over 6 hectares. Eminently suitable land must not exceed 300 metres above sea level; contour of land must be 1:6, recontoured land with cuts greater than 1 metre must have a geologist's report; minimum or average lot size may be made up of 3 eminently suitable areas that are not contiguous; unsuitable land must not exceed 25% of the land being subdivided. Intensive horticulture; no minimum area or frontage requirements. The purchaser must have the appropriate knowledge, and finance; the land must be suitable. Lots for residential use are also allowed. There is no minimum area or frontage requirements.
C	Horticulture	Agriculture; horticulture; forestry; associated service industries by way of a controlled use; cottage industry; churches; schools; packing sheds; cool-stores; recreation facilities; taverns; elderly accommodation. Two dwellings per conforming site and one dwelling per non-conforming site. One additional dwelling per site permitted by a controlled use. Intensive horticultural uses same as for Rural B.	Minimum area 2 hectares; average area must exceed 6 hectares. Conditions for eminently suitable land same as for Rural B. Exceptions; the minimum area of 50ha for pastoral use and the need for unsuitable land to not exceed 25% of the land being subdivided does not apply. Intensive horticulture requirements same as for Rural B. Lots for residential use are also allowed.
D	Intensive Horticulture on small sites	Agriculture; horticulture; industry; packing sheds; accommodation for elderly; one dwelling per site; two dwellings on a conforming site allowed by way of a conditional use.	Minimum area: 1 hectare.

### 3.2.5 Discussion.

The amended ordinances of the second review indicate a relaxation in the Council's planning policies. For example, the requirement that the average area of the proposed lots in a horticultural subdivision shall exceed 6 hectares with a minimum area allowed of 2 hectares. This ordinance should permit a more flexible design range and meet the demand for a variety of lot sizes. The creation of rural residential lots in the Rural B and Rural C zones should also encourage the development of labour accommodation. The checklist of 7 conditions will ensure that the Council can regulate the creation of these residential lots. Such checklists with some room for manoeuvrability should also permit easier processing of scheme subdivision plans. Checklists of conditions can also be used to restrict development. Nevertheless, the concessions made, if used correctly, are major improvements to the Second Recommended Review.

On the negative side, the Council has not amended the ordinances to permit the creation of additional horticultural lots. However, the requirement that the average area of the proposed lots in a horticultural subdivision shall exceed 6 hectares is not necessarily restrictive. Under this ordinance a 16 hectare subdivision can only be subdivided into two lots. One lot of 3 hectares, and one lot of 13 hectares would be allowed. A later subdivision of the 13 hectare lot into two separate lots of 6.5 hectares should also be possible. If insufficient small lots are created the Council has been advised by the Planning Tribunal to reduce the averaging clause of 6 hectares to a lower figure.

The ordinances which could limit horticultural development are:

- (1) that the minimum area for pastoral lots be 50 hectares;
- (2) that land unsuitable for horticulture shall not exceed 25 per cent of the land being subdivided for horticultural use; and
- (3) the conditions regulating intensive horticultural use.

The requirements (1) and (2) refer to the Rural B zone where there is an increasing demand for horticultural land. The land most affected will be pastoral lots 50 hectares and under. Many of these lots could make profitable horticultural units, when at present they are marginal pastoral units. To what extent these lots could be affected is uncertain. Personal communications with surveyors indicate that the change from 20 per cent to 25 per cent limit on unsuitable land may have reduced the severity of this ordinance on lots under 50 hectares. Furthermore the Tribunal has stated that some residue pastoral lots less than 50 hectares should be permissible. This suggests that pastoral lots less than 50 hectares will be subdivided in the future, especially if a case is put forward for keeping the residue land in productive use; e.g. pinetrees, or grazing. The subdivision of less than 6 hectares from an existing economic pastoral lot could also be allowed.

In (3) above the horticultural crops classified as being intensive horticultural crops can also be grown extensively on 6 or more hectares. Two hectares of Kiwifruit on a pergola type system can be classified as intensive horticulture. The distinctions between horticulture and intensive horticulture and the provisions thereon are not necessary. It will be shown in later chapters of this thesis that 2 hectares of intensive Kiwifruit are more economic than 6 hectares of intensive citrus. The defining of intensive horticultural crops can only reduce optimal land use. This especially applies when planning legislation is in direct conflict with market forces. It should be sufficient for Council to monitor land use trends and adjust the size of horticultural lots on merit.

The twelve criteria regulating intensive horticultural subdivisions are also seen by many people as giving the Council dictatorial powers over land use. In contrast the provision for judging horticultural subdivisions on merit may appear too subjective and non-constructive. There are no simple answers to this issue. Someone has to make a value judgement. Council members are the elected representatives of the people. There is safety in a collective judgement and a list of criteria. Thus it is important that the silent majority elect the persons who will do the best job.



The Council defends its district scheme by stating that the amended ordinances of the second review are intended to consolidate the development of horticulture within the Rural C zone. This will, in turn, reduce the costs of rural roading, water reticulation and transport within the Rural B zone.

The proponents of horticulture believe that horticulture is widespread throughout both zones, and there should be no distinction between the zones. The consolidation of horticultural development within the Rural C zone is designed purely to protect the dairy industry. This objective is not justified in view of current land use trends.

Despite the conflicts of these two opposing views, the Council has adjusted its planning policies to favour horticultural land use. The question of whether the Council has gone far enough, remains an issue of debate.

### 3.3 LAND USE PLANNING: WHAKATANE COUNTY

The Whakatane district, with its large land area, varied topography and soil types, gives opportunity for a wide diversity of land uses. The rapid expansion of horticulture within the Tauranga County has initiated horticultural development within the Whakatane district. Provided market returns for horticultural products remain profitable, the Whakatane district could experience a rapid increase in horticultural development. The district could benefit from the 'planning experience' gained by the Tauranga County Council.

The planning objectives of the 1973 Whakatane County District Scheme were similar to those of the 1969 Tauranga District Scheme. The objectives were; to channel urban growth into orderly stages; to consolidate existing built-up areas and to preserve good farmland from urban sprawl.

The areas in the district were zoned for rural residential, commercial, and industrial purposes. The Council's policy as to zoning was to avoid the indiscriminate mixture of incompatible uses whilst maintaining the stability of individual property values; to maintain local amenities; and to avoid the use of land liable to flood.

#### 3.3.1 The Rural Zones

Under the 1973 District Scheme three zones A, B and C covered all rural land within the district. The three zones are described as follows:

**RURAL A ZONE.** This is the main zone which comprises the majority of all productive rural land within the district, i.e. 202,350 hectares. The permitted agricultural uses ranged from farming of any kind, and forestry, to rural industries such as butter factories, to licensed hotels, and country stores. The best use of land was left to the farmer or occupier to decide.

**RURAL B ZONE.** This zone covers 600 hectares between Ohope/Otarawairere and Whakatane. The land in the zone is undulating to steep, parts command excellent coastal views. Some of the land may eventually be developed for residential purposes.



This zone was introduced on the fringe of Whakatane for the purpose of preventing rural uses on the outskirts of the town. Farming of any kind (excluding vineyards), race-courses, camping grounds, and dwelling houses are permitted, but rural industries and services are not allowed.

RURAL C ZONE. Farming of any kind (excluding vineyards) is allowed in this zone, but no buildings and rural industries are permitted.

### 3.3.2 Subdivision in the Rural Zones

No minimum subdivisional areas for each zone were established and each 'subdivisional lot' was judged on its merits. The development of an allotment that was not capable of being used as an independent economic unit was not encouraged. The minimum area permitted in each case was based on productivity or potential productivity of the soil in relation to the type of farming use proposed, and on any other relevant factor determined by the Council.

The subdivision of land for dwellings was permitted in the Rural A and B Zones but not the Rural C Zone. Building permits for dwellings were issued to bona fide full-time farmers and to persons who claimed, because of their work or other sufficient reason, that they needed to live in a rural area and not in a neighbouring township. These policies did not stop a person from farming a small allotment on a part-time basis, but a house was only permitted on the allotment if it was proved to be essential for the farming operation.

### 3.3.3 The Rural Resource Strategy Study

The Whakatane District Council, in anticipation of changing land use patterns within the district, commissioned two studies, an Urban Growth Study and a Rural Resource Study. Both studies were to be completed before the present Operative District Scheme was reviewed.

The Urban Growth Study was completed in 1977. The study recommended that future growth should be channelled into existing urban areas and that productive farmland should be protected from urban encroachment.

The Rural Resource Study evolved from a discussion of the first strategy study. The general policies for managing the rural resources of the Whakatane district during the forthcoming planning period are based upon the study's recommendations. Six rural zones were proposed by the rural study. These zones are described in the Rural Resource Strategy Study as follows:(3)

1. Rural (General Uses) Zone
2. Rural (Special Limited) Zone
3. Rural (Scenic Protection) Zone
4. Rural (Environmental Buffer) Zone
5. Rural (Marae Papakainga) Zone
6. Urewera National Park Zone

1. RURAL (GENERAL USES) ZONE. The one main rural zone in the present Operative District Scheme will be continued. No restrictions will be given to forestry, intensive agriculture or general farming activities. The general requirements for land subdivision will ensure that each allotment will be used as an economic unit or be a size suitable for the permitted use.

2. RURAL (SPECIAL LIMITED) ZONE. The present Rural B Zone will be retained in its present form but the zone's boundaries will be extended to encompass Whakatane.

The remaining four zones will be used to protect the coastal region, recreational areas, airport approaches, and provide social and cultural centres for the Maori people. The Urewera National Park will be accorded a new zone and no predominant or conditional uses will be permitted.

The proposals in the Rural Resource Study, as outlined, will be included in Council's 'Statement of Objectives and Policy' which will be published before the review of the District Scheme.

### 3.3.4 Discussion

The present land uses permitted in the Rural A zone of the Whakatane County are similar to the land uses permitted in the one rural zone of the 1969 Tauranga County District Scheme.<sup>6</sup> In the Rural A zone, the permitted agricultural uses range from farming of any kind, to rural industries, and licensed hotels. The Rural Resource Strategy Study has proposed to maintain this rural zone in its present form.

Horticultural development within the Whakatane County, is in an early development stage. Conflicts between pastoral and horticultural land uses are not yet apparent. The total milk supply area for the Rangitaiki Plains Dairy Company is approximately 33,376 hectares. In contrast the area committed to horticultural use is 800 hectares.

However, if horticultural profitability is maintained the trend towards horticultural development will increase. The Whakatane Council can monitor and accommodate the change in land use trends. The Rangitaiki Plains Dairy Company can also change its strategies to accommodate differing land use. For example, by introducing fruit processing or by encouraging existing farmers to increase production to make up short-falls in milk production. If market forces say that horticulture is more profitable, then dairy farmers will eventually diversify, or sell up and leave. This has occurred in the Tauranga County.

### 3.4 CONCLUSION

Whenever there are conflicts of interest, there will always be trade offs, and subsequently there will be costs. The restrictions on horticultural development and the protection of the dairy industry within the Western Bay of Plenty, particularly Tauranga County has involved such costs. These costs arise from conservatism, parochialism, scepticism, and above all insufficient knowledge. The questions to ask are: what are the costs of these conflicts, especially in terms of lost income, and are the costs involved great enough to cause a change in rural planning and thinking? Later sections of this thesis will deal with the role and attitude of rural planners and the potential benefits of changing land use.

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<sup>6</sup> See pp. 33-34.

## CHAPTER 4

AN ANALYSIS OF ORCHARD PROFITABILITY  
IN THE WESTERN BAY OF PLENTY

## 4.1 INTRODUCTION:

In the Western Bay of Plenty the developing horticultural industry is rapidly encroaching upon land used for traditional pastoral farming. Rural planners and farming leaders are divided in their concern over this trend in land utilization. Farming leaders are confident that markets exist for New Zealand's pastoral products. Less confidence is expressed by farming leaders and planners in New Zealand's ability to find markets for the expected increases in horticultural production.

This concern is understandable as the infrastructure which supports pastoral farming activities is firmly established. In contrast the horticultural industry is in a state of rapid growth. The infrastructure which supports horticultural activities is still evolving. Markets for horticultural products are still being developed.

At the national level New Zealand urgently needs overseas exchange to pay for a rapidly increasing oil bill. The price New Zealand pays for oil has increased from \$70 million in 1973, to \$1,250 million in 1979. Unemployment has also reached levels unprecedented in the post war era. Between 1981 and 1991, the New Zealand Planning Council estimates that more than 200,000 jobs will be required. To achieve full employment and maintain our standard of living a resumption in New Zealand's growth is essential. The rapidly expanding horticultural industry could play a major part in New Zealand's economic revival. Because of this importance, a study of the horticultural industry is warranted. Government and private researchers are now looking at future markets, new crops, pest and disease techniques, and the demands for labour, technical advice, finance, transport, packing, coolstore and processing facilities.

The determination of orchard profitability at the farm gate should:

- (1) Guide planners and businessmen in their decisions to allocate resources (namely capital, land, and labour) towards the horticultural industry;
- (2) Give planners and businessmen an indication of the benefits which could accrue with a change from traditional land-uses to horticultural uses;
- (3) Show that small areas of land in orchard (less than 6 hectares) can be productive, and profitable; and
- (4) Show the importance of Kiwifruit production on orchard profitability within the Western Bay of Plenty.

In this thesis the determination of orchard profitability involves a case study analysis of three orchards. The orchards were selected from 18 visited throughout the Western Bay of Plenty.

The orchards were selected on the basis of size, production and profitability, diversity of crops grown, and management. These factors will be discussed during the analysis. After discussions with M.A.F. advisory staff and orchardists, the author of this thesis believes that the three orchards chosen are representative of what new growers are trying to achieve within the region.

The analysis is in four sections which involve the following:

- (1) A Physical Analysis of the Case Study Orchards;
- (2) A Financial Analysis of the Case Study Orchards;
- (3) A Discussion and Analysis of Orchard Profitability; and
- (4) The Profitability of the Livestock Options.

#### 4.2 A PHYSICAL ANALYSIS OF THE CASE STUDY ORCHARDS

The three orchards chosen for the case study analysis are designated orchards I, II and III. The site location of the orchards is on two adjacent volcanic plateaus in the Te Puke district. The plateaus are separated by a deep gully which runs south of Te Puke township, midway between the two plateaus. The orchards are within the Tauranga County Council's designated Rural C zone.

The orchards are in an established orcharding area. In this respect their location is favoured and similar to established orchards South and West of Tauranga City. New orchards are being established on areas of similar topographical relief within the County's Rural B zone. The productivity of these newer orchards, when established, should be similar to the orchards in the case study. Orchards are also being planted in lesser known areas, for example on the coastal flats. These orchards have yet to be fully proven. No firm conclusions, in the author's estimation, can be made at the present time as to their profitability. Soil types throughout the County are free draining and friable. They are not a limiting factor to production.

Orchards II and III are approximately 76 metres above sea level. Both orchards are subject to differing rainfalls. The average annual rainfall for Orchard II is 1,372 millimetres and for orchard III is 2,000 millimetres per annum. Orchard I is 213 metres above sea level. This orchard is also subject to a rainfall of 2,000 millimetres per annum. The high rainfall of 2,000 millimetres per annum can provide a loss in working hours. The incidence of plant diseases, for example botrytis, could also be higher. However the possibility of plant diseases occurring can be reduced with good plant management.

The three orchards have been established on land sloping towards the north east. This minimises the danger of damage to plants from frosts. New orchards, being established in less climatically desirable areas, for example on the coastal flats, may not be as fortunate. One grower with an orchard in such a position expects to lose one Kiwifruit crop every five years.



4.2.1 Description Orchard I. Orchard I has an area of 3.64 hectares. The property is one of many small orchards developed from post war rehabilitation blocks during the late 1940's. The crops produced are Kiwifruit, lemons, tamarillos, mandarins, and avocados. The diversity of crops grown is typical of similar sized orchards established around the outskirts of Tauranga City at Te Puna and Bethlehem.

Since establishment the management of Orchard I has been innovative. Successive owners have kept up with current planting trends. For example in the late 1940's and early 1950's the orchard was planted in lemons and tamarillos. These crops remained until 1964, when the area in lemon trees was reduced in favour of more tamarillos and tangelos. Kiwifruit vines were planted in the early 1950's with further plantings throughout the 1960's. Initially the Kiwifruit vines were planted on 0.5 hectares and then interplanted amongst 1 hectare of tamarillos. The tamarillos were used as a cash crop until the Kiwifruit vines came into production.

The present owner took over the property in December 1973. The programme of crop diversification was continued. Kiwifruit was increased to 1.54 hectares (under wire). The area in lemon trees was steadily reduced from 1.2 hectares to the present 0.45 hectares. In 1975, 90 avocado trees were planted. Another 158 trees were planted in 1976. Poor stock, and a wet spring followed by a drought caused 51 avocado trees to be replaced from the 1976 planting. In 1978, another 120 trees were planted. Of these trees, 3 were replanted the following year.

The tangelos were cut out in January 1980. In 1981 the owner expects to remove the lemons and tamarillos. After 1981, orchard income will be dependant upon Kiwifruit and avocado production.

The diverse range of crops grown e.g. avocados with tamarillos, has been designed to maximise the utilization of the owner's labour, utilize available area, and maintain a cash flow until the Kiwifruit and avocados come into production.

The orchard is worked by both husband and wife. Casual labour is employed for fruit harvesting and Kiwifruit pruning. Orchard operations are centred around the Kiwifruit which is packed at the local cooperative in Te Puke.

Table 4.1

Production Orchard I: Effective Area 3.64 Hectares

Crop	Age (Years)	Tree/vine number	Area (Hectares)	PRODUCTION			Local Market Trays
				Year	Total Trays	Export Trays	
Kiwifruit	(mature)	383	2.02	1980	11,933	11,103	833
	"	(female)	(1.54 under wire)	1979	16,149	15,149	1,000
				1978	9,053	8,600	453
Citrus					Total cases	Kilo- grams	
Lemons	(mature)	120	0.45 (Inter- planted with avocados)	1980	950	17,796	
				1979	694	12,491	
Tamarillos	4	400	0.60 (Inter- planted with avocados)	1980	70.5	635	
				1979	72.5	654	
Tangelos	-	(removed January 1980)	0.00	1980	5.5	100	
				1979	60.5	1,090	
Avocados	3-5	368	0.30	1980	36	180	
				1979	7	35	
Mandarins	(mature)	15	0.02	1980	-	-	
				1979	21	385	

Production from Kiwifruit and lemons are the main sources of income. Export production from Kiwifruit in 1980 was 11,103 trays compared with 15,149 trays in 1979. The drop in Kiwifruit production was attributed to the removal of the minimum number of 49 fruits per tray for export and the biennial bearing habit of the vines. In 1981 the owner expects to obtain 13,000 export trays. Yearly production should average around this figure. Tamarillo production is also 50 per cent down on previous years. The owner attributes this drop in production to frosts and plant diseases.



Avocado production will steadily increase. An annual production equivalent to 10 tonnes per hectare is expected within five years. By 1985 Kiwifruit and avocados will be the only crops on the orchard.

4.2.2 Description Orchard II. Orchard II is a horticultural unit which has been developed, and is being managed by the original purchaser. The 5.66 hectare property was developed, in after work hours, and in weekends while the owner was employed at the local dairy factory. The owner's wife also had full time, off farm employment.

The owner is a dedicated orchardist and has the reputation of being one of the better Kiwifruit growers in the district. New growers should, within 10 years, have accumulated a similar practical knowledge.

The property consists of 9.30 hectares, 3.64 hectares of which are in steep gully. The effective orchard area is 5.66 hectares. The property was purchased by the present owner (then aged 53 years) in 1969 for \$30,000. At that time the property was run down and consisted of areas of scrub and poorly kept hedges and buildings. The buildings comprised an old weatherboard house, a cowshed and a haybarn.

In 1969 (the year of property purchase), 0.8 hectares of Kiwifruit, 0.4 hectares of passionfruit, and 1.4 hectares of tamarillos were planted. The cowshed was converted into a poultry house and additional income was obtained from 250 fowls. Further Kiwifruit vines were planted in 1970 and 1971, bringing the total area planted under wire to 3.64 hectares. Citrus trees were planted in areas unsuitable for Kiwifruit. In 1973 Kiwifruit production commenced. In April that same year, the owner left the dairy company, to work full time on the orchard.

Kiwifruit production has steadily increased from 900 export trays in 1973 to 32,000 export trays in 1979. During this time the house was renovated, two sheds were built and irrigation was installed for the Kiwifruit. In 1977 the owner's son returned home to work full time on the orchard.

Today both father and son work on the property.

Orchard operations are centred around Kiwifruit production. Casual labour is employed for Kiwifruit pruning and harvesting. The Kiwifruit are packed at the local cooperative.

The citrus require one person for a total period of four months. The citrus is normally sold at the gate. In 1980, the bulk of the citrus was marketed by the local cooperative.

The Kiwifruit vines were initially trained on Tee Bars. In 1978 the owner began to convert to Pergolas. The conversion was completed in July 1980 with the exception of 0.5 hectares.

The orchard was converted from Tee Bars to Pergolas because the owner considered too much tractor damage was being done to vines and fruit, at ground level. The owner estimated the fruit losses at 10 per cent. Production from Orchard II is shown in Table 4.2.

Table 4.2

Production Orchard II: Effective Area 5.66 Hectares

Crop	Age of vines/ trees/ Years	Number vines/ trees	Area (Hectares)	Year	Total Trays	Export Trays	Local Market Trays
<u>Kiwifruit</u>	mature	1,525	4.45	1980	22,518	21,000	1,518
			(3.64	1979	34,046	32,000	2,046
			under wire)	1978	24,008	23,000	1,008
<u>Citrus</u>					<u>Cases</u>	<u>Kilograms</u>	
Navel Orange	mature	51			50	900	
Tangelos	"	199			140	2,520	
Grapefruit	"	99	1.21	1980	120	2,160	
Mandarins	"	106			50	900	
Lemons	"	7			7	126	

Table 4.2 shows that in 1979, the ninth year from planting 32,000 export trays of Kiwifruit were produced. In 1980, Kiwifruit export production dropped to 21,000 trays. This production drop was due to a heavy pruning of the vines after the 1979 harvest. The pruning was done to let in the light and increase fruit size for the 1980 season. The pruning

was too severe with a resultant drop in production. Production is expected to return to 32,000 export trays in 1981.

In 1979, the owner produced 22 trays per female vine on Tee Bars. This production was equivalent to 7,540 trays/hectare. The production was the highest recorded on Tee Bars within the region.

Citrus production is of secondary importance in orchard operations. Citrus production is not expected to increase.

4.2.3 Description Orchard III. Orchard III is one of the original Kiwifruit orchards in New Zealand. The orchard is fully developed and the Kiwifruit vines are 25 years old. The financial success of properties such as Orchard III, has encouraged Kiwifruit plantings throughout the country. The orchard is above average size, being 15.76 effective hectares in area. (The present average orchard area is around 6 hectares in the Tauranga County). Orchard III specialises completely in Kiwifruit. The property has been in the same family since the late 1940's. A son of the original owner is now managing the property.

The total orchard area is 18.21 hectares. There are 13.75 hectares of mature Kiwifruit vines on pergolas. The balance of the property consists of 2.45 hectares gully, 0.8 hectares nursery, and 1.21 hectares in buildings. The orchard has packing and coolstore facilities.

The present owner lives on the property. Although he is involved in management decisions, a manager is employed to carry out daily orchard operations. The orchard has a permanent staff of 6 (excluding the owner). The permanent staff complete the Kiwifruit winter pruning in two months. Four casual staff, in addition to the permanent staff, are employed for three months over the summer pruning period.

During the six week harvesting period 34 casual staff are employed. Fifteen persons pick and 25 persons pack the fruit. The packing shed throughput is approximately 3,500 export trays per day. The harvesting and packing of fruit is the major orchard operation.

Production from Orchard III is shown in Table 4.3:

Table 4.3

Production Orchard III: Effective Area 15.75 Hectares

<u>Crop</u>	<u>Age of vines</u>	<u>Area (Hectares)</u>	<u>Year</u>	<u>Production (trays)</u>		
				<u>Total</u>	<u>Export</u>	<u>Local Market</u>
Kiwifruit	mature	13.75	1980	88,200	82,000	6,200
			1979	102,150	95,000	7,150
			1978	68,800	64,000	4,800

Table 4.3 shows that in 1980 Kiwifruit production dropped 14,000 trays on the previous year. This is attributed to the biennial bearing pattern of the Kiwifruit vines. Export production is expected to return to 95,000 trays in 1981.

Although the Kiwifruit vines are mature, production is still steadily increasing. This is due to new plantings and the acceptance of improved cultural and training techniques. In future years annual production should exceed 100,000 export trays.

4.2.4 Summary. The physical characteristics of the three case study orchards are summarised in Table 4.4:

Table 4.4

Physical Characteristics of the Three Case Study Orchards

<u>Physical characteristics</u>	<u>Orchard I</u>	<u>Orchard II</u>	<u>Orchard III</u>
Orchard topography	flat with northerly aspect	flat with northerly aspect	flat with northerly aspect
Climatic position	good	good	good
Orchard size	small	medium	large
Crop production	diversified	greater specialisation	specialised
Management skill	good	good	good
Permanent labour units (excluding owner)		1.0	6.0
Total Casual Labour Units (annual equivalent)	0.86	1.16	4.46
<u>Kiwifruit</u>			
Area planted (hectares)	2.02	4.45	13.75
Total production (trays)	14,041	28,282	95,200
Production/Ha (trays)	6,950	6,355	6,923
Labour units			
Casual staff:			
winter pruning	1 for 8 wks	2 for 6 wks	
summer pruning	2 for 3 months	2 for 2.5 months	4 for 3 months
Harvesting/Packing:			
Casual staff (persons)	3	4	34
Mandays worked	7	10	25.2

### 4.3 A FINANCIAL ANALYSIS OF THE CASE STUDY ORCHARDS

The whole farm budgets for the case study orchards are as follows: Orchard income and costs are described in Appendix D, page 112.

#### 4.3.1 Whole Farm Budget Orchard I: 1979/1980

TOTAL ORCHARD COSTS	\$	TOTAL ORCHARD REVENUE	\$
Orchard working costs		Kiwifruit export	103,301
Labour casual	3,554	(13,126 trays)	
Beehire	390	Local Sales (915 trays)	2,504
Electricity	312	Lemons (17,796 kg)	4,407
Contracting	212	(Tamarillos (635 kg)	745
Freight and cartage	707	Mandarins (108 kg)	23
Fertilizer	960	Avocados (180 kg)	682
Orchard Sundries	732	Tangelos (100 kg)	50
Marketing	29,730	Rebates	66
Sprays	703		
Repairs and maintenance			
Fences	347		
Car expenses	579		
Petrol, oil & diesel	983		
General expenses	570		
Administration	2,473		
Rates	434		
Interest	41		
Depreciation	\$3,441		
Total Farm Costs:	\$47,296	Total Farm Revenue	\$111,778
Net Farm Income: <sup>1</sup>	\$64,482		
Plus capital increment	\$71,550		
Total net benefits	\$136,032		
Opportunity costs:			
Labour	\$29,100		
Capital	\$44,718		
Total Opportunity Costs	\$73,818		
Economic profit	\$62,214		
N.F.I. PER HECTARE	\$17,714		

<sup>1</sup> Net farm income is the amount left to pay the owner's drawings, management reward, tax, capital repayments, and provide money for further development.

Kiwifruit comprise 55.5 per cent of orchard area and contribute 94.6 per cent of orchard revenue. Sales from other fruit crops contribute the balance. Avocado production is expected to reach 14 tonnes (10 tonnes per hectare) in five years. At 1980 prices of \$32.00 per tray, avocado gross revenue would be \$89,600. In 1985, if current prices and costs increase at the same rate, total orchard revenue would be \$195,000. This would represent an increase in orchard revenue of 74 per cent.

The capital increment of \$71,550 indicates the size of increase in market value of the property. This orchard was purchased in 1973 for \$82,000. The current value is now estimated at \$447,000. This increase in value is equal to a compound interest rate of 27 per cent on the original purchase price.

The export tax incentive and the deduction of development expenses has enabled Orchard I to reduce taxable profits. The tax situation for the year ending 30 March 1980 is as follows:

Tax Situation Year to March 1980.

Net profit per accounts			<u>\$35,872.48</u>
Export sales (1979)	15,149 trays	\$109,391.00 (F.O.B.)	
Base average	1973	4,218	
	1974	3,386	
	1975	6,821	
		<u>14,425 ÷ 3</u>	\$4,808.00
Increase in export sales for 1980		\$104,583.00	
		25% of 104,583	is \$26,145.75
Profit b/fwd for tax purposes			is \$ 9,726.73
Development expenditure b/fwd			<u>4,801.08</u>
Current year 1979/80			Nil
Profit adjusted for tax purposes			<u>\$ 4,925.65</u>

The export tax incentive has reduced taxable income from \$35,872 to \$9,726.<sup>2</sup> The deduction of development expenditure has further reduced taxable income to \$4,925.

<sup>2</sup> The difference between the net profit per accounts and the N.F.I. in this analysis is \$28,610. The difference is due to the payment of \$20,000 to a family trust and additional fruit income. Kiwifruit production is the average of the 1979 and 1980 crops.



4.3.2 Whole Farm Budget Orchard II: 1979/1980

TOTAL COST	\$	TOTAL REVENUE	\$
Orchard working costs		Kiwifruit Export (26,500 trays)	208,555
Labour permanent	9,100	Local Sales (1,782 trays)	4,878
casual	7,938	Citrus	2,096
Beehire	1,050	Rebates	687
Electricity	584		
Contracting	135		
Freight and Cartage	1,364		
Fertilizer	634		
Orchard Sundries	934		
Rations	524		
Marketing	60,223		
Sprays	6,039		
Repairs & Maintenance			
Buildings	333		
Fences	4,911		
Plant and Machinery	1,850		
Car Expenses	471		
Petrol, Oil, Diesel	867		
Administration	3,640		
Rates	657		
Interest	1,900		
Depreciation	4,201		
Total Farm Costs:	<u>\$107,355</u>	Total Farm Revenue	<u>\$216,216</u>
Net Farm Income	\$108,861		
Plus Capital Increment	\$113,346		
Total Net Benefits	\$222,207		
Less Opportunity Costs			
Labour	\$14,180		
Capital	\$70,841		
Total Opportunity Costs	\$85,021		
Economic profit	\$137,185		
N.F.I. PER HECTARE	\$19,233		



In the whole farm budget of Orchard II, the returns from Kiwifruit make up 98.7 per cent of total Orchard Revenue. From the orchard revenue, orchard costs take 49.0 per cent. Of these costs, Kiwifruit marketing costs represent 56.0 per cent.

Citrus returns make up 1.0 per cent of total orchard revenue. The citrus produces no surplus income but introduces variety into the work and provides additional family employment. If the citrus was replaced with a more profitable crop and the waste gully developed, another 1.21 hectares could be utilized.

The actual orchard profit from the 1979/80 financial accounts to 31 March was \$70,715.<sup>3</sup> An estimation of the benefit of the export tax incentive is shown below:

Orchard profit per financial accounts 1979/80	\$70,715
Export sales (1979) Kiwifruit 32,000 trays	\$231,040 (F.O.B.)

Base average	1973	900	
	1974	7,000	
	1975	13,200	
		21,100	÷ 3
			\$7,033

Increase in export sales 1980	\$224,007
	25% of \$224,607 is \$56,001
	Profit b/fwd for tax purposes is \$14,714

In the above example the export tax incentive would reduce the taxable profit from \$70,715 to \$14,714. Any development expenditure brought forward would further reduce taxable profit.

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<sup>3</sup> The difference between actual orchard profit per accounts and the N.F.I. in this analysis is \$38,146. The difference consists of \$12,000 rent to a trust and \$26,000 for development expenses on an additional orchard block.

4.3.3 Whole Farm Budget Orchard III: 1979/1980

TOTAL COSTS	\$	TOTAL REVENUE	\$
Orchard working costs		Kiwifruit Export (88,500 trays)	696,495
Labour permanent	56,600	Local Sales (6,700 trays)	18,341
casual	31,270		
Beehire	2,000	Dividends	89
Electricity	3,700		
Fertilizer	3,000		
Freight and cartage	5,000		
Rations	1,500		
Marketing	84,075		
Sprays	7,940		
Coolstore	1,600		
Repairs & maintenance			
Fencing	3,500		
Roading	4,250		
Plant and machinery	12,300		
Travelling expenses	7,000		
Petrol, oil, diesel	5,600		
Administration	8,730		
Interest	14,000		
Rates	1,950		
Depreciation	13,600		
Total Farm Costs	<u>267,615</u>	Total Farm Revenue	<u>\$714,925</u>
Net Farm Income	\$447,310		
Plus Capital Increment	\$322,266		
Total Net Benefits	\$769,576		
Less Opportunity Costs:			
Labour	\$10,140		
Capital	\$201,416		
Total Opportunity Costs	\$211,556		
Economic Profit	\$558,020		
N.F.I. PER HECTARE	\$28,382		

In the whole farm budget of Orchard III, total fruit sales are derived from Kiwifruit. Of this revenue orchard costs comprise 37.0 per cent. The marketing costs represent 31.0 per cent of total costs. When labour for packing, coolstorage, electricity, administration, maintenance, and opportunity costs of plant and equipment are included the total marketing costs are 50 per cent.

In the 1979/80 financial year to 31 March, Orchard III had a taxable income of \$210,000. This income was reached after the deduction of the export tax incentive, and the deduction of development expenses from taxable profit.

#### 4.3.4 A Discussion And Analysis Of Orchard Profitability

Table 4.5  
The Physical and Financial Characteristics of the  
Case Study Orchards (1979/80)

Characteristics	Orchard I	Orchard II	Orchard III
Effective area (Ha)	3.64	5.66	15.76
CROP PRODUCTION	Diversified	Increasing specialisation	Specialised
Total labour units (including owner)	1.86	3.16	11.21
Total Gross Margin: Kiwifruit	\$68,641	\$121,640	\$496,201
TOTAL GROSS MARGIN PER TRAY/Kiwifruit	\$ 4.88	4.30	5.21
MARKETING COSTS PER TRAY/Kiwifruit	\$ 2.295	2.295	1.55
Total Gross Margin: 'other crops'	\$3,055	\$1,659	
Total N.F.I.	\$ 64,482	108,861	447,310
N.F.I./hectare	\$ 17,714	19,233	28,382
N.F.I./labour unit	\$ 34,667	34,449	39,902
Capital Increment/Hectare	\$ 19,656	20,025	20,448
Total Net Benefits/Hectare	\$ 37,371	39,259	48,830
Total Opportunity Costs/Hectare	\$ 20,279	15,021	13,423
Economic Profit/Hectare	\$ 17,091	24,327	35,407
N.F.I./Market Value	% 14.0	15.0	22.0
Total Net Benefits/Market Value	% 30.0	31.0	42.0

Table 4.5 shows that N.F.I. increases as orchard size increases and as the orchards become more specialised. The financial returns from 'the other fruit crops' are very low compared with the returns from Kiwifruit. The citrus on Orchard II actually being uneconomic.

Orchard III's major cost advantage is due to lower marketing costs for Kiwifruit. If marketing costs are excluded, then Orchard I has the lowest costs of production per hectare for Kiwifruit. This is achieved on a planted area of 2.02 hectares.

The N.F.I./labour unit indicates the low cost of labour relative to the present cash returns per hectare. The more specialised the orchard, for example the area of Kiwifruit worked per person, the greater the return.

The values of the capital increments indicate the size of the annual increases in property values during the past five years. Production on the case study orchards has been steadily increasing, full production not being reached until 1979. All three orchards can undergo further development.

The total Net Benefits indicate that financial benefits are accruing to the orchard owners through both income and property appreciation. The Total Net Benefits become more attractive when one realises no tax is payable on the capital increment. The tax on N.F.I. is also reduced with export incentives, trust accounts, formation of partnerships, and the deduction of development expenses from taxable profits. The financial advantages of the Total Net Benefits are indicated by the Economic Profit/Hectare. The Economic Profit/Hectare shows the high returns from orcharding compared with investing the owners resources in secured deposits.

Table 4.7 indicates that the combination of N.F.I. and capital increment and low tax commitments makes the three case study orchards attractive investments. Table 4.7 also shows how important Kiwifruit production is on orchard profitability, and that small areas, e.g. of 2 hectares can be profitable.

#### 4.4 THE PROFITABILITY OF THE LIVESTOCK OPTIONS

This analysis of livestock farming options is designed to give an indication of the differences in size of N.F.I.'s compared with orcharding, and not to compare livestock options per se. The farms selected are in developing horticultural areas. They comprise a dairy farm, a sheep and beef farm, and a sheep, beef and deer farm. The whole farm budgets are as follows: Farm income and costs are described in Appendix E, page 117.

##### 4.4.1 Whole Farm Budget Dairy Farm: 1979/80

TOTAL COST	\$	TOTAL REVENUE	\$
Farm Working Expenses:		Sales:	
Wages casual	1,000	Butterfat (17,100 kg)	36,252
Freight and cartage	300		
Herd improvement	790	Livestock	
Animal health	840	Cattle 20 at \$160	3,200
Sundry farm expenses	470	Bobby calves	1,180
Stock food	222	Insurance recovery	117
Fertilizer	3,150	Subsidies (spray)	471
Contracting	750		
Shed expenses	680		
Electricity	800		
Repairs and maintenance			
Buildings	424		
Fences and gates	500		
Plant and machinery	1,150		
Roading and water	500		
Vehicle expenses	1,510		
Petrol oil, diesel	1,400		
Administration	1,760		
Rates	680		
Interest	2,855		
Depreciation	4,000		
Total Farm Costs	<u>\$23,781</u>	Total Farm Revenue	<u>\$41,220</u>
Net Farm Income	\$17,439		
Plus Capital Increment	\$134,207		
Total Net Benefits	\$151,646		
Less Opportunity Costs:			
Labour	\$18,720		
Capital	\$82,832		
Total Opportunity Costs	\$101,552		
Economic Profit	\$50,094		
N.F.I. PER HECTARE	\$359		

The dairy farm in this analysis is 48.56 hectares in area, and has 118 milking cows. The farm has a production of 372 kilograms of milkfat per hectare. Average production in the region is around 285 kilograms of milkfat per hectare. The highest production reported was 397 kilograms milkfat per hectare.<sup>4</sup>

The present owners (father and son) purchased the farm in 1964. The purchase price for land and buildings was then \$395/hectare. The farm is now in the middle of a developing horticultural area, east of Te Puke. Thirty two of the farm's 48.56 hectares could be developed for horticultural uses. The owners estimate the market value of their farm at \$755,000. The value of the horticultural land is estimated at \$17,500/hectare.<sup>5</sup>

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<sup>4</sup> Personal communications with MAF Tauranga.

<sup>5</sup> Discussions with land agents in February 1981 indicated that horticultural land in the immediate vicinity was now priced at \$25,000/hectare.

4.4.2 Whole Farm Budget Beef, Deer, and Sheep Farm:1979/1980

TOTAL COST	\$	TOTAL REVENUE	\$
Farm Working Expenses:		Sales:	
Wages casual	317	Sheep (642)	8,256
Rations	112	Less purchases	
Shearing	1,508	6 rams @ 600	
Animal health	827	Sheep Cash Surplus	<u>7,656</u>
Contracting	98	Cattle (37)	<u>10,954</u>
Sundry farm expenses	237	Less purchases	
Freight and cartage	57	(71) 13,369	
Fertilizer	6,538	Cattle cash loss	<u>-2,415</u>
Electricity	562	Deer (8)	<u>8,600</u>
Woolshed expenses	417	Less purchases (11)	<u>6,244</u>
Repairs and maintenance		Deer cash surplus	<u>2,356</u>
Buildings	109		
Fences and gates	5,603	Sales:	
Plant and machinery	1,789	Wool and skins	21,081
Water	111	Velvet	<u>4,606</u>
Car expenses	120		
Petrol, oil, diesel	1,678	Sundry Income:	
Administration	1,690	Hay	750
Rates	774	Rebates	626
Interest	3,594	Grazing	<u>2,053</u>
Depreciation	<u>3,722</u>	Grants	<u>427</u>
Total Farm Costs	<u>\$29,860</u>	Total Farm Revenue	<u>\$39,555</u>
Net Farm Income	\$9,695		
Plus Capital Increment	\$149,489		
Total Benefits	\$159,184		
Less Opportunity Costs:			
Labour	\$19,620		
Capital	<u>\$69,626</u>		
Total Opportunity Costs	\$89,246		
Economic Profit	\$69,938		
N.F.I. PER HECTARE	\$55		



This property was purchased with livestock (excluding deer) by the present owner for £40,000 (\$80,000) in 1963. The farm area consists of 176 hectares and is stocked with 1,400 breeding ewes, 150 cattle, and 130 deer. The farm is in a developing horticultural area but the terrain is not naturally suited for horticultural development. If the horticultural industry continues to expand, areas of the farm could be contoured for horticultural development.

The owner has been involved in deer farming since 1978, but prices for deer and velvet have not been stable. For example in November 1979 deer velvet was selling for \$242/kilogram. A year later the price was \$95/kilogram. Surplus funds from deer farming have gone back into deer farm development. The owner believes that the deer enterprise would fare no better on flat orchard land compared with steeper terrain.

The farmer's tax position from the 1979/80 financial accounts is as follows:

Tax due February 1981	
A.C.C. Levy	71.67
2nd instalment	1,625.00
Balance 1980 terminal	<u>988.59</u>
	\$2,685.26

Stock purchases totalling \$20,000 and development expenditure have kept N.F.I. low and reduced the tax payable.

4.4.3 Whole Farm Budget      Sheep and Beef Farm: 1979/1980

TOTAL COST	\$	TOTAL REVENUE	\$
Farm Working Expenses:		Sales:	
Rations	360	Sheep	9,300
Wages casual	495	Cattle	18,000
Shearing	1,008		
Animal health	654	Woolskins	13,496
Contracting	742		
Sundry farm expenses	563	Sundry Income	
Stock food	2,139	Rebates	1,332
Freight and cartage	120	Weed spray subsidy	465
Fertilizer	3,866		
Woolshed expenses	160		
Weed and pest control	1,125		
Electricity	641		
Repairs and maintenance			
Buildings	246		
Fences and gates	3,188		
Water, track, bridges	850		
Plant and machinery	2,721		
Petrol, oil, diesel	1,850		
Car expenses	939		
Administration	1,443		
Rates	1,082		
Interest	4,680		
Depreciation	2,559		
Total Farm Costs	<u>\$31,431</u>	Total Farm Revenue	<u>\$42,593</u>
Net Farm Income	\$11,162		
Plus Capital Increment	\$81,136		
Total Benefits	\$92,298		
Less Opportunity Costs			
Labour	\$27,280		
Capital	\$50,338		
Total Opportunity Costs	\$77,618		
Economic Profit	\$14,680		
N.F.I. PER HECTARE	\$89		

The effective farm area of this sheep and beef farm is 125 hectares. The farm comprises 16 hectares of flats with the remainder in rolling terrain. The farm is on the fringe of a developing horticultural area, 30 kilometres west of Te Puke. Areas of the farm totalling 5 hectares could be developed for horticulture without disruption to the livestock farming. The farm is stocked with 750 breeding ewes, 820 lambs, 250 hoggets, and 200 cattle.

The owner has been on the property for 18 years.

The financial characteristics of the livestock options are summarised in Table 4.6:

Table 4.6  
Financial Characteristics of the Livestock Options (1979/80)

<u>Characteristics</u>	<u>Farm I</u> <u>Dairy</u>	<u>Farm II</u> <u>Sheep, Beef, Deer</u>	<u>Farm III</u> <u>Sheep and Beef</u>
Area (Hectares)	48.56	186	125
N.F.I.	\$ 17,439	9,695	11,162
N.F.I./Hectare	\$ 359	55	89
Capital Increment/Ha	\$ 2,763	849	649
Total Net Benefits/ Ha	\$ 3,122	904	738
Opportunity Cost/Ha	\$ 2,091	507	620
Economic Profit/Ha	\$ 1,031	397	117
N.F.I./ MARKET VALUE	% 2.1	1.3	2.2
TOTAL NET BENEFITS MARKET VALUE	% 18.4	21.9	18.3
Total labour units	1.5	1.6	1.7
N.F.I./labour unit	11,626	6,059	6,565

#### 4.4.4 Discussion: Profitability of the Livestock Options.

The N.F.I.'s of the livestock options are insufficient to reward the owners for their labour, give interest on investment, pay tax and provide capital for development. The N.F.I.'s represent less than 3 per cent of the farm's market values. Farm profitability is dependent upon the realisation of the capital increments for cash some time in the future. The higher capital increment of Farm I indicates the suitability of the land for horticultural use.

The high opportunity costs relative to the N.F.I.'s indicate that the farmers would gain greater cash rewards by investing their resources elsewhere in the economy.

Despite the low cash returns these farmers are dedicated to the land. They like their way of life. They also believe profitability can be increased with improved livestock production. Furthermore the developing horticultural industry should ensure that land values, especially on Farm I, will continue to increase.

4.4.5 A Comparison of Profitability, Livestock Farming and Orchardring. The financial returns from the livestock options are much lower than for the case study orchards. The N.F.I. from one hectare of Orchard I is greater than the total N.F.I. from the dairy option. The dairy option has 32 hectares which are capable of producing a cash surplus of \$17,000 per hectare. This represents total potential earnings of \$544,000 compared with the present earnings of \$17,439.

The N.F.I./labour unit for the orchards are 3 to 5 times greater than for the livestock options. This indicates favourable employment opportunities associated with changing land use.

The financial characteristics of the case study orchards show that orcharding, especially Kiwifruit growing, is a more profitable use of land than pastoral farming. The large differences in the financial returns and down-stream benefits, e.g. jobs created outweigh the benefits from using horticultural land for pastoral uses. This analysis clearly indicates that in the Western Bay of Plenty, 2 hectares of orchard can be more profitable than a dairy unit of 48 hectares producing above average kilograms of milkfat per hectare.

## CHAPTER 5

### THE DISTRICT SCHEMES: AIDS OR HINDRANCES TO OPTIMAL LAND USE?

#### 5.1 AN EVALUATION OF DISTRICT PLANNING SCHEMES

From the previous discussions in Chapters 3 and 4, the question is asked: 'Have the district schemes aided or hindered optimal land use?'

Such a question is difficult to answer, as there is no control situation against which the current allocation of land can be contrasted if land use policies had been different. Neither is it easy to specify 'optimal'.

From all the foregoing material and the discussions, it has been shown that horticulture is, from a national and regional viewpoint, a desirable land use on soils suitable for such enterprises. Further, the economic and social benefits from the development of the horticultural industry seem to outweigh the costs. Therefore, in terms of the objectives for optimal land use, as specified in the Town and Country Planning Act of 1977, land suitable for horticultural crops should be allocated to such uses, and planning through district schemes should facilitate such changes.

In the discussion following, emphasis will be on Tauranga County. The reason for this is evident. Although horticulture has developed in Whakatane County, the total area is still small. In the future, the rate of development is expected to increase and the District Scheme places no constraints on such development, as scheme plans are assessed on merit.

##### 5.1.1 Tauranga District Schemes

In the case of Tauranga County, the conflict between horticultural and pastoral land use, as can be discerned started in 1976. In the 1976 review, Council policy in the four rural zones was to avoid incompatible uses and allow farming, including forestry, to be the dominant land use. The minimum area for subdivision in the Rural B zone was 50 hectares and the main objective in this zone was to encourage farming.

Subdivision for horticultural use in the Rural B zone was permitted only by way of a specified departure. Between the 1976 and 1979 reviews, the Council did not anticipate the rapid demand for horticultural land in the Rural B zone. In the period from 1976 to 1979, the export price for Kiwifruit per tray increased from \$3.60 to \$6.70 per tray, or a gross return of around \$21,000 to \$40,000 a hectare. The Council's planning department was constantly supplied with requests for specified departure for subdivision in the Rural B zone. This demand has not abated and in December 1979, 20 scheme plans for subdivision were placed before the Council. Land syndication companies were formed. These companies provided monies to meet the high costs of orchard establishment and land could be developed without the need for rural subdivisions. The formation of tenants-in-common ownership arrangements was another way to overcome the 50 hectare limit. Many of these properties are now developed orchards. This indicates that those who embarked on such schemes, understood better than the Council, which land was suitable for horticultural development. Because land suitable for horticulture was developed in this way, unnecessary costs were imposed (legal and other costs). Now, under the latest review, some of these tenancies-in-common can be subdivided. The question now is: "Were these extra costs necessary?"

From 1977 to 1979, many disputes heard by the planning tribunal in the Tauranga County concerned the subdivision of land, especially in the Rural B zone. As a rule, an appeal to the tribunal for permission to subdivide in the Rural B zone was successful, if the subdivision of land from an existing pastoral lot for horticultural purposes did not result in an 'uneconomic pastoral block' remaining.

In the second review, the subdivision of land for horticultural uses within the Rural B zone is now permitted without a specified departure. However, certain conditions are imposed upon the subdivision of land for horticultural and intensive horticultural use. These conditions could place constraints on horticultural development. This has been discussed in Chapter 3.<sup>1</sup>

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<sup>1</sup> See page 45, Discussion on the Amended Ordinances of the Second Review.



### 5.1.2 The Council's Argument in Defence of Tauranga's District Schemes

In what follows the standard argument the Council gives for its attitude towards land use planning is presented and evaluated. The argument is a hypothetical one, but one put together after interviews with councillors, planners and other people.

One of the reasons for presenting the argument is that the Tauranga County Council is not unique in its attitude to land use planning and similar arguments are presented in many other counties in New Zealand.

The argument is as follows:

"This Council has never been opposed to horticultural development but it is our task to stop irresponsible subdivision. We have seen before new enterprises that became profitable, leading to large scale changes in land use and social upheaval. Now the same again, horticulturalists (and speculators) want more subdivisions, and stepping stones towards larger properties. While horticultural product prices are high (especially Kiwifruit), people are prospering. Meanwhile, the demand for subdivisions has increased land prices. Some farmers are subdividing off areas of their farms. Others plant part of their farms in horticultural crops. If we as Council allow these subdivisions, we will have many uneconomic dairy units. Those farmers remaining in dairying are faced with rising land prices and increasing rates and death duties. This will force many off their farms. The declining numbers of dairy farms in the area will reduce milk supplies to the local dairy companies.

Then, when the boom stops<sup>2</sup> and the prices drop, horticultural enterprises (and especially Kiwifruit) on small holdings will become uneconomic. These holdings cannot be used economically for farming. The only use left is their occupation by people desiring a rural residential life style. This is contrary to the Town and Country Planning Act as:

- (a) it does not encourage the best use of the land; and
- (b) it encourages ribbon development or urban sprawl.

Further, the dairy industry requires some protection (local labour, capital invested etc).

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<sup>2</sup> Some councillors saw the current development as a 'flash in the pan'. This attitude was especially strong at the early stages of the Kiwifruit 'boom'. Since then some of the councillors have diversified parts of their own farm(s) into Kiwifruit.

When the horticultural boom is over, it will be hard to amalgamate those now uneconomic small holdings into economic farms.

Hence, because of the above reasons, there should be control on land subdivision. We propose a minimum subdivision requirement of 6 hectares so that whatever happens, areas greater than 6 hectares can always provide an economic unit for owner.

Ten years from now, when the boom is over, the people of the region will thank us for our foresight."

This is the argument that has been heard several times in interviews. At places it may be exaggerated but it does display some of the reasoning behind the Council's actions. The reasoning makes sense and sounds appealing. However, the premises on which it is based are wrong.

The above statement is against the spirit of land use planning, and the arguments provided go beyond the scope of land use planning.

### 5.1.3 A Critical Discussion of 'The Argument'

The Council's argument will be discussed as follows:

1. LAND USE PLANNING AND MARKET FORCES. In planning, recognition should be given to the dynamic nature of land use which will invariably be influenced by market forces. What was once 'best suited' land for beef and sheep has been, decades ago in the Bay of Plenty, replaced by the dairy industry. Market forces are now indicating that some of that land is now 'best suited' for horticultural enterprises rather than dairy farming. To say that the market forces are wrong and that things will soon change is crystal ball gazing.<sup>3</sup> It is beyond the scope and abilities of councillors and planners, particularly in the present economic climate to under-write or seek to maintain any given set of economic circumstances. Economic incentives are likely to remain far more powerful than any artificially imposed constraints limiting the size of holdings and dictating their use.

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<sup>3</sup> The analysis on orchard profitability has shown that an orchardist can adapt to market forces, by changing the crops grown.

Land use planning was initially instituted to protect people from the effects of incompatible uses (externalities); to protect the public good aspects of land use, for society; to protect the productive capabilities of land; and to provide a pleasant social, environmental and cultural environment in the rural area.

Protecting an existing use (the dairy industry) does not fall into these categories. It is like any sector in the economy when relative market realization changes, it is adapt or die. The dairy industry has been slow in making changes. However it is now planning for future changes. There is no reason why the Bay of Plenty Dairy Co-operative should not continue processing 'food' products.

To protect people from moving into horticultural enterprises with insufficient capital or experience is not the task of the planner. If these people fail, then they will have taken a risk and failed. This is the hall-mark of a free enterprise society. The fact that these entrepreneurs did not succeed has done nothing to the productive capability of the land. The land is still there.

The planners' role is to help orderly adjustments in land use so as to complement market forces. To work against the market forces (using artificial constraints, rules and legislation) will lead to sub-optimal use of the land and foregone income to the nation.

2. MINIMUM SUBDIVISIONS AND ECONOMIC UNITS. One of the Councillors greatest concerns was the possibility that too many subdivisions would ultimately lead to rural residential living and unproductive use of the land.

Research has shown that this is not a necessary consequence of small subdivisions. Small subdivisions are often expensive and few people can afford just to live on them (this is applicable in the Tauranga County with land prices ranging from \$20,000 to \$37,500/hectare.

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<sup>4</sup> Recent research on rural small holdings clearly shows that they are used productively. Some of that research can be found in: "A Study of rural small holdings in Taranaki County", by A.D. Meister and D.S. Stewart. Discussion Paper No.3, in Natural Resource Economics, Department of Agricultural Economics and Farm Management, Massey University.

Small subdivisions in the Bay of Plenty are not only suitable for Kiwifruit. If the price of Kiwifruit drops, people will plant other horticultural crops. Who knows what crops will be grown in the future? Who expected 15 years ago, that Kiwifruit would become as important as it is today.

Minimum subdivisions are arbitrary and inflexible. Fifty hectares in the first operative scheme kept many people out of horticulture but brought in syndicates and tenants-in-common.<sup>5</sup> Six hectares appears more reasonable, but is still arbitrary and inflexible. To state that 6 hectares will remain an economic unit much easier than a smaller area is an irrelevant argument. Land use planning does not concern itself with economic units. No-one can predict economic circumstances which vary from land owner to land owner depending on, for example, his ability and indebtedness.

In terms of the Town and Country Planning Act, councillors are not asked to judge the economic position of the owner of a property but to judge the way in which he uses the land. The economics of a property has little to do with productive land use.

Further, the economic unit concept is biased against part-time farmers who, as many studies have shown, can and will use their small properties very productively.

In conclusion, councillors should not rely upon 'economic units' and subdivisional limits as tools in land use planning. It is evident that they cause distortions to the workings of the market system and lead to sub-optimal use of New Zealand's land resources.

3. RURAL RESIDENTIAL LIVING. As stated in the previous section, small subdivisions do not automatically lead to rural residential settlements. If the demand for rural residential properties was great (and this has not been proven in the Bay of Plenty) then 6 hectares or any minimum size is not going to stop it. People desiring such properties will, obtain the property they desire even if they buy 6 hectares when 1 hectare or less is sufficient.

<sup>5</sup> See Appendix B, page 107.

Councils should recognize that there is a demand for rural residential properties. Not all land in New Zealand is of high productive value. There are many small areas and corners that could be subdivided for people to live on. Such subdivisions could be allowed on the conditions of self-provision of services.<sup>6</sup> Besides diminishing the demand, it would also enhance the rural environment of the Bay of Plenty. With more people in the rural area this may result in a return of the rural community and a return of some rural services.

A cursory study of the "Land Use Survey of Small Rural Properties (1-6 ha)"<sup>7</sup> in the Tauranga County Council area, does not support councillors' argument that small rural properties lead to unproductive land use. Although the study did not analyse the productivity of properties, conclusions can be drawn.

This survey covered 92 per cent of the small holdings (1-6 ha) in the County. Using averages for the size divisions (1.0-1.9 (Av. 1.5); 2.0-3.9 (Av. 3.0); 4.0-5.9 (Av. 5.0)), the area covered by the properties is approximately 3810 hectares. Of this total the area occupied by 'houses plus gardens' (i.e. no 'productive' uses c.f. pasture/horticulture/or a combination) is 192.5 hectares or 5 percent of the total. Since we cannot assume that gardens are unproductive we must conclude that most land is used productively to some extent.

From Table 21 of the report we can calculate that of the total area of 3810 hectares, 2815 hectares are occupied by properties growing some crop and that 79 per cent of those 2815 hectares are effectively under horticultural production.

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<sup>6</sup> Attempts have been made to satisfy the above demands in the second review, with the creation of a rural residential zone, and the creation of lots for residential use in a horticultural subdivision.

<sup>7</sup> A survey commissioned by the Tauranga County Council, January 1980.



The above figures show that unproductive small holdings (with land being unused or used by ponies) are not the rule in the area but rather a small minority. The area mentioned above (2815 hectares) represents approximately 2 per cent of the total area available in the County's Rural B, C and D zones.

In conclusion therefore, rural residential property demand does not:

- (a) lead automatically to bad and unproductive use of the land; and
- (b) represent a threat to land use in the area and hence presents no justification for minimum subdivision regulations.

4. SMALL PROPERTIES AS STEPPING STONES FOR YOUNG HORTICULTURAL\*  
ISTS. With few small properties available and only large properties or semi-developed orchards for sale at high prices (\$400,000 to \$1 m), it has become difficult for young horticulturalists to enter the industry.

Councillors agree with the desirability of young horticulturalists coming into the industry, but they argue against stepping stones. Small properties can only serve once as a stepping stone. Once they are developed the owner sells and moves to a larger property. The small property, now fully developed, can serve no more as a stepping stone.

There is nothing wrong with this argument. This is how the stepping stone principle works. The existence of stepping stones and fully developed small holdings, provide greater opportunities for young men to enter the industry, than can be achieved by only large undeveloped holdings and full-size orchards. The first alternative provides opportunities. The second does not, except for those with plenty of funds.

Furthermore, with the development of the horticultural industry, and expected increases in production, for example from Kiwifruit and avocados, downturns in profitability must come. (If one believes in basic economic business cycles).

A downturn in prices will see more orchards for sale. This will occur as speculators capitalise on their earnings, and 'others' fail to meet their debts. The downturn will give younger horticulturalists an opportunity to enter the industry.

5. MINIMUM SUBDIVISION AS A USEFUL ADMINISTRATIVE TOOL. If the productive use of our land resources is what we are striving for then councils should consider applications for subdivisions and land use changes on their merits. Any other way, based on reasons of administrative ease, involves trade-offs. Inflexible and unreasonable rules may ease the burden on councillors, but will not achieve society's aim of producing the best use of land resources.

## 5.2 CONCLUSION

The policies of the Tauranga County Council, as reflected in the District Planning Schemes, have been to protect the pastoral industry. The horticulture industry is relatively new compared with agriculture. Council policy has been to tread cautiously until the horticulture industry has proved itself. This attitude is understandable in a county which is traditionally agriculturally oriented. Although this attitude is understandable, it is not acceptable to those who firmly believe in the future of horticulture and in the optimal use of New Zealand's land resources.



## CHAPTER 6

FUTURE LAND USE TRENDS IN THE WESTERN BAY OF PLENTY

## 6.1 FUTURE LAND USE TRENDS AND RURAL PLANNING POLICIES

In this section current rural planning policies and their influence on future land use trends within the region (namely Tauranga County), will be discussed. The future financial benefits and costs from the region's proposed horticultural plantings will also be evaluated. Finally, labour requirements for Kiwifruit will be determined.

6.1.1 Potential Land Area Suitable for Horticultural Use in Tauranga County

Tauranga County comprises an area of 182,100 hectares, of which 123,300 hectares are in the Rural B and Rural C zones. The total land area potentially suitable for horticultural use is estimated at 38,500 hectares. This was determined from Land Resource Inventory work-sheets produced by the Water and Soil Division of the Ministry of Works and Development. Land in classes I to IV is considered the most suitable for horticultural development. Limitations to use, for example the level of erosion, steepness of slope, wetness, soil type, and climate, are few. The land classes suitable for horticultural development are shown in Table 6.1.

Areas of poorly drained flat land exist on the coastal plains and in narrow valley floors. These soils include gley soil types in class IIIw<sup>1</sup> and comprise an area of 7,400 hectares. These soils are suitable for intensive agriculture and market gardening. They have not been included together with another 5,000 hectares in the region which are in forestry.

Areas of land in classes IIw<sup>1</sup> and IIIw<sup>1</sup> should become available when flood protection is provided to the Kaituna River district.

Table 6.1Land Area Potentially Suitable for Horticultural Development  
in Tauranga County

<u>Land class</u>	<u>Primary horticultural areas</u>	<u>Area (Hectares)</u>
IIe <sup>1</sup>	Limitations for horticultural use are	3,200
IIIs <sup>1</sup>	minor. Land consists of flat to gently	9,400
IIIe <sup>1</sup>	undulating terraces near sea level.	5,400
IIIe <sup>2</sup>	Soils are free draining and friable;	8,000
	slope gradient is no steeper than 1:6.	
	Current uses are dairying, intensive	
	grazing, cropping, and horticulture.	
	Total land in primary horticultural	26,000
	areas:	
<u>Secondary horticultural areas</u>		
IIw <sup>1</sup>	Limitations for horticultural use are	6,400
IIIs <sup>4</sup>	poor draining, and sandy soils prone	200
	to droughtiness.	
IIIe <sup>5</sup>	The slope gradient is no steeper than	3,300
IIIe <sup>9</sup>	1:6. Current uses are dairying, crop-	1,200
	ping, intensive grazing, and forestry.	
IVs <sup>2</sup>		1,400
	Total land in secondary horticultural	12,500
	areas:	
	Total land potentially suitable for	38,500
	horticulture:	

6.1.2 Future Land Use Trends

In September 1980, the total area in horticultural crops and/or sheltered for horticultural crops in the Western Bay of Plenty was estimated by M.A.F. staff in Tauranga at 8,000 hectares. This area comprised 800 hectares in the Whakatane County and 7,200 hectares in the Tauranga County. A schedule of the total present and proposed plantings of horticultural crops in the region, is shown in Table 6.2. Data in Table 6.2 was obtained from a survey conducted by the Economics Division of M.A.F. in April 1980. (2) The survey was primarily concerned with Kiwifruit plantings. There is not the same degree of accuracy regarding the information about other crops. Nevertheless, Table 6.2 gives an indication of planting trends.

Table 6.2

Present and Proposed Plantings of Horticultural Crops in the  
Western Bay of Plenty (Hectares Per Year)

Crop	Year					Hectares (Total)
	1979	1980	1981	1982	1983	
Kiwifruit	2775	866	670	350	344	5,005
Citrus	785	34	70	39	14	942
Avocados	198	114	94	31	15	452
Tamarillos )						
Feijoas )	166	51.5	48.4	17	2	284.9
Passionfruit)						
Pip and Stone	103	13.7	19.7	8	8.5	152.9
Berryfruit	67.3	50.0	19.5	24.1	6.8	167.7
Asparagus	47	24	37	19		127
Vegetables	70	30				100
'Other'	54.6	31	33.3	18.9	4.4	142.2
Total (Hectares)	4265.9	1214.2	991.9	501	394.7	7373.7

Reference: Economics Division, M.A.F.

Table 6.2 indicates that by 1983, 67.8 per cent of total horticultural plantings could comprise Kiwifruit, 12.7 per cent citrus and 6.1 per cent avocados. Other subtropical fruits, vegetables, and horticultural crops could make up the balance of 13.4 per cent. The majority of these plantings, over 90 per cent, will occur in Tauranga County as shown.

	Horticultural Plantings Hectares		
	1979	1980	(Increase)
Tauranga County	4055	6877	(2822)
Whakatane County	211	497	(286)
	4266	7374	(3108)

After 1983, horticultural plants throughout the region are expected to continue at a minimum rate of 500 hectares per year.

In Table 6.1, page 86 the area of primary horticultural land in Tauranga County totals 26,000 hectares. This area

exceeds by three times, the total area of 7,200 hectares currently committed for horticultural use in that County. Although drainage and frost prevention measures may be necessary in some areas, there is still ample land available for further development. In contrast only 800 hectares are committed for horticultural use in Whakatane County. The total milk supply area for the Rangitaiki Dairy factory is approximately 33,000 hectares. The development of land for horticultural use within the Whakatane area has just begun.

### 6.1.3 Land Uses Being Replaced with Horticulture

The pastoral uses of land currently committed for future horticultural use within the Western Bay of Plenty, are as follows:

<u>Present land use</u>	<u>Area committed for horticultural</u>	
	<u>use 1980/83</u>	<u>(Hectares)</u>
	(%)	
Dairying	25.0	777.0
Grazing	28.0	870.3
Livestock farming	5.0	155.4
Maize production	25.0	777.0
'Other uses'	8.0	248.6
Nil use	9.0	<u>279.7</u>
		3108.0

In the five year period from 1975 to 1980, milkfat production in Tauranga County has dropped by an average of 200,000 kilograms per year. In 1983 at an average production of 350 kilograms milkfat per hectare, from good quality dairy land, lost annual production from 777 hectares would be 271,950 kilograms. Dairying land may also be diverted to other pastoral uses in this time. At an annual loss of 500 hectares, one million kilograms of milkfat would be lost over 5.7 years. Total milkfat production in Tauranga County would then be around 8 million kilograms.

Future land use trends indicate that the rate of land diversion from dairying may be decreasing. However, while profits from horticultural crops per hectare exceed those from pastoral uses, the development of land for horticulture will continue.

#### 6.1.4 Rural Planning Policies and Land Use

During the 1970's, Tauranga County planning policies have been slowly evolving to permit an increase in the numbers of horticultural subdivisions. In the second review provisions for horticultural subdivisions in the Rural B zone were introduced. In the Rural B zone, the Council has the objective of allowing land to be used for both horticultural and pastoral use. This policy, in itself, will restrict horticultural development. This has been discussed in Chapter 3.

The size of the Rural B zone (107,400 hectares) will ensure that the subdivision of land for horticultural use will continue. Market forces are more powerful than rural planning policies designed to protect traditional pastoral uses. The ordinances of the Rural B zone will be amended to encourage further horticultural development when horticulturalists and farmers demand change. A further relaxation in County subdivision policy was also recommended by the Planning Tribunal. Ultimately the major constraint to horticulture development in the County could be from land-owners who are not prepared to sell.<sup>1</sup>

In the Whakatane district, rural planning policies for horticulture are just evolving. The numbers of scheme plans for land subdivisions are small compared with Tauranga County, and as such are judged on merit. As horticulture development escalates additional criteria and ordinances will be introduced. The large land area potentially suitable for horticulture should ensure that future development will not be adversely restricted.

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<sup>1</sup> See Appendix A, pp. 105-106.

## 6.2 THE FUTURE FINANCIAL BENEFITS FROM THE REGION'S PROPOSED HORTICULTURAL PLANTINGS

Since Kiwifruit, avocados, and citrus, are the major crops grown, emphasis is on these crops in this analysis.

The analysis covers the financial benefits and costs (from the region's viewpoint) associated with the proposed plantings of Kiwifruit, avocados, and citrus from 1980 to 1983. The method of analysis is described in Appendix F, page 121. The net financial benefits are in Table 6.3.

Table 6.3.

The Financial Benefits from the Region's Proposed Horticultural Plantings (1980-1983) in 1979/80 \$'s

<u>The Financial Benefits (Income Gained)</u>			
<u>Crop</u>	<u>N.P.V. Per ha (\$)</u>	<u>Total area (ha)</u>	<u>Total N.P.V. (\$)</u>
Kiwifruit			
Tee Bars	131,862	1378	181.705 m
Pergolas	133,542	852	113.777 m
Avocados	111,341	254	28.280 m
Citrus	<u>363</u>	<u>157</u>	<u>56,991</u>
Totals		2641	323.819 m
<u>The Financial Costs (Income Foregone)</u>			
<u>Land Use</u>	<u>N.P.V. Per ha (\$)</u>	<u>Total area (ha)</u>	<u>Total N.P.V. (\$)</u>
Dairying	2248	660.25	1.484 m
Grazing/live-stock	1061	871.53	0.924 m
Maize	1892	660.25	1.249 m
Other Uses) lowest			
) opport-	1061	<u>448.97</u>	<u>0.476 m</u>
) unity			
Nil    Use ) cost		2641	4.133 m

Total N.P.V. Benefits (Horticulture) \$319.686 million.

Table 6.3 shows that the cash earnings from the proposed plantings of Kiwifruit, and avocados should greatly exceed those earnings from traditional land uses. The size of the possible cash benefits indicate that restrictions to further horticulture development will cause losses in potential earnings for the region.



There is no justification in maintaining rural policies designed to protect traditional land uses within the Western Bay of Plenty. For example, in the 1979/80 season, the total payout to dairy suppliers in Tauranga County was \$19.324 million. This dairy payout was from a milk collection area of not less than 25,000 hectares. The payout was equivalent to the gross revenue earned from 460.5 hectares of Kiwifruit, and was equivalent to the net cash surplus from 644 hectares.

The cash returns from the proposed citrus plantings show a low N.P.V. relative to current pastoral uses. This is due to the high costs of citrus establishment relative to the financial benefits. Citrus establishment costs can be reduced with farmer initiative. The citrus N.P.V. could then be equated with the N.P.V.'s of the traditional pastoral uses. However, under the present price assumptions used in this thesis, citrus production is not a recommended land use.

### 6.3 LABOUR REQUIREMENTS FOR KIWIFRUIT IN THE WESTERN BAY OF PLENTY

Knowledge of the future labour requirements for Kiwifruit is important considering the area of plantings and the short harvesting period of approximately 6 weeks. In contrast avocado and citrus harvesting can be spread throughout many months of the year, depending upon crop varieties planted.

From the chapter on Orchard Profitability, the following labour requirements for Kiwifruit were ascertained.

	<u>Pergolas</u>	<u>Tee Bars</u>
<u>Fulltime labour units</u>	1 person per 2.25 hectares	1 person per 4.50 hectares
<u>Casual labour units</u>		
Summer pruning for 3 months	0.45 persons/ hectare	0.22 persons/ hectare
Winter pruning for 6 weeks	0.45 persons/ hectare	0.22 persons/ hectare
<u>Harvesting and Private Packing</u>		
1 person can pick and pack 100 Kiwifruit trays per day.		
1 person can pick 4 bins (272 trays) of Kiwifruit per day.		

Using the areas estimated in each fencing system, the cultural labour requirements for Kiwifruit in the Western Bay



of Plenty is shown in Table 6.4.<sup>2</sup>

Table 6.4

Cultural Labour Requirements for Kiwifruit in the Western Bay of Plenty by 1990

Fencing system:	Tee Bars and 'Other'	Pergolas	Total Plantings (hectares) to 1983
Hectares	2978	2027	5005
<u>Fulltime labour units</u>	662	901	1563
<u>Casual labour units</u>			
Summer pruning	665	912	(
Winter pruning	665	912	1577)

The total number of present and intending Kiwifruit growers in the Western Bay of Plenty is estimated at 885 persons. In 1990, if these Kiwifruit growers are actively employed on their properties, the fulltime labour requirements would be 678 persons.

The casual labour requirements of 1577 persons are in addition to the fulltime labour requirements.

#### 6.3.1 Labour Requirements for Kiwifruit Harvesting and Packing

KIWIFRUIT HARVESTING. In this analysis labour requirements are calculated for 20, 25 and 30 work days. Twenty days is the usual harvesting period for Kiwifruit growers with their own packing and coolstore facilities. Length of the harvesting period is also determined by the number of wet weather days. The possibility of frosts damaging fruit also increases with a long harvesting period.

In 1990, total Kiwifruit production from 5,005 hectares could be 105,105 tonnes or 28, 378, 350 trays. This production is equivalent to 417,329 bins of fruit. Eleven persons (10 persons picking and 1 person on a tractor) can pick 40 bins of fruit per day. The labour requirements for harvesting is shown in Table 6.5.

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<sup>2</sup> See Appendix F, pp. 122-123.

Table 6.5Labour Requirements for Kiwifruit Harvesting in the Western Bay of Plenty in 1990

No. of work days	20	25	30
No. of bins per day	20,866	16,693	13,911
No. of persons picking at 4 bins/person/day	5,216	4,173	3,478
No. of persons on tractor at 40 bins/day	521	417	347
	<u>5,737</u>	<u>4,590</u>	<u>3,825</u>

KIWIFRUIT PACKING. In 1990, if 90 per cent of the crop is exported, the number of trays packed would be 25,540,515. The labour requirements using private packing facilities is shown in Table 6.6. One person can pack a minimum of 140 to 160 export trays per day. The number of export trays packed per day depends upon; the grading installation, the experience of the packers, fruit quality control standards, and the number of interruptions (i.e. machinery breakdowns, and disruption to fruit flow due to wet weather).

Table 6.6Labour Requirements for Private Kiwifruit Packing in the Western Bay of Plenty in 1990

No. of days to pack	20	25	30
No. trays packed per day	1,277,025	1,021,620	851,350
No. of persons packing at:			
140 trays/day/person	9,121	7,297	6,081
150 trays/day/person	8,513	6,810	5,675
160 trays/day/person	7,981	6,385	5,320

Table 6.7The Total Labour Requirements for Private Kiwifruit Packing and Harvesting in the Western Bay of Plenty in 1990

No. of days to pack	20	25	30
No. of persons harvesting and Packing at:			
140 trays packed/day/person	14,858	11,887	9,906
150 trays packed/day/person	14,250	11,400	9,500
160 trays packed/day/person	13,718	10,975	9,145

6.3.2 Discussion

In 1980, the Western Bay of Plenty produced around 16,416 tonnes of Kiwifruit. The author of this thesis estimates the area in production as follows:

	<u>Area (Hectares)</u>
Full production	510
Various stages of production	426
Non producing	<u>2,705</u>
Total area (hectares)	3,641
<u>Reference:</u> Economics Division, M.A.F.	

The author's estimates for the total labour requirements for 1980 compared with the labour requirements for 1990 are shown below:

	<u>1980</u>	<u>1990</u>
Area in production	936 hectares (in various stages)	5,005 hectares (in full production)
Total production	16,416 tonnes	105,105 tonnes
Fulltime labour units	226 persons (includes owners plus 100 employees)	1,563 persons (includes owners plus 678 employees)
Casual labour units	200 persons	1,577 persons
Harvesting and packing for 25 days at 140 trays per person per day	1,856 persons	11,887 persons

In 1990, the casual labour requirements for pruning and training will increase by 1,370 persons. The numbers of fulltime workers will increase by 1,330 persons and the labour for harvesting will increase by 10,000 persons.

In the same period, Tauranga's geographic population is expected to increase by 34 per cent. The areas of Kiwifruit plantings and population densities for 1980 and 1990 are shown below:

<u>Year</u>	<u>1980</u>		District populat- ion		<u>1990</u>		District population
District	<u>Area in Kiwifruit</u> <u>(Hectares)</u>	<u>(%)</u>			<u>Area in fully</u> <u>producing</u> <u>Kiwifruit</u> <u>(Hectares)</u>	<u>(%)</u>	
Katikati	848	23.3	4,000		1,250	25.0 )	County population 34,600 persons. Central Te Puke and Tauranga have access to Tauranga City and Mt Maunganui. A population of 67,500 persons
Te Puna/ Omokoroa	455	12.5 )	7,000 )	Central Te	596	12.0 )	
Tauranga	463	12.7 )	)	Puke and	639	12.7 )	
Te Puke	1,395	38.3 )	)	Tauranga have	1,698	34.0 )	
and		)	12,000 )	access to		)	
Eastern	310	8.5 )		Tauranga City	574	11.4 )	
Areas				and Mt			
				Maunganui. A			
				population of			
				53,000 persons			
Whakatane	170	4.7	42,000		248	4.9	48,000
	<u>3,641</u>				<u>5,005</u>		

In 1990, the areas which will have the most difficulties attracting casual labour will be Katikati and the Eastern districts of Te Puke. In 1981, there were difficulties in obtaining labour for harvesting in some areas of Te Puke and Tauranga. One grower considered running a bus service daily for workers from Rotorua to Te Puke. In 1990, with the need for another 10,000 persons during harvesting, labour planning and management will be essential.

#### 6.4 CONCLUSION

The future financial benefits from the changing land uses show that the region is entering an era of unprecedented prosperity. As the region's prosperity increases, demands will be upon the Counties to further encourage horticultural development. Now is the time for rural planners and industry leaders to continue to facilitate changes in rural planning so that the horticulture industry will be adequately serviced. Rapid development of the industry will ensure that the region's horticulturalists will be better placed to meet ever increasing production costs and overseas competition. This will also ensure the greatest financial returns to the region.

## CHAPTER 7

### THESIS CONCLUSIONS AND RECOMMENDATIONS

#### 7.1 CONCLUSIONS

From the information gathered and from interviews and public meetings in the area, it is concluded that the development of the horticultural industry in the Western Bay of Plenty has been desirable and beneficial from a regional as well as from a national point of view. This development can be attributed to the workings of the private enterprise system. Government export tax incentives and the deduction of development expenses from taxable income have also aided horticultural development.

It is also concluded that land use planning in Tauranga County has acted as a constraint in achieving optimal land use. Rural planning policies which have constrained horticultural development in the region include; the setting of minimum sizes for residue pastoral and horticultural lots, the use of the economic unit concept as a subdivisional tool, and the requirement in the first review that horticultural subdivisions in the Rural B zone be permitted by means of a Specified Departure.

A more flexible approach to planning, especially towards subdivision in the Rural B zone under the 1976 first review, would have led to a greater availability of parcels of land of smaller sizes (i.e. smaller than 50 hectares). Whether this would have increased the development of the horticultural industry cannot be proved definitely. However, developments since 1976, and especially developments in the last two years, would seem to confirm this assumption.

The slow realization by Councillors and planners that horticultural development was more than a 'flash in the pan' has led to an inflexible and conservative attitude towards planning. As a result of this attitude, overtime, costs have been incurred and income has been lost, both of which would not have been necessary. The emergence of syndicates and tenants-

in-common are a direct result of these policies and the unavailability of land areas (of suitable sizes under 50 hectares) for horticultural development.

An additional constraint to horticultural development has been the unavailability of subdivided land. Between April 1976 and March 1979, more land was subdivided for horticultural use than was planted in horticultural crops. This implies that constraints to horticultural development have come from both rural planning policies and from land owners who have not been prepared to either develop or sell their land for horticultural uses.

Although the Council (in the second review of its District Scheme), has liberalized its attitude towards horticultural subdivisions, the Council is still concerned with minimum subdivisional lots, economic units, and protection of the pastoral industry. These constraints to horticultural development cannot be justified. The economic analysis in Chapter 4 indicates that small areas of land used for orcharding (i.e. less than 6 hectares) can be economic and the best use of land. Two hectares of Kiwifruit can return a net farm income of \$62,000 compared with a net farm income of \$21,000 from 6 hectares of citrus. If current prices for Kiwifruit were reduced by 50 per cent, 2 hectares of Kiwifruit would remain more profitable than 48 hectares of orchard land used for dairying. Furthermore rural planners and industry leaders seem concerned about future markets for the expected increases in horticultural products. The planners' role should be to complement current market forces and not to maintain any given set of economic circumstances. Fruitgrowers in the Western Bay of Plenty have shown their ability to adapt to changing market trends. The projected surpluses of citrus fruits expected in the late 1970's have been reduced with fruitgrowers diversifying into other forms of horticultural production. In Chapter 4, the consecutive owners of Orchard I have maintained profitability, since the 1940's, by continually diversifying and adjusting crops to suit market trends. Other established orchards have maintained profitability by investing surplus monies into further land development and in 'off farm' investments. In Chapter 6 the gains in potential earnings from the projected



increases in horticultural plantings far exceed the financial rewards from maintaining pastoral farming at the expense of horticulture.

The Council's concern for rural residential dwellings and urban sprawl also appears unwarranted. A more flexible attitude to rural subdivisions would satisfy demands for rural residential dwellings and would not contravene the Town and Country Planning Act. In Chapter 6, the increase in labour requirements estimated for Kiwifruit harvesting in 1990, total 10,000 persons. This future demand for labour inputs requires that Council maintains a flexible attitude to rural residential dwellings.

In the future constraints such as the availability of horticultural advisory officers, and the capacity of servicing and processing industries may appear. In time the market system should overcome these constraints by channelling more resources into these areas. The prosperity of the Bay of Plenty region is already attracting capital, and skilled commercial labour from other areas of the country.

In conclusion, the horticultural industry will continue to expand throughout the Western Bay of Plenty. But with thought and co-operation, dairying and horticulture can exist in harmony in the region. In Tauranga County, the rolling nature of the terrain is such that milk production will continue in the area.

## 7.2 RECOMMENDATIONS

### 7.2.1 District Planning Schemes

It is recommended that Councils, when writing their District Schemes, concentrate more on encouraging productive uses of land. Councils should avoid arbitrary and inflexible rules such as minimum subdivision limits, and the economic unit concept, by considering changes in land use and property sizes on merit.

It is also recommended that when approving scheme plans on merit, the ordinances are used as guidelines rather than inflexible rules. Departures from rules involve costs of advertising and in the extreme of taking the cases before the Tribunal. In the past such costs often proved unnecessary and could have been avoided by a more flexible scheme.

Furthermore, when reviews of District Schemes are open for objections, Councils are recommended to make operational those parts of the review which receive no objections. The time period from the start of the review to its approval can be long (up to two years as in Tauranga's case). During this period the Council is often not willing to act on scheme plans which however, it may approve later. The cost of waiting can be high, and could in some cases be avoided by the above recommendation.

In the case of the Tauranga District Scheme, it is recommended that the 6 hectare averaging clause for horticultural lots and the distinction between horticultural and intensive horticultural use be removed. A review of the ordinances in the Rural B zone which require:

- (a) that land unsuitable for horticulture shall not exceed 25 per cent of the land being subdivided for horticultural use; and
- (b) that residue lots shall have a minimum area of 50 hectares; is also recommended.

In Tauranga County, it is recommended that Council monitor the demand for lots in horticultural subdivisions and adjust the average lot size accordingly. Residue pastoral lots of 50 hectares and less should also be subdivided if these lots can be used productively.

#### 7.2.2 Rural Planning Policies

All County Councils are recommended to look for ways to minimize interference in the land market system. When prices clearly indicate that new enterprises are desirable then people will engage themselves in these new enterprises. Councils should tread warily if they intend to hinder such developments. In many cases the price system provides better information about desirable land use trends than informed judgements by Councillors. To work against market forces will lead to suboptimal use of land and lost income to the nation.

By 1990, horticultural production in the Bay of Plenty region is expected to increase dramatically. Rural planners and industry leaders are recommended to maintain flexible planning policies, so that the horticulture servicing industries can develop. For example, Councillors are recommended to permit rural residential dwellings for the expected increases in horticultural workers.

Further development of the region's horticultural potential is also recommended. This will ensure that the region's horticultural products can compete with future increases in overseas production by satisfying current market demands. An established horticultural industry is also in a better position to withstand rising production costs. Horticultural development will continue in the region until the market system indicates that further development is not economic under 'then' present prices and costs. Government policy should now be advising horticulturists to invest surplus monies against possible future downturns in prices. A review of the Government export tax incentives for horticultural products, especially for Kiwifruit, is also recommended. The financial returns per hectare from

Kiwifruit are higher than from traditional pastoral uses. The export tax incentives could be used to encourage the development of overseas coolstores and/or the establishment of international markets for the expected increases in horticultural production.

It is also recommended that the Bay of Plenty Cooperative Dairy Company continue to formulate policies for diversification. The Company should also survey the suitable land areas for horticulture on shareholders' farms as well as surveying farmers' future intentions. The monitoring of land use patterns, and the formulation of policies to diversify will ensure that the Company can keep pace with current trends.

Finally, horticulturalists, and farmer associations should formulate land use policies and put forward representatives to implement these policies. Horticulturalists and farmer associations should not employ 'fire fighting tactics' to oppose County planning schemes.

The above recommendations are not intended to belittle the role of Councillors and Planners. With the rapidly changing economic environment, both Councillors and Planners have a difficult task to perform, a task often beyond their abilities. The knowledge of this should encourage them to be flexible and seek professional advice upon which to base their decisions.

## A P P E N D I X      A

SUBDIVISION OF LAND WITHIN THE TAURANGA COUNTY

Since the first review of the Tauranga County District Scheme in 1976, rural land within the County has been divided into four rural zones, namely A, B, C and D zones. The areas of these zones are:

Rural A	57,700 hectares	
Rural B	107,400	"
Rural C	15,900	"
Rural D	300	
Total in rural zones	181,300	"
Area of rural townships	800	"
Total area of Tauranga County	182,100	"

The demand for horticultural land, especially for orcharding, is in the Rural C and B zones. Limited land is available in the Rural D zone, and no subdivision for horticulture is permitted in the Rural A zone.

Land in the Rural C zones consists of predominantly the flat volcanic plateaus around Katikati, Tauranga, and Te Puke. This land extends along the Western Bay of Plenty Coast and rises from sea level inland to a height of around 100 metres. South of Te Puke the land rises to a maximum height of 250 metres. The land in the Rural C zone is considered most suitable for horticulture. The Rural B zone is the largest of the four zones. Land in this zone is classified as rolling hill country, and is considered more suitable for pastoral farming than horticulture. Limited subdivision for horticultural uses, however, has occurred in this zone.

The pattern of subdivision of land within the Rural B and C zones is shown on the following page.

Table A.1Land Subdivision in the Rural B and C Zones

Year	Area (ha) Subdivided in Rural B			Area (ha) Subdivided in Rural C			Total land B & C (ha)
	Usable for hort.	Unusable for hort.	Total land	Usable for hort.	Unusable for hort.	Total land	
1973/74	-	-	-	306	113	419	419
1974/75	18	18	36	-	-	-	36
1975/76	33	15	48	235	120	355	403
1976/77	134	40	173	687	266	953	1126
1977/78	29	5	34	415	260	675	709
1978/79	173	78	251	606	222	828	1079
1979/80	246	77	323	430	213	643	966

Reference: Tauranga County Council, 1980

In June 1972, the Tauranga County Council amended the District Scheme to limit the subdivision of land to that land not less than 40 hectares in area and 201 metres in frontage. Proposed subdivisional lots below this area had to come within certain classifications and standards listed in the code of ordinances. Later, at the first review of the District Scheme in 1976, the Council introduced zoning and designated land in a Rural C zone as being suitable for subdivision for horticultural use. In the interim between 1972 and 1976, the owners of land which was to be designated Rural C at the first review of the District Scheme, were granted permission to subdivide. In 1973, all land approved for subdivision for horticultural uses was within this zone, although in 1974 no land was subdivided in the Rural C zone. In 1974 and 1975, only 36 and 48 hectares respectively were subdivided in the Rural B zone.

In 1976, the District Scheme was amended to permit subdivision in the Rural B zone by means of a specified departure. The total amount of land then subdivided in both the B and C zones increased to 1126 hectares, compared with the 403 hectares in 1975.



From 1976 to 1980, the total area of land subdivided shows a downward trend, although the area subdivided is still greater than for the period prior to 1976. Most noticeable is an increase in the amount of land subdivided in the Rural B zone, from 34 to 323 hectares in the period 1977 to 1980.

The recommended second review was approved on the 19th November 1979, and since that date to March 31st 1980, a period of four months, 184 hectares has been approved for subdivision in the Rural B zone. If this trend continues, then it may indicate that the Tauranga District Scheme has hindered the development of the horticultural industry by limiting the amount of land for subdivision in the Rural B zone. From about 1978, land in the Rural B zone has also been acquired by 'syndicates' and 'tenants-in-common' arrangements. This means that despite planning constraints more land is being developed for horticulture in the Rural B zone than present information would indicate.

Table A.2

Horticultural Subdivision (ha) Tauranga County

Year	No. of lots	Total area subdivided for hort.	Total area usable for hort. <sup>(1)</sup>	Total area in hort.	Area planted in hort. this year <sup>(2)</sup>	Surplus land (1 - 2)
1973/74	45	419	306	2137	-	
1974/75	3	36	18	2167	30	
1975/76	38	403	267	2442	275	
1976/77	118	1126	821	2717	275	+546
1977/78	63	709	444	2992	275	+169
1978/79	106	1079	779	3390	398	+381
1979/80	84	966	676			

Reference: Tauranga County, Ministry of Agriculture and Fisheries

From 1st April 1976 to 31st March 1979, the total area subdivided and usable for horticulture exceeded the annual development of land for horticulture. This could imply that:

- (a) landowners who subdivided did not sell, and/or had no desire to go into horticulture themselves on all the land they subdivided;
- (b) finance is limited and/or development costs are too high;



- (c) people are using their land for other uses;
- (d) people are holding vacant land as an investment;
- (e) a combination of all the above four uses.

The above reasons offered for the excess of vacant land over land being developed for horticulture are additional constraints.

Summing up, the constraints to horticultural development are from:

- (1) The planners' desire to protect pastoral farming, the prevention of sporadic subdivisions, their uncertainty about future markets for horticultural products and the costs of servicing the subdivisions.
- (2) The market system.

## A P P E N D I X      B

TENANTS-IN-COMMON

Under the 1976 Tauranga County District Scheme (first review) the subdivision of land within the Rural B zone for horticultural uses was permitted only by means of a specified departure. This policy restricted the amount of land available for horticultural subdivisions within the Rural B zone. During the period of the first review from April 1st 1976 to the approval of the recommended second review in November 1979, a total of 3644 hectares were subdivided for horticultural uses. This total area consisted of:

Rural B	656 hectares	
Rural C	2988	"
	<hr/>	
TOTAL	3644	"

The non-availability of land in the Rural B zone, together with the high prices paid for land, encouraged the development of land syndication. Land syndication enabled investors to pool their financial resources and develop whole dairy farms without the need for subdivision. The development work being carried out by hired contractors.

Another method of obtaining land in the Rural B zone has been by co-ownership or 'tenancy-in-common'. Under this arrangement two or more persons would purchase a whole farm. The co-owners would decide on how the farm was to be divided and each co-owner would then work his share of the farm as agreed by the co-owners.

Although the land is bought collectively by the co-owners or partners, the land is registered under one title. This means that any monies raised for development using the farm as collateral must be secured by the land of all the partners. This can present management problems. For example, it may be easy to obtain a mortgage to build a house for one partner, but there may be difficulties in obtaining further monies to build houses for the remaining partners, especially if the land has already been put up as collateral for a previous loan. The partners, thus, need to act collectively in terms of finance.

Other problems which could arise are:

- (1) HOUSING. Under the 1976 Tauranga County District Scheme, two residential buildings were permitted on any conforming site and one residential building on any non-conforming site. Additional housing on any conforming site required a conditional use application. Building permits for residential purposes on non-conforming sites in the Rural B zone were limited to one.

In the recommended second review one extra dwelling is now permitted on both a conforming and a non-conforming site, but a controlled use application is necessary.

- (2) MANAGEMENT OF LAND. Problems between partners could arise over: the best way to divide land amongst the partners; access to blocks; articulation of water; block layout and siting of buildings; the type of shelter; additional costs such as earthworks.
- (3) RESALE OF LAND. Any partner wishing to sell his share of the farm must obtain the consent of his partners.

A 'tenants-in-common' agreement, in the above situation, is only workable when the partners involved do not have limited cash resources. Despite the management and financial problems which could beset such an arrangement, personal communications with Mr Luke Martin, a registered surveyor from Rotorua, suggests that between 15 to 20 'tenancy-in-common' agreements are operating around the Te Puke district.

## A P P E N D I X C

THE APPEAL FROM THE KATIKATI BRANCH OF FEDERATED  
FARMERS AND OTHERS TO THE PLANNING TRIBUNAL

In May 1981, the Planning Tribunal heard an appeal between Katikati Branch of Federated Farmers, Katikati Fruit Growers Association, Katikati Commercial Growers, (The Appellants) and Tauranga County Council (the respondent).

The appellants were not satisfied with the amended ordinances of the second review and sought the following changes;

- (1) that the whole of the ordinances regulating subdivision in the Rural B and C zones be deleted and replaced by new provisions set forth in the notice of appeal (I shall not summarise these new provisions for a reason which appears later); and
- (2) that the Rural B and C zones be merged.

The appellants also challenged the 6 hectare average required for new horticultural lots in both Rural B and C zones. In addition they questioned the exclusion of Kiwifruit from the definition of "intensive horticulture". The appellants confined the effects of the amendments sought by them to the Katikati riding of the respondent's district (excluding Matakana Island).

The appellants' appeal originated from the shortage of land for horticulture in the Katikati riding. In 1979, a survey was organised by the Katikati Lion's Club to obtain information on changing land use patterns. The survey covered approximately 10,730 hectares of land in the Katikati riding. The survey results indicated that 39.4 per cent or 4,225 hectares of the 10,730 hectares covered were suitable for horticulture. At that time the total area committed for horticulture was 1,836 hectares. Data submitted to the Tribunal during the appeal suggested that 3,650 hectares were now committed to horticultural use. The area left for development being less than 1,000 hectares.

## THE PLANNING TRIBUNAL DECISIONS

At the hearing the Tribunal pointed out to the appellants that their requests in (1) above went beyond the scope of the objections out of which their appeal arose, and was thus outside the Tribunal's jurisdiction. However, the Tribunal made comments on the appellant's proposals as follows:

The appellants' provisions would allow proposed subdivisions to be considered 'on their merits' and that they contained few criteria against which to judge the merits of a proposed subdivision. The Tribunal further commented that each council in its district is empowered by the Local Government Act 1974 to control subdivisions. Previously the criteria in district schemes regulating rural subdivisions were criticized as being too arbitrary, and that they did not control subdivisions in a constructive way. Now, it was common practice for district schemes to specify principles or criteria against which subdivisions could be judged. Although difficult, it is acknowledged that a Council must make a subjective judgement. Thus, the drafting of criteria or principles appropriate to the needs of a Council's district requires great skill.

The Tribunal summed up by stating that the new provisions proposed by the appellants were too general. The provisions would not ensure that proposed subdivisions are judged upon merit and against known criteria. Rather, the merits would tend to be such as are seen subjectively by those putting forward the subdivision and/or by those called upon to make the judgement.

In (2) above, the appellants contended that there was now little land left for horticultural subdivision in the Rural C zone in Katikati riding, though a demand still existed. The retention of the differences between the two zonings was no longer justified particularly in view of the extensive horticultural development in the Rural B zone.

The Tribunal commented that if a slope of 1 in 6 was acceptable for horticultural land in the Rural C zone, then the same should apply in the Rural B zone. The Tribunal ordered the Council to make the slope of 1 in 6 applicable to both zones.

The other differences between the zones are that Rural B zoning requires:-

- (1) that land unsuitable for horticulture shall not exceed 25 per cent of the land being subdivided for horticultural use; and
- (2) that residue lots shall have a minimum area of 50 hectares.

No changes to these requirements were ordered. The Tribunal stated that both these requirements have the objective of keeping in pastoral use, land not suitable for, or not immediately intended for horticultural use. That objective is sound and in accordance with the requirements of the Act. However the Tribunal commented that the differences between the Rural B and C zones should not necessarily be maintained intact. For example it was not necessarily contrary to the objectives of the Act to allow some uneconomic pastoral parcels to remain after the creation of a number of horticultural units - it was largely a matter of degree.

The Tribunal also commented that it was not in their jurisdiction on this appeal to amend the 6 hectare average required for new horticultural lots. The Tribunal believed the ordinance encouraging subdivision into lots of varying sizes was sound. However the Tribunal could not be persuaded that the definition of intensive horticulture should include Kiwifruit.

The Tribunal gave instructions that the Council should amend the ordinances and criteria regulating horticultural subdivisions, if the desired objectives of these ordinances were not achieved. The Tribunal also commented that the twelve conditions regulating intensive horticultural subdivisions did not apply where the intensive horticultural use already existed. They only applied to proposals for the creation of a new intensive horticultural use. These provisions reflected the Council's concern that the subdividers stated intentions for the land would be carried out. These provisions should also be reviewed in due course.



## A P P E N D I X D

FINANCIAL ANALYSIS OF THE CASE STUDY ORCHARDS

The financial year is taken from 1 July 1979 to 30 June 1980. This ensures that trading income follows the current financial year's costs.

## D.1 ORCHARD INCOME.

(i) ON FARM INCOME. This includes all fruit income from export and local sales. Kiwifruit income is calculated on production which is the average of the 1979 and 1980 crops. This is considered necessary because 1979 was a high production year and 1980, a low production year for mature vines. Production previous to 1979 was not considered because not all Kiwifruit vines had reached maturity. The price per export tray for Kiwifruit is \$7.87 net to the grower.<sup>1</sup> The price for process and local market fruit is taken at 75 cents per kilogram. In 1980, the price for process fruit varied from 65 cents to 85 cents per kilogram. Income from other fruit crops and 'off farm income' was obtained from the growers' financial accounts.

(ii) OFF FARM INCOME. Interest on savings, dividends, and rebates from fruit sales and purchases.

## D.2 CASH COSTS: ORCHARD WORKING AND ADMINISTRATION COSTS

These cash costs have been obtained from the growers' financial accounts. Orchard working costs are as set out in the whole farm budgets. The administration costs include levies, accounting fees, legal, and bank fees, telephone and tolls, sundry office expenses, subscriptions, insurances, and travelling expenses.

## IMPUTED COSTS:

(i) DEPRECIATION: Depreciation has been calculated at 10 per cent on current value of plant and machinery, 2 per cent on current value of buildings, and 4 per cent on coolstores. The current values of buildings, plant and machinery were

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<sup>1</sup> Price paid by N.Z. Fruit Growers Federation.



estimated by the owners of the case study orchards.

(ii) CAPITAL INCREMENT:<sup>2</sup> The capital increment is the estimated increase in market value of the orchard, excluding chattels, during the 1979/80 year. The percentage increase in market value is calculated at 20.0 per cent, based over a 5 year period.

Discussions with the valuers and land agents indicated that the market value of orchards had doubled between 1975-1980. This is confirmed by the Horticultural Land Price indices for Tauranga County as follows:

Horticultural land index figures 1975-80 <sup>3</sup> Tauranga County		
<u>Year</u>	<u>Index</u>	<u>% Change</u>
1975	1,000	
1976	1,268	+ 26.80
1977	1,497	+ 18.10
1978	1,868	+ 24.78
1979	2,417	+ 29.39
1980	2,945	+ 21.86

Fully established orchards are not readily available on the open market. The price index figures above relate more to semi-developed orchard properties. Generally the market value of these properties is increasing at a faster rate (because of the capital gain component from increasing production) than for established orchards.

The method of valuation, based upon orchard sales and discussions with valuers and land agents, is as follows:

	<u>\$'s per hectare</u>
Mature Kiwifruit vines	
9-10 years	90,000
Land	25,000
Mature Shelter, over 5 years	10,000
Mature fruit trees	\$40-\$90/tree

<sup>2</sup> Unpublished data held by the Valuation Department.

<sup>3</sup> The calculation of a capital increment is considered necessary because many people are attracted into buying orchards because of this potential gain in value.

## (iii) OPPORTUNITY COSTS:

(a) Labour. This has been calculated on what the owners could be earning had they continued in their previous occupations. Where the owners has had no 'off farm' profession, labour has been calculated at \$10,400 per year. A rent free house is also included at \$3,120 per annum. Labour contributed by a wife is also calculated at \$5.00/hour. Labour contributed by children is estimated at half the adult rate.

(b) Capital. Interest on capital invested is estimated at 12.5 per cent. This is the return on capital, before tax, that one could obtain from secured investments, for example from money invested with lawyers on first mortgage.

(iv) TOTAL NET BENEFITS: The combination of both N.F.I. and Capital increment give the total net benefits. These are the total financial benefits before payment of tax.

(v) ECONOMIC PROFIT. This is the difference between the total net benefits (N.F.I. and Capital Increment) and the opportunity costs.

## ORCHARD I

(i) Depreciation

	Current value \$	Depreciation %	Depreciation \$
Plant and equipment	17,615	10	1,761
Buildings	84,000	2	1,680
			<u>\$3,441</u>

(ii) Capital Increment

Crop	Area (ha)	\$/Ha	Total value (\$)	Capital Increment \$	Estimated Value 1979
Kiwifruit	2.02	125,000	252,500		
Citrus	1.62	57,300	92,800		
Buildings			84,000		
Total			429,300	(20%) 71,550	\$357,750
Plant & equipment			<u>17,615</u>		
TOTALS			446,915		

(iii) Opportunity Costs

Labour, owner - Professional forester at \$20,000/year.  
 wife - 35 hrs/week at \$175/week \$ 9,100  
 Total opportunity cost labour \$29,100

Capital,  
 opportunity cost of \$357,750 at 12.5% is \$44,718

## ORCHARD II

(i) Depreciation

	Current value \$	Depreciation %	\$
Plant and equipment	29,419	10	2,941
Buildings	63,000	2	1,260
			<u>\$4,201</u>

(ii) Capital Increment

Crop	Area (ha)	Value \$/ha	Total value (\$)	Capital increment \$	Estimated value 1979
Kiwifruit	4.45	125,000	556,250		
Citrus			18,480		
Headlands	1.21	35,000	42,350		
Buildings			63,000		
Total			680,080	(20%) 113,346	566,734
Plant and equipment			<u>29,419</u>		
TOTALS			709,500		

(iii) Opportunity Costs

Labour - Owner, \$10,400/year and house at \$60/week  
 is \$13,520

Wife, 1 hr/week and 2 weeks fruit  
 picking: 132 hours at \$5.00/hr 660  
 \$14,180

Capital,  
 Opportunity cost of \$566,734 at 12.5% is \$70,841

## ORCHARD III

(i) Depreciation

	<u>Current Value (\$)</u>	<u>Depreciation %</u>	<u>\$</u>
Plant and equipment	97,100	10	9,710
Buildings	94,500	2	8,890
Coolstore	50,000	4	<u>2,000</u>
			13,600

(ii) Capital Increment

<u>Crop</u>	<u>Area (ha)</u>	<u>\$/ha</u>	<u>Total value \$</u>	<u>Capital increment \$</u>	
Kiwifruit	13.75	125,000	1,718,750		
Headlands	2.01	35,000	70,350		
Buildings			<u>144,500</u>		
TOTAL			1,933,600	(20%) 322,266	1,611,334
Plant and equipment			<u>97,100</u>		
TOTALS			2,030,700		

(iii) Opportunity Costs

Labour - owner works 6 hours/day

Salary \$10,400

Rent free house 3,120

Total income \$13,520

75% income \$10,140

Capital - opportunity cost of \$1,611,334  
at 12.5% is \$ 201,416

## A P P E N D I X E

THE LIVESTOCK OPTIONS

## E.1 FARM INCOME AND COSTS:

These have been obtained, except for depreciation, from the farmers' financial accounts for the year ending 30 June 1980.

Depreciation and opportunity costs are calculated on the same basis as for the case study orchards.

## E.2 CAPITAL INCREMENT:

The capital increment in farm values during 1979/80 is calculated at 20 per cent.

The farmland price index as calculated by the Valuation Department for Tauranga County has averaged a 21.0 per cent increase per year over the past five years. In contrast the price index for dairyland and fattening land has been 12.0 per cent and 14.0 per cent per year respectively. The farms in this analysis are in favoured horticultural areas. The increases in values of these farms are not typical of similar type farms throughout the region. The average percentage increase in values has been calculated at 20.0 per cent. This percentage is not considered unrealistic. The market value of the dairy farm has increased at a compound interest rate of 26 per cent over 16 years from purchase. The market values of the farms were calculated after discussions with farmers, valuers, and land agents.

## E.3 MEAT AND WOOL PRICES (FARM GATE) AT \$ PER HEAD

Year	Lambs	Mutton	Beef cents kg	Wool cents kg
1975/76	9.52	6.42	51.9	157.1
1979/80	15.00	11.20	117.1	260.0
% increase	57	75	125	65
Increase per year over 1975/80 %	11.5	15.0	25.0	13.0

Reference: Report of the Agriculture Review Committee to the Minister of Agriculture, March 1980.

Livestock values were determined after discussions with farmers. Livestock numbers on the farms visited were representative of the previous five years. The capital increment for the livestock values was calculated on the average yearly increase in farm gate prices for livestock between 1975 and 1980. This is set out above.

The costs associated with the farm types are set out below:

FARM I (DAIRY)

(i) Depreciation

	Current value \$	Depreciation %	\$
Plant and equipment	25,000	10	2,500
Buildings	75,000	2	<u>1,500</u>
			4,000

(ii) Capital Increment and Farm Value

Estimated value 1980					Estimated value 1979
Area (hectares)	Description	\$/ha	Total value \$	Capital increment \$	
32	Flat	17,500	560,000		
16	Rolling	7,500	120,000		
	Buildings		75,000		
Total			755,000	(20%) 125,833	629,167
Plant and equipment			25,000		
Stock	\$ per head	Total value \$			
118 cows	300	35,400			
22 heifers	90	2,070			
23 calves	90	2,070	41,870	(25%) 8,374	33,496
TOTALS			821,870	134,207	662,663

(iii) Opportunity Costs

Labour, owner - \$10,400 per year

wife - \$ 5,200 per year (6 months)

house - \$ 3,120 per year

Total \$18,720 per year (1½ labour units)

Capital, opportunity cost of \$662,663 at 12.5% is \$82,832.

## FARM II (BEEF, DEER, SHEEP)

(i) Depreciation

	Current value \$	Depreciation %	\$
Plant and equipment	18,120	10	1,812
Buildings	95,500	2	<u>1,910</u>
			\$3,722

Area (hectares)	Description	\$/ hectare	Total value/ (\$)	Capital Increment (\$)	Total value (\$)
143.6	Rolling	2,471	355,000		
32.4	Rolling	3,088	100,000		
	Buildings		955,000		
Total			<u>500,500</u>	(20%) 91,750	458,750
	Plant and machinery		18,120		
<u>Stock</u>	<u>\$/Hd</u>	<u>Total value (\$)</u>			
1,400 ewes	15.00	21,000	(15%)	2,739	18,261
150 cattle	250.00	37,500	(25%)	7,500	30,000
130 deer	750.00	97,500	156,000(95%)	47,500	50,000 (deer 55)
<u>Totals</u>			<u>724,620</u>	<u>149,489</u>	<u>557,011</u>

(iii) Opportunity Costs

Labour - owner,	\$10,400 per year	
wife	6 months at \$200/week is	\$5,200
children	3 (3 weeks) at \$100/week	900
house (rent)		<u>3,120</u>
		\$19,620

Capital - opportunity cost of \$557,011 at  
12.5% is \$69,626

## FARM III (SHEEP AND BEEF)

(i) Depreciation

	Current value \$	Depreciation %	\$
Plant and equipment	18,190	10	1,819
Buildings	37,000	2	<u>740</u>
			\$2,559



(ii) Capital Increment and Farm Value

<u>Area</u> <u>(hectares)</u>	<u>Description</u>	<u>\$/hectare</u>	<u>Total</u> <u>value (\$)</u>	<u>Capital</u> <u>increment (\$)</u>	<u>Total</u> <u>value</u> <u>(\$)</u>
125	Rolling	2,965	373,000		
	Buildings		37,000		
Total			<u>409,000</u>	(20%) 68,166	340,834
	Plant and equipment		18,190		
<u>Stock</u>	<u>\$/hd</u>	<u>Total</u> <u>value (\$)</u>			
820 lambs	12.00	<u>9,840</u>		(11.5%) 1,014	8,826
1,000 ewes	15.00	15,000		(15%) 1,956	13,044
200 cattle	250	50,000	<u>74,840</u>	(25%) <u>10,000</u>	<u>40,000</u>
Total assets:			502,030	81,136	402,704

(iii) Opportunity Costs

Labour, owner - (Timber mill manager)	\$20,000	
wife 20.8 weeks at \$200/week		\$4,160
children (3) 1 day/week at \$100/week		<u>\$3,120</u>
Total opportunity cost		\$27,280
Capital, opportunity cost of \$402,704 at 12.5% is		\$50,338

## A P P E N D I X F

THE FUTURE FINANCIAL BENEFITS AND COSTS  
FROM THE REGIONS PROPOSED HORTICULTURAL PLANTINGS

## F.1 METHOD OF ANALYSIS

The financial benefits from the region's proposed plantings of Kiwifruit, avocados, and citrus are based upon an orchard unit of 6 hectares. Five and one half hectares of the orchard unit are planted. The remaining 0.5 hectares are used for farm buildings.

The annual cash flows during the life of a crop (40 years), are determined for a planted area of one hectare. These cash flows are based upon whole farm budgets calculated for each of the three crops, see pages . The capital costs of plant and equipment are included in the whole farm budgets. The annual cash balances are then discounted and the net present value (N.P.V.) is calculated for each crop.

This same approach is used to assess the income foregone on the equivalent area of agricultural land which will be planted into orchard.

## F.2 AGRICULTURAL COSTS

For the year ended 30 June 1980, the net loss of production on dairy land was assessed at \$441.00 per hectare, less wages of management at \$214.00 per hectare. This represents a net loss of \$227.00 per hectare.

The equivalent net loss of production from sheep and beef land was based upon a model farm of 150 hectares carrying a maximum of 18 stock units per hectare. The net loss was assessed at \$107.00 per hectare.

The net loss of production from maize was estimated at \$234.00 per hectare, less wages of management of \$40.00 per hectare. This represents a net loss of \$194.00 per hectare.

### F.3 SALVAGE VALUES

Existing plant, machinery, fencing, livestock, and some farm buildings will become redundant with horticultural development. The salvage values of these items have been included as a benefit. These items were assessed at \$1,293.00 per hectare for dairy land and \$692.00 per hectare for sheep and beef land.

The salvage values of the capital inputs for the horticultural crops were assessed as follows:

Kiwifruit:	Tee Bars	\$13,108/ha	Avocados	\$4,428/ha
	Pergolas	\$13,604/ha	Citrus	\$3,434/ha

### F.4 DISCOUNT RATE

The discount rate chosen is 10 per cent. It is assumed that the majority of the development finance will come from the Rural Banking and Finance Corporation of N.Z. Interest rates for the Rural Bank's development loans are currently 9 per cent. This interest rate is usually rebated to 6 per cent for the first 3 years and 7½ per cent for the second 3 years.

### F.5 LAND BEING DEVELOPED FOR ORCHARDING (1980-1983)

The proposed plantings of Kiwifruit, avocados, and citrus are shown below:

Crop	Proposed plantings (hectares)				
	1980	1981	1982	1983	Total
Kiwifruit					
Tee Bars	535	414	216	213	1,378
Pergolas	<u>331</u>	<u>256</u>	<u>134</u>	<u>131</u>	<u>852</u>
Sub total	866	670	350	344	2,230
Avocados	114	94	31	15	254
Citrus	<u>34</u>	<u>70</u>	<u>39</u>	<u>14</u>	<u>157</u>
	1,014	834	420	373	2,641

Actual plantings of crops begin in 1980. It is assumed shelter is planted in 1979, that is, in year 0. The N.P.V. per hectare for each crop is calculated with prices and costs for the year 1 July 1979/30 June 1980.

The areas of proposed plantings of Kiwifruit in Pergolas and Tee Bars have been calculated as similar to the current use of these support structures. In 1980, the area in each support structure was determined as follows:

Fencing support	Tee Bars	Pergolas	'Other'	Total
Area	1517.2	1044.9	17.3	2579.4
% area	59.5	40.5		100

Reference: Economics Division, M.A.F.

The labour requirements for 'other' types of fencing structures appear similar to Tee Bars. The area in Tee Bars and Pergolas for 1983 plantings was determined as shown:

Fencing support	Tee Bars	Pergolas	Total
Area	2978	2007	5005
% area	59.5	40.5	100

#### E.6 PRICE AND YIELD ASSUMPTIONS FOR WHOLE FARM BUDGETS. KIWIFRUIT

In the 1979/80 season, the price per export tray to the grower was \$7.87. The price for local market fruit was estimated at \$750 per tonne. Kiwifruit gross revenue is calculated with a weighted price based upon the percentage of export and local market fruit together with the yield assumptions made below:

Year:	4	5	6	7	8	9	10	40
Production tonnes per hectare:								
Pergolas	2.5	6.6	9.3	13.1	17.8	21	22	22
Tee Bars	2	6	8.5	12.5	17	20	21	21
% export	50	50	60	80	90			90
% local	50	50	40	20	10			10
Price/tonne (\$)	1437.5	1437.5	1,575	1,850	1987.5			1987.5
Gross revenue \$								
Pergolas	3,593	9,487	14,647	24,235	35,377	41,737	43,725	43,725
Tee Bars	2,875	8,625	13,387	23,125	33,787	39,750	41,737	41,737

CITRUS

The price per tonne is \$277.00. This is based upon \$6.00 per bushel for fresh market and \$2.65 per bushel for process. Seventy per cent of the crop is sold as fresh market fruit, i.e. auction, gate sales, mail order, and 30 per cent as process. Citrus gross revenue is calculated using the yield assumptions below:

Year:	3	4	5	6	7	8	9	10
Production Tonnes per hectare	2.08	7.28	12.48	17.68	22.88	29.12	35.36	35.36
Gross revenue (\$)	576	2,016	3,456	4,897	6,337	8,066	9,794	9,794

AVOCADOS

In the 1979/80 season, the average export price per tray to the grower was \$32.00. This price is not expected to be maintained as production increases. Prices used are \$16.00 per export tray, and \$7.00 per tray for local market fruit. Avocado gross revenue is calculated using the price and yield assumptions below: (one tray is equal to 5 kilograms).

Year:	4	5	6	7	8	9	10	11
Production Tonnes per hectare	2	4	5	6	8	8	10	10
% export	50	50	80	90	90	90	90	90
% local	50	40	20	10	10	10	10	10
Price/ tonne (\$)	2,300	2,480	2,840	3,020	3,020	3,020	3,020	3,020
Gross revenue (\$)	4,600	9,920	9,920	14,200	18,120	24,160	30,200	30,200

References: M.A.F.  
N.Z. Fruit Growers Association

Table F.1

## COST OF CAPITAL INPUTS ASSOCIATED WITH WHOLE FARM BUDGETS

Kiwifruit					Avocados and Citrus				
Item	Year of Purchase	Total cost \$	Life in years	Salvage values per hectare (\$)	Item	Year of purchase	Total cost \$	Life in years	Salvage values per hectare (\$)
Shed	0	5,250	30	554.1	Shed	0	5,250	30	554.1
Trailer	0	400	25	24	Trailer	0	400	25	24
Tractor	1	6,000	15	333.3	Tractor	1	6,000	15	333.3
Tractor	5	8,500	15	849	Tractor	5	8,500	15	849
Mower	1	1,800	12	200	Mower	1	1,800	12	200
Weed sprayer	1	200	16	16.6	Weed sprayer	2	200	16	20.8
Crop sprayer	3	5,500	15	427	Crop sprayer	1	2,000	15	111
Tools	1	300	15	16.6	Tools	1	300	15	16.6
	2	300	15	20		2	300	15	20
	3	300	15	23.3		3	300	15	23.3
Fuel tank	1	120	25	8	Fuel tank				
Forklifts	4	3,000	25	260	Forklifts	3	3,000	25	240
Spreader	3	800	15	61.8	Spreader	3	800	15	61.8
					Diptank	3	150	15	11.6
Packing shed	6	30,000	40	625	Packing shed	5	10,000	40	166.6
Coolstore	6	40,000	30	5,555.4					
Grader	6	12,500	25	1,250	Grader	5	4,000	25	373.3
Ancillary	6	5,000	15	555.5	Ancillary	5	3,500	15	349.3
Forklift	6	5,000	25	500					
Bins (20)	6	800	15	88.8	Bins (10)	3	400	15	31.1
(20)	8	800	15	106.6	(10)	5	400	15	39.9
		<u>126,570</u>		<u>11,475/ha</u>	Total (\$)	Citrus	<u>47,420</u>		<u>3,434/ha</u>
Fence	1	1,725	30	1,054.16					
Tee Bars	2	904	30	579	Avocados:				
Pergolas	2	1,675	30	1,074.79	Crop Sprayer	1	5,500	15	305.5
Kiwifruit Tee Bars				13,108/ha	Ladder	8	6,000	15	800
Pergolas				13,604/ha	Total (\$)		<u>56,920</u>		<u>4,428/ha</u>

Table F.2

WHOLE FARM BUDGET: KIWIFRUIT ESTABLISHMENT AND COSTS FOR PERGOLAS IN 1979/80 \$'s PER HECTARE

Year	0	1	2	3	4	5	6	7	8	9	10 → 40
Shelter establishment	385										
Land preparation		130									
Fence construction		1,725	1,675								
Vine planting		731	20								
Fertilizer	34	242	239	130	121	121					
Handiwork around vines		304	304	152	152	101	51				
Mowing		92	92	92	92	92					
Weed spraying		175	175	175	175	175	92				
Training and pruning		210	525	700	875	1,050	1,260	1,680	1,820	2,275	
Pest and disease control				121	207	299	413				
Bee hire						120	180	240			
Administration	450	450	500	500	600	600	700	700	800		
Repairs and maintenance		100	150	200	300	300	400	400	500		
Harvesting					122	324	384	470	639	669	701 →
Packing and Coolstorage					675	1,782	1,929	3,627	5,549	6,547	6,859 →
CASH COSTS \$	869	4,159	3,680	2,070	3,319	4,964	5,622	7,886	10,317	11,800	12,144 →
Capital inputs per Ha	941	1,403	50	1,100	500	1,416	15,550		133		
TOTAL CASH COSTS \$	1,810	5,562	3,730	3,171	3,819	6,380	21,172	7,886	10,450	11,800	12,144 →
GROSS REVENUE \$					3,593	9,387	14,647	24,235	35,377	41,737	43,725 →
NET REVENUE \$	-	1,810	5,562	3,730	3,171	266	6,525				
+						3,107		16,349	24,927	29,937	31,581 →



Table F.3

WHOLE FARM BUDGET: KIWIFRUIT ESTABLISHMENT AND COSTS FOR TEE BARS IN 1979/80 \$'s PER HECTARE

Year	0	1	2	3	4	5	6	7	8	9	10 — 40
Shelter establishment	385										
Land preparation		130									
Fence construction		1,725	904								
Vine planting		731	20								
Fertilizer	34	242	239	130	121	121					
Handiwork vines		304	304	152	152	101	51				
Mowing		92	92	92	92	92					
Weed spraying		175	175	175	175	175	92				
Training and pruning		210	350	350	437	525	630	840	910	1,138	
Pest and disease control				122	207	299	413				
Bee hire						120	180	240			
Administration	450	450	500	500	600	600	700	700	800		
Repairs and maintenance		100	150	200	300	300	400	400	500		
Harvesting					98	293	351	449	611	637	669
Packing and coolstorage					540	1,620	1,767	3,464	5,300	6,235	6,547
CASH COSTS \$	869	4,159	2,734	1,721	2,722	4,246	4,797	6,862	9,130	10,319	10,663
Capital inputs per Ha	941	1,403	50	1,100	500	1,416	15,555		133		
TOTAL CASH COSTS \$	1,810	5,562	2,784	2,821	3,222	5,662	20,347	6,862	9,263	10,319	10,663
GROSS REVENUE \$					2,875	8,625	13,387	23,125	33,787	39,750	41,737
NET REVENUE \$	-	1,810	5,562	2,784	2,821	347		6,960			
+						2,963		16,263	24,524	29,431	31,074

Table F.4

## WHOLE FARM BUDGET: AVOCADO ESTABLISHMENT AND COSTS IN 1979/80 \$'s PER HECTARE

Year	0	1	2	3	4	5	6	7	8	9	10 —→ 40
Shelter establishment	480										
Land preparation		130									
Tree planting (218)		7,253	200								
Fertilizer	34	241	238	130	121	121					
Handiwork trees		91	17	17	17	17					
Mowing		92	92	92	92	92					
Weed spraying			175	175	175	175	175	92			
Training and pruning			18	18	35	52	70	70	105		
Pest and disease control				229	229	423	634	634	846		
Administration	450	450	500	500	600	600	700	700	800		
Repairs and maintenance		100	150	150	200	200	300	300	400		
Harvesting					120	240	227	272	293	293	366 →
Grading and packing					440	876	1,085	1,297	1,728	1,728	2,160 →
CASH COST \$	964	8,358	1,390	1,311	2,029	2,796	3,421	3,595	4,494	4,494	5,000 →
Capital inputs per Ha	941	2,286	83	775		4,400			1,000		
TOTAL CASH COSTS \$	1,905	10,644	1,473	2,086	2,029	7,196	3,421	3,595	5,494	4,494	5,000 →
GROSS REVENUE \$					4,600	9,920	14,200	18,120	24,160	24,160	30,200 →
NET REVENUE \$ -	1,905	10,644	1,473	2,086							
+					2,571	2,724	10,779	14,525	18,666	19,666	25,200 →

Table F.5

## WHOLE FARM BUDGET: CITRUS ESTABLISHMENT AND COSTS IN 1979/80

Year	0	1	2	3	4	5	6	7	8	9	10→40
Shelter establishment	606										
Land preparation		130									
Tree planting (1400)		6,386									
Fertilizer	34	229	238	222	167	157					
Handiwork trees		490	81	81	81	81					
Mowing		92	92	92	92	92					
Weed spraying			175	175	175	175	175	92			
Training and pruning			18	28	56	84	112	112	112	168	
Pest and disease control		166	166	166	309	309	463	463	618		
Administration	450	450	500	500	600	700	700	700	800		
Repairs and maintenance		100	150	150	200	200	300	300	400		
Harvesting				76	266	400	566	653	831	1,009	
Grading and packing				169	592	1,015	1,439	1,861	2,368	2,875	
CASH COSTS \$	1,090	8,043	1,420	1,659	2,538	3,113	4,085	4,511	5,607	6,292	
Capital inputs per ha	941	1,703	83	775		4,400					
TOTAL CASH COSTS \$	2,031	9,746	1,503	2,434	2,538	7,513	4,085	4,511	5,607	6,292	
GROSS REVENUE \$				576	2,016	3,456	4,897	6,337	8,066	9,794	
NET REVENUE \$ -	2,031	9,746	1,503	1,858	522	4,057					
+							812	1,826	2,459	3,502	

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