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THE GEOGRAPHY OF SMALL RURAL FARMLETS:
A CASE STUDY OF THE HAWKES BAY RURAL 'B' ZONE

A thesis presented in partial
fulfilment of the requirements
for the degree of
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ABSTRACT

A major problem confronting geographers and town planners today, is the outward expansion of urban areas onto good agricultural land. One factor emerging from the impact of urban expansion on rural land, is the development of a number of small size farmlets on the rural/urban interface. Most of the available literature on this topic is American and is based to some extent on von Thunen 'rings' of land-use around an urban area.

This study is based in the Hawkes Bay Rural 'B' Zone - an area surrounding the expanding urban centres of Napier and Hastings and refers to small rural farmlets between 0.8 and 10.0 hectares in area.

It was found that 1984 small rural farmlets exist on the 34 400 hectare study area. From this a 20 percent random sample amounting to 392 farmlets was made and a questionnaire relating to the geography of these farmlets drawn up and sent to the sample. The study looked at the social geography of the farmlets, their occupiers, as well as at land-use activities and patterns.

It was found that the smaller size properties were located nearer to the urban areas than their larger counterparts and that the majority of farmlets are located around the periphery of the urban areas. Analysis showed that those living on the farmlets enjoy the same day-to-day services and facilities of their urban counterparts but also enjoy the benefits associated with living in a rural environment even though they do incur higher transport costs than those living in urban areas.

Only 20 per cent of those living on their farmlets earned their living working their farmlets full-time. The majority of the others had occupations unrelated to their farmlets, in the urban centres and were classified as part-time farmers. Even so, it was noted that a wide variety of land-uses was undertaken on the farmlets. A table of intensity of land use was drawn up. From this it was found

that although the intensity of use was greater than other areas studied in New Zealand, (Manawatu - Chiu, 1975 and Taupo - Crawford, 1977) there was still a reduction in intensity for the rural 'B' zone. Intensity of use was found to be related to the size of farmlet and the occupation of the farmlet owner. From this a pattern of land-use was noted. Finally it was concluded that a new phenomenon in land ownership in the Hawkes Bay is occurring; one of 'rural-urbanization'.

INTRODUCTION

Man and land are the two essential elements of human geography. The way man uses land is a visible representation of the relationship between man as a cultural and economic being and his environment. Any changes in the way man uses his land are expressions of changes in that relationship.

Throughout the world the growth of cities and their spread into surrounding rural land is continuing and as such, problems raised by the conflict and co-operation between agriculture on rural land and urban growth are not unique to any one city or country. This phenomenon of urban accretion on rural land is of special significance to New Zealand, for rural land is the basic resource of this nation. On rural land is built the foundations of New Zealand's economy and our standard of living.

Surprisingly little is known about this finite and precious resource. Geographers and town planners have begun to study this phenomenon for it is a process which is both affecting and altering the characteristics of the environment. Problems resulting from the rural/urban fringe and rural subdivisions have provided the basis for a good deal of discussion, particularly amongst American writers.

It is of interest to see whether the patterns of land-use found around North American cities are to be found in New Zealand. To this end, the Hawkes Bay Rural 'B' Zone surrounding the expanding cities of Napier and Hastings provides an excellent setting to study an area where a wide variety of land uses are being carried out on small rural properties within a 16 km radius of Napier and Hastings. This study sets out to explore the geography of these small rural properties (0.8 - 10.0 hectares), to isolate any pattern of land use found and to relate this pattern to the literature available.

CHAPTER I

REVIEW OF LITERATURE

Location theory has narrowly been defined as a normative theory of optimal locations of individual manufacturing plants, or quite broadly, as a body of theory aimed at explaining individual locations as well as location and landuse patterns of all human activities. It has concentrated on particular types of land-use - agricultural, residential, industrial and central place. These types of land-use have been studied separately and the interface between these different types of use has been comparatively neglected. The pattern of land use resulting from competition between different uses has been treated descriptively by Burgess (1929), Hoyt (1939) and Harris-Ullman (1945), but the process determining this pattern has not been extensively explored.

One area of competition which has been causing increasing concern is the urban/rural fringe, where resulting industrial and central place uses are competing with agriculture. Again there have been many descriptive studies - Best (1977), Best and Champion (1970) in Great Britain - but these studies contain little explanation of the process of change of these competing land uses.

No single factor relating rural land use to proximity to urban areas can adequately explain the complicated patterns of landuse that exist today. Over the years a number of factors have been identified which collectively provide an understanding and explanation of the variation of land use in rural areas close to urban areas.

One of the most important of these factors according to Sinclair (1977) is urban expansion, for as cities grow they expand out into the adjacent rural land. Urban expansion is not entirely due to a natural increase in the population but due to the phenomenon of urbanisation. For example, 'urban drift' (or the movement of population away from rural areas and small settlements towards the ever growing cities and their surrounding suburbs) is common to most industrialized

countries and has been clearly observable in New Zealand censuses since 1926, (see Table 1), such that in 1976 eighty-three percent of New Zealanders lived in communities/towns/ cities with populations in excess of one thousand.

The impact of urban expansion is felt in two principle ways:

(1) rural land is lost to housing development in the face of the outward extension (or sprawl) of the urban area, and

(2) the demand for agricultural produce is increased which in turn stimulates the establishment of a variety of intensive agricultural enterprises serving the urban area, such as market gardens.

The conversion of rural land to urban use is far more extensive than that for housing alone. It involves the related phenomena of schools, roads, storage and warehouse facilities, industrial uses, shopping centres, water and sewage extensions and facilities plus numerous more.

Several studies have been made of the loss of rural land to urban and other uses. Best (1977) has pointed out that since 1945, there has been an average agricultural land loss of 15 600 hectares per year in England and Wales. There are several reasons for this, the most important constraint being the new planning legislation after 1947. While one would have expected that losses to agricultural land would have increased, actual losses were highest between the two wars with about 24 500 hectares lost between 1927 and 1928 between 1938 and 1939 (Figure 1).

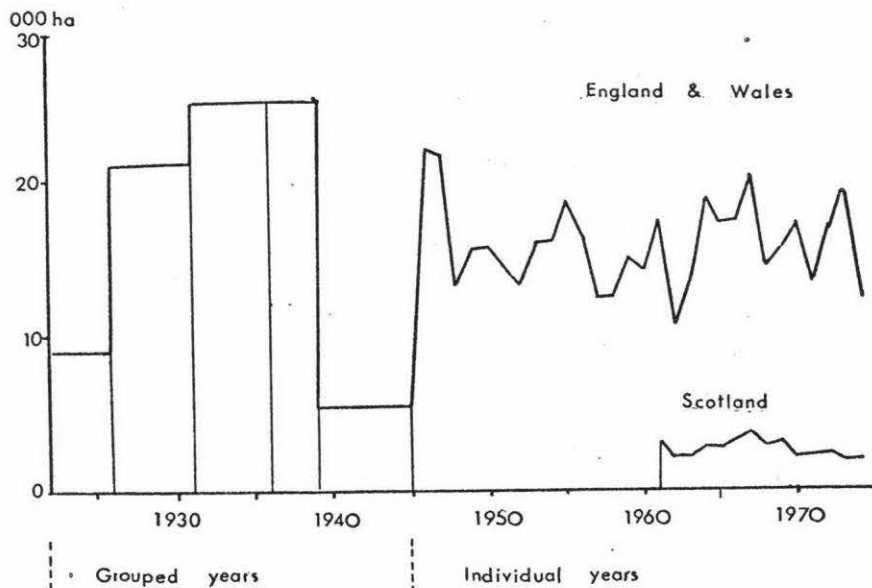
In the United States, estimates for land loss to urban use vary considerably, but the figure is certainly over 400,000 hectares per year and is accelerating fast (Clawson, Held, and Stoddard, 1960). An important factor in explaining suburban expansions is the preference of suburban families for horizontal rather than vertical living. In New Zealand for example a 'quarter acre' town section is the norm that New Zealanders' have been conditioned to accept as an average section size. With a tradition of low density living, both in New Zealand and

TABLE I
URBAN - RURAL POPULATION OF NEW ZEALAND
FOR CENSUS PERIODS 1962 - 1976

CENSUS	URBAN	RURAL
	% POPULATION	% POPULATION
1926	67.2	32.8
36	67.2	32.8
45	71.7	28.3
51	73.2	26.8
56	74.3	25.7
61	76.7	23.3
66	79.6	20.4
71	82.0	18.0
76	83.0	17.0

Source 1976 Census of
 Population and
 Dwellings Vol 1 A

FIGURE 1
LOSSES OF AGRICULTURAL LAND TO URBAN USE



Source: Best, R.H. (1977) Agricultural land loss - myth or reality pg. 15

TABLE 2
POPULATION DENSITY PER SQUARE KILOMETER (1975)

<u>YEAR 1975</u>	<u>POPULATION</u>	<u>SURFACE AREA (Km²)</u>	<u>DENSITY PER Km²</u>
World	3,967,000,000	135,830,000	29
Europe	473,000,000	4,937,000	96
Nth America	561,000,000	42,082,000	13
New Zealand	2,862,631	268,676	11

Source: United Nations Demographic
 Yearbook 27th Ed. 1975

the United States, the loss of land to urban uses is considerably higher per annum in proportion to the population than is experienced in Europe (Table 2). On the other hand, because of the size of the United States, it is only around the major metropolitan areas, particularly on the east coast that rural land loss is considered seriously as a loss. A similar situation occurs in New Zealand, as the majority of the population, 83 percent, live in urban areas on 1 percent of the land area. However, the rate of urbanization is quite rapid, as the area of urban land increased by about 65 percent between 1960 and 1970. Of the total area urbanised, about 37 percent consists of soils of high value for food production. Although the overall loss of good land is not in itself considerable, the limited areas of good agricultural land in New Zealand make the loss important, as the supply of good agricultural land is not inexhaustable and is a major resource on which New Zealand's presence and future depends.

The outward expansion of urban areas has come under the heading of 'Urban Sprawl and Speculation' in many studies due to the disjointed nature of this outward expansion in most cities. Harvey and Clark (1965) described urban sprawl as consisting of 'areas of essentially urban character located at the urban fringe, but which are

scattered, or strung out, or surrounded by, or adjacent to undeveloped sites or agricultural sites...'

Urban sprawl occurs in three major forms:

- (1) Low density continuous development
- (2) Ribbon development sprawl - (this is composed of segments compact within themselves, but which extend axially and leave the interstices underdeveloped.
- (3) Leap-frog sprawl - (where the more accessible land is not developed, and/or where the greatest capital expenditure is required to provide total urban services of the time of development.

Harvey and Clark (1965) point out that there are three main causes and catalysts of sprawl.

(a) The physical terrain alters the developmental pattern of sprawl, in that it tends to utilize land which is the most readily and economically available (ie: the effects of mountains, oceans, rivers, underground deposits of minerals and so on).

(b) By virtue of individuality of the decision making process among monopolistic competitors who act independently and without collusion in location decisions.

(c) Speculation is clearly encouraged by both rural and urban interests. Farmers often welcome the advance of the urban periphery because it enables them to sell their land at prices far in excess of agricultural values, and to re-invest the capital in improved farm structures and land development elsewhere, or to retire living on the interest from re-invested capital. On the other hand the presence of urban capital owned by city business interests also stimulates the closer subdivision of rural land for speculation purposes. Harvey and Clark (1965) refer to speculation as 'a motivation of the growth process. All incremental additions to the urban fringe are speculative ventures. The independence of placement and timing of these ventures permits a sprawl pattern. It is the lack of co-ordination of the decision to speculate which produces sprawl and not the speculation itself.'

Sprawl has been decried because of the high costs

it is thought to impose on its occupants and society in the extension and development of capital, social and service facilities, namely the provision of roads, railways, rubbish tips, recreational facilities, public transport, schools, libraries, hospitals, fire and police stations, plus the supply of water, gas, electricity, telephone and sewage facilities. Just how much do these capital, social and service facilities cost, and what benefits accrue to the occupants of these areas and society? The validity of the answers to these questions is suspect, in that one is trying to apply a static measure to a dynamic process. That is, a static or very short-run view on urban development permits an exaggeration of development costs per unit, when costs may in fact be modest on a unit basis, once the development is viewed as a complete entity. Therefore there is a need for the following questions to be answered:

- (a) What is the immediate cost of development to the occupants and society?
 - (b) What is the time period for the completion of the development?
 - (c) What is the ultimate number to be served?
- and (d) What is the cost per unit?

In New Zealand there have been cost-benefit studies applied to various urban developments. J.T. Wards' (1965) analysis of a development project of 10 percent flats and 90 percent detached houses was compared with a project for 58 percent flats and 42 percent detached houses. The analysis included costs of land purchase and development, construction of buildings, the provision of basic services (water, sewage, electricity, telephone), loss of commercial gardening land, gains from house gardens, commuting costs, road and traffic problems, use of central facilities and local body effects. After analysis it was found that the higher density settlement was the lower cost strategy because savings in size of units and service costs for high density housing out-weighed their high per-foot construction.

A comparison of urban and rural use of the same piece of land, in which the net agricultural produce loss would be

compared with the value of services rendered to potential house owners, can be seen in table 3.

TABLE 3
BALANCE SHEET OF DISCOUNTED COSTS AND BENEFITS

<u>Participant</u>	<u>Costs</u>	<u>Benefits</u>
Farmer	Lost net product	Sale of land
Developer	Purchase of land and development	Sale of existing buildings and developed sections
Builder	Building	Sale of houses
Resident	Purchase of section and house	Value of services derived
	—————	—————
	TOTAL COSTS	TOTAL BENEFITS

Source: Donavan, W.G., 1966; Economic Aspects of Urban Development, with special Reference to the Conversion of Land from Agricultural to Urban use. M.Agr.Sc., Thesis Lincoln.

It has been contended that discontinuous development can lead to an efficient allocation of resources even though the costs of this form of development are high. Ohls and Pines (1975) demonstrated that discontinuous development may be beneficial to society in that resources can be allocated efficiently, as there may be a trade off between living space and accessibility, in that the development of retail and commercial services near the urban fringe must often await the development of markets large enough to exhaust economies of scale and that high speculative prices discourage premature development and thus reserves land

for its more productive uses. Sprawl occurs, in fact because it is economic in terms of the alternatives available to the occupants.

Poor administration or the absence of public administration, not sprawl, may produce costs to society which might properly be borne by the individual. For example, urban authorities near the fringe of development may want to see rural land developed for urban purposes for the following reasons. (McIntyre (1974) p 214)

- '1. Increased revenue from rates;
2. Increase in facilities including schools, etc;
3. More people using the commercial centre;
4. Prestige from having above average growth rates.

This results in land adjacent to existing urban areas within individual local authority boundaries being developed without consideration of alternatives and often without overall planning guidance.'

It has been suggested that 'the optimal rate of land development can be ensured by land speculation. An efficient allocation of resources can be achieved by market competition, the speculative price reflecting the future profitability. This withholding of land potentially productive in the future by the speculative price, in fact discourages premature development.' (Harvey and Clark (1965) p. 4). At the same time it must be remembered that urbanization is in large part inevitable and that urban capital has far superior buying power than rural capital due to its more intensive use.

The problems of ribbon development and urban sprawl have not gone un-noticed, as various governments have introduced regulations such that 'controls' have been placed on the free operation of the economic system. In NZ these controls are:

- (a) The Town and Country Planning Act 1953;
- (b) The Counties Amendment Act 1961;
- (c) The Town and Country Amendment Act 1973.

There are numerous amendments to the 1953 Act, all of which together with the 1953 act are now replaced by the Town and

Country Planning Act 1977.

These Acts deal with the general environmental effects of urban development and directions are also laid out for the protection of good agricultural land. In particular, Planning authorities are to provide for:

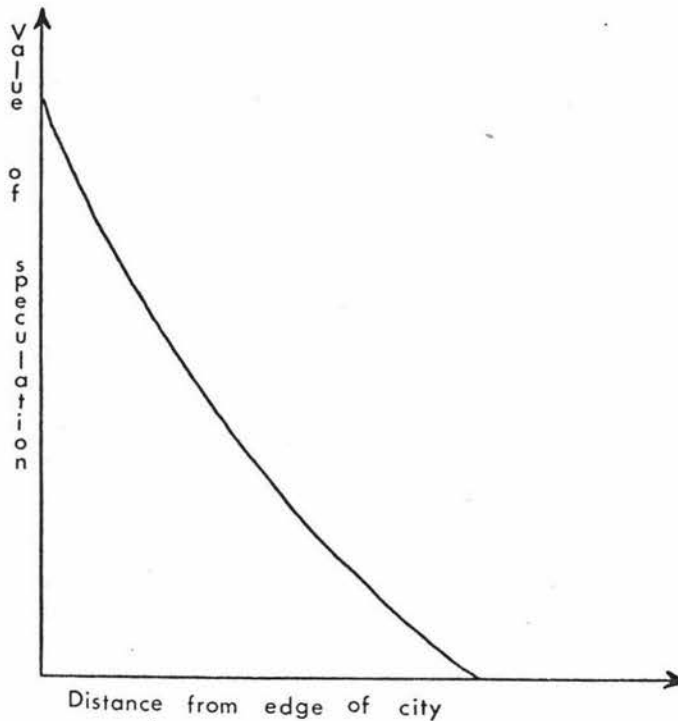
- '(b) The avoidance of encroachment of urban development on, and the protection of, land having a high actual or potential value for the production of foods.
- (c) The prevention of sporadic urban subdivision in rural areas.' (Town and Country Amendment Act 1973 'Matters of National Importance' 2.B)

The Act and its amendments may have sufficient powers to influence the direction of development in a given situation. However, there are locational limits on what is practical as well as economic limits. Society would not want to preserve farm land at all costs, but it might be willing to pay some of the cost of preserving land in agricultural use rather than have it all swallowed up by urban development. This requires an assessment of the alternative sites available for further urban development. This has been partially discussed on page 7.

Even with these governmental 'controls' on the development of rural land, land use and values can be expected to increase with proximity to an urban area as land value is dependent on land use.

Variables that affect this relationship include, future urban values, the timing of future development, acceptable returns from investment, that is, a reflection of the degree of certainty of future urban development. A theoretical urban-speculative-value decay function is illustrated in Figure 2.

FIGURE 2

THEORETICAL URBAN-SPECULATIVE-VALUE DECAY FUNCTION

Source: Found, W.C. 1971: A Theoretical Approach to Rural Land-Use Patterns p. 76.

This distance-decay function is similar to the concepts used by von Thunen (1826) and Alonso (1960) in their models on the spatial analysis of agricultural and urban rent in location models. It has been said that 'explicit consideration of the spatial dimension of the economy and its subsystem began with Von Thunen (1783-1850)', (Hurst, 1972 pg 106) with his work on agricultural land use patterns near 'urban areas' and the forces which determine those patterns. Von Thunen's method of approach was to establish the agricultural produce needed within the urban market and the controlling factors of its production, which need not necessarily be transport costs and to show the effects of these controls on the economy and the pattern of differentiated agricultural production. Economic rent is the 'income that accrues to a farmer growing a particular crop over and above that which he could expect by growing

that crop at the margin of production. The margin being defined by the extra transport costs, which at increasing distance from the market eventually add so much to the price of the produce grown that the market price is less than the production costs plus transport costs.' (Tarrant 1974, p 22)

Von Thunen considered the relationships of the three following factors:

- (1) The distance of the farms from the market
- (2) The prices received by farmers for their goods
- and (3) Economic rent

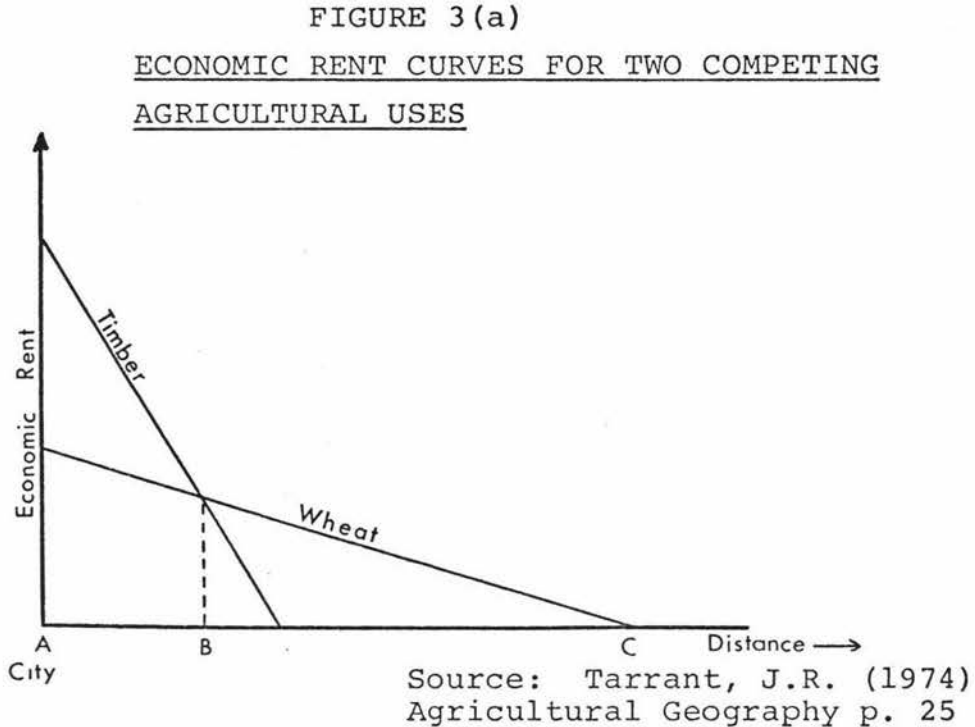
with the following seven basic assumptions:

- '(1) There is an "isolated state" consisting of one market city and its agricultural hinterland.
 - (2) This city is the market for surplus products from the hinterland and receives products from no other areas.
 - (3) The hinterland ships its surpluses to no other market except the city.
 - (4) There is a homogenous physical environment, including a uniform plain around the city.
 - (5) The hinterland is inhabited by farmers who wish to maximize their profits, and who adjust automatically to the market's demands.
 - (6) There is only one mode of transport - the horse and waggon (1826)
 - (7) Transportation costs are directly proportional to distance, and are borne entirely by the farmers who ship all produce in a fresh state.'
- (Hurst, 1972, p 106)

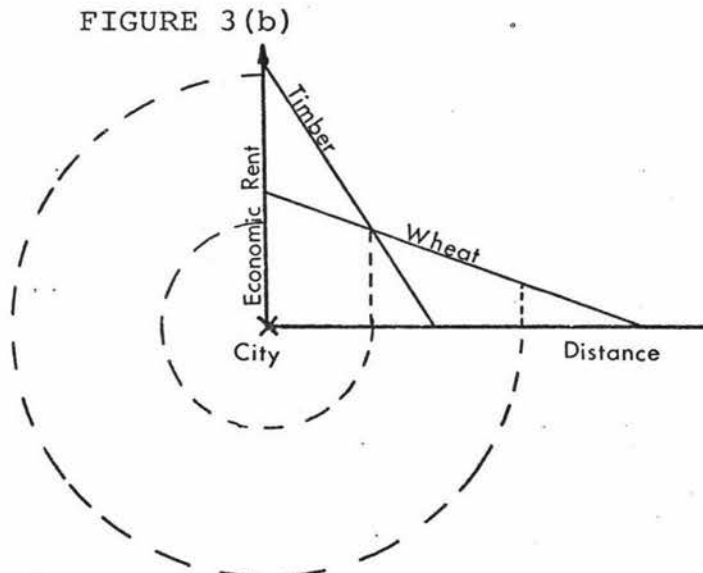
Von Thunen's theory implies that if transport costs rise, the margins will move closer to the city and crops will either have to be grown more intensively to produce enough for the market from the smaller area, or the price of the crop will have to rise to allow the original area to be used.

With competing crops, a decline in economic rent with distance will not be the same in all cases. The gradient will depend on transport costs per hectare of the

agricultural produce. Therefore crops which yield high bulk per unit area will incur high transport costs. Figures 3 (a) and (b) show the economic rent curves for timber and wheat in a von Thunen economy.



In Figure 3(a) the economic rent for timber is highest between A and B, while that for wheat, is highest between B and C: If the graph is rotated through 360 degrees, the areas of land devoted to timber and to wheat appear as concentric circles (Figure 3(b)).



Source: Tarrant, J.R. (1974) Ibid
p. 25

Further emphasis on the transport dimension of von Thunen's theory, is the problem of perishability of the goods produced. For where deterioration is rapid, there is a great gain from being close to the market because spoilage is reduced or eliminated. Consequently perishable goods yield an economic rent which declines very sharply as the distance from the market increases, much more sharply than for other products; therefore they tend to be located near the consuming centre.

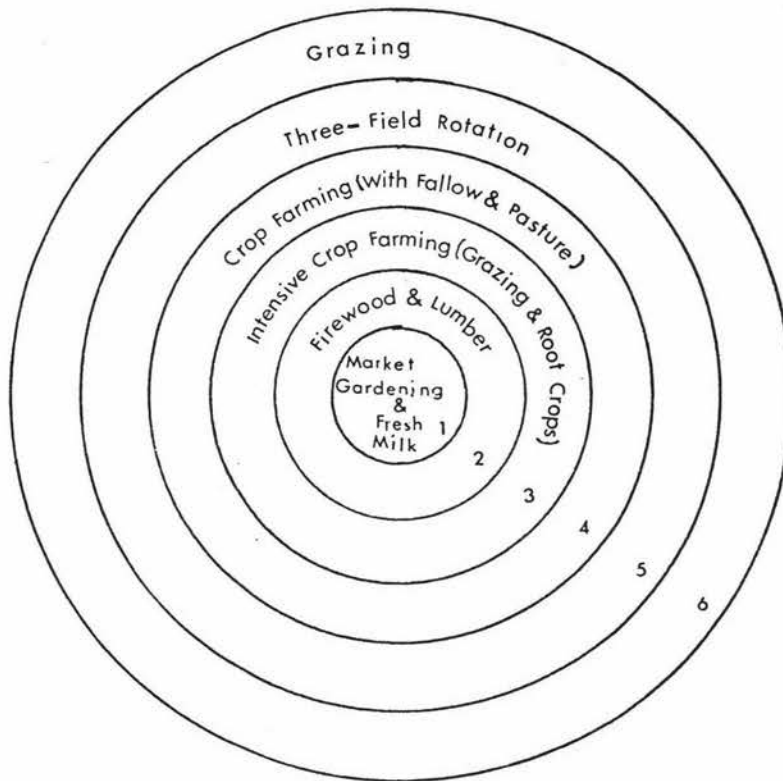
To add a further dimension to von Thunen's theory one can consider the effect of altering production costs, i.e.; by varying the level of inputs - such as fertilizers - to a considerable extent. By the 'law' of diminishing returns, each successive increase of inputs yields a smaller increment of production than the last. Under such conditions, if we move towards the market from a distant place, it becomes worthwhile to intensify production, in so far that savings in transport costs compensate for higher production costs. There is therefore a spatial distribution of farming systems as well as of products. Generally - but not exclusively - those systems which have large inputs of manure, labour etc, are found near the market and the extensive ones further away, such that one would expect most cities to have pockets of intensive agriculture on their urban periphery.

Under these conditions a different crop is substituted as transport costs rise, so that bulk yield per acre falls with distance.

As well, different methods of production may be substituted for transport costs, such that as transport costs increase, the costs of various inputs are decreased. 'By the reduction of inputs, yields and therefore transport costs per hectare are reduced. In this way the economic rent for extensive production, although starting at a lower level, falls much less steeply than for intensive production of the same crop. To illustrate this, von Thunen used three separate arable systems, growing the same crops, but under different systems of intensity, which occurred in three concentric zones.' (Tarrant, 1974, p. 26).

Bringing together the two systems of substitution of crops and substitution of degrees of intensity of production for transport costs, the full pattern of land use proposed by von Thunen is arrived at. (Figure 4).

FIGURE 4
SEQUENCE OF LAND-USES IN VON THUNEN LANDSCAPE



Source: Sinclair, R.J. (1967):
Von Thunen and Urban Sprawl
A.A.A.G. 57:1 p 77

In his analysis of the urban land market, Alonso uses 'concepts which fit with agricultural rent theory in such a way that urban and rural land uses may be considered all the same time, in terms of a single theory.' (Alonso, 1960, p. 150). The concentric zoning of agricultural production around the urban centres can be explained best in Alonso's words.

- '1. Land uses determine land values, through competitive bidding among farmers;
2. land values distribute land uses, according to their ability to pay. This ability depends

upon the level of location rent accruing to a particular product at a particular location with respect to the market.

3. The steeper rent curves capture the central locations, in other words, those products that have most to gain by locating near the market and the most to lose by being further away.

Abstracting the process from agriculture, we have:

1. for each user of land, a family of bid rent functions is derived, such that the user is indifferent to his location along any one of these functions;
2. the equilibrium rent at any location is found by comparing the bids of the various potential users and choosing the highest;
3. equilibrium quantities of land are found by selecting the bid rent curve for each user, whether it be in an agricultural, business, residential setting or so on.' (Alonso, 1960 p 151)

The steeper curves (bid rent curves, - which are very similar to economic rent curves as they reflect the rent over and above that paid at the margins which can be offered for a piece of land) will occupy the more central locations. 'Therefore if the curves of the various users are ranked by steepness, they will also be ranked in terms of their accessibility from the centre in the final solution. Thus, if the curves of the business firm are steeper than those of the residences, and the residential curves steeper than the agricultural, there will be business at the centre of the city, surrounded by residences, and these will be surrounded by agriculture.

This model and von Thunen's model represent a basis for locational analysis of urban and rural land markets and use. Does von Thunen's model apply to present day land use trends and patterns? There are those like Clark (1951) who reach the conclusion that von Thunen's theory was only relevant to a horse economy, but there are others like

Chisholm (1962) who regard von Thunen's work as a method of approach to a difficult subject, rather than a model to which all farming systems must approximate.

Von Thunen's model, unlike most deterministic models, is a method of study based on what happens to land use as demand grows in a central market, has a dynamic element and can be applied to situations of rapid and world wide change with considerable success. Although the specific assumptions made by von Thunen can be questioned or altered, the model can be shown to have value in organising methods of approach to the study of large - or small - scale agricultural distributions and it has formed the basis of many such studies since its inception in 1826.

Von Thunen's ideas have been extended to form a more general rent theory as Alonso (1960) has done with his Urban Land Market. Others like Garrison and Marble (1957), have adopted a normative approach to this type of general theory when they say,

'for every spatial location there is some jointly optimum intensity of land use, type of land use and groups of markets, the selection of which by agricultural entrepreneurs leads to spatially ordered patterns of land use.' (Ibid p. 4)

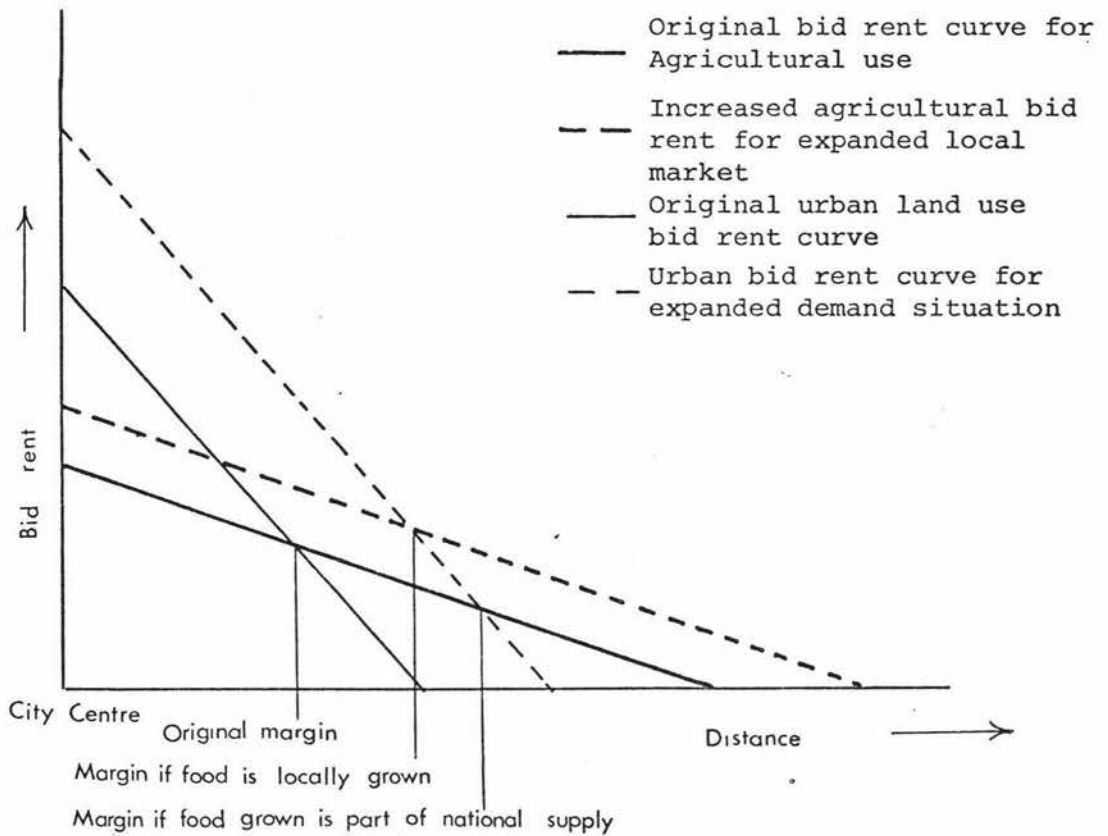
This has much in common with industrial location models of least cost, or maximum profit type.

As expansion pre-supposes that land will be available in the future in sufficient quantity for intending purchasers, von Thunen's agricultural land-use model shows us that the land into which an urban areas expansion will take place will be in some form of intensive production. It would be expected that some level of resistance to its use for urban expansion would be met. The competitive situation between agricultural land use and urban land use is described by Muth (1961) in terms of an expanded von Thunen model. On the one hand there is rapidly increasing demand for urban land and on the other there is an industry producing goods in a very inelastic demand situation. In this situation the demand for urban land use must be more flexible than

that for agricultural use. Consequently urban land will win the competition. Because of the different rent gradients of urban and rural land use, Muth calculates that increased demand for housing will have to be at least 1.4 times that for food to move the urban margin outwards (see Figure 5).

FIGURE 5

BID RENTS FOR URBAN AND RURAL
LAND-USES ON CITY MARGINS

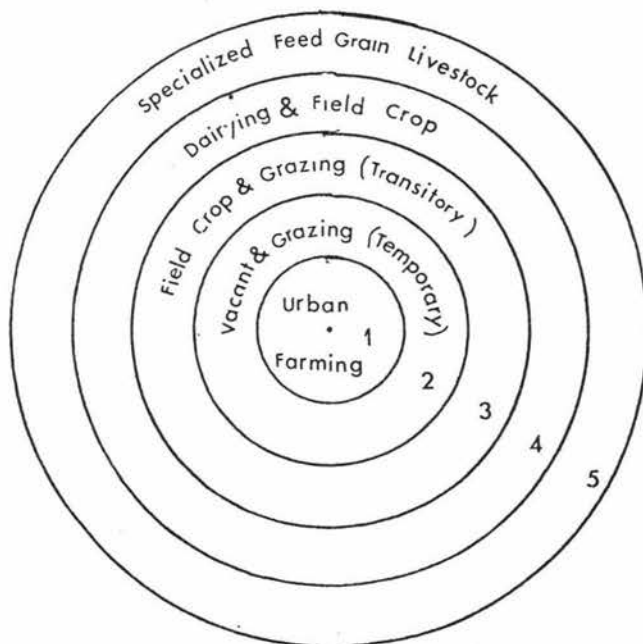
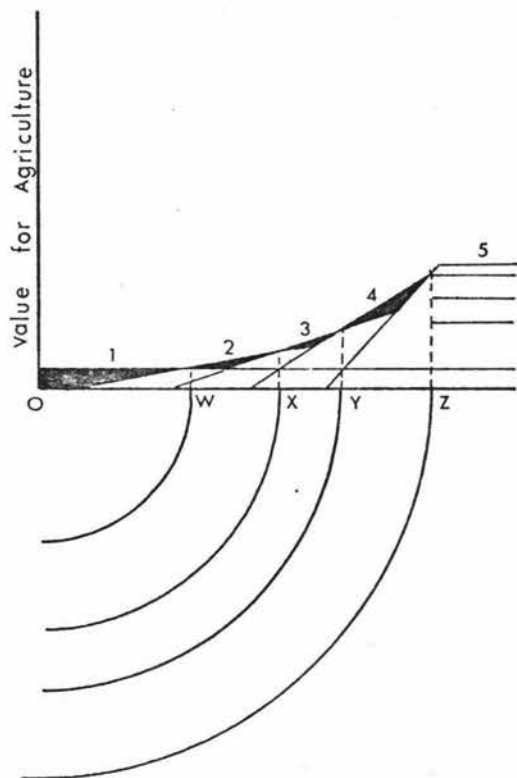


If demand for rural and urban land increases, the city margin will move outwards. If the demand for urban land increases and rural demand remains static, the city margin will be pushed further from the city.

Source: Tarrant, J.R., (1974)
Agricultural Geography, p. 240

FIGURE 6

RELATIONSHIP OF VALUE FOR AGRICULTURE
AND DISTANCE FROM URBAN AREA FOR NUMEROUS
COMPETING LAND-USES



Source: Sinclair, R.J. (1967) von Thunen and Urban Sprawl. Annals of the Association of American Geographers 57,30.

It must be noted that the Alonso/Von Thunen/Muth model is normative, i.e. if everyone behaved as rational economic men with complete knowledge, returns from land use would be maximised if uses are distributed as they suggest. But there is not complete knowledge, neither do men always act in a rational and economic manner. Therefore following von Thunen's model it is expected that most cities will have pockets of intensive agriculture on their urban periphery. Sinclair (1967) has suggested that '... in developed economies, although the basic allocating force governing land use is economic rent, the major force influencing spatial variation in such rent is no longer simply transport costs, even though accessibility is an urbanising force.' He contends that the most potent force is massive urban expansion on a scale hardly envisaged in von Thunen's time. Urban expansion, proceeds in an uneven, and often aimless way and consequently fluctuates in both space and time, thereby creating a 'zone of uncertainty.' Urban land invariably commands a higher value than rural land and where the two types of land use are in direct competition urban uses invariably win as has been shown by Muth. However land that is expected to become urbanized also has a higher value - an 'anticipated' value and helps to create a zone of uncertainty. In von Thunen's model land that was most likely to become urbanized was the land adjacent to the urban market. This land would therefore have the highest anticipated value. Under these conditions a farmer or landowner is unlikely to invest large amounts of capital and labour in agricultural production.

Sinclair thus argues that the value of land for agricultural purposes is lower close to an expanding urban centre and increases with distance as the likelihood of urban encroachment declines. This relationship is shown in Figure 6 in which a competitive situation between five agricultural types is shown, their competitive position being governed by the intensity of agricultural use.

Using these principles, Sinclair proposes a hypothetical progression of land uses around an expanding urban centre. Whether this hypothetical scheme appears to reflect many or

any of the characteristics of agricultural land-use around expanding cities in New Zealand remains for empirical study to be undertaken. Studies in the United States have shown this progression to be true. This hypothetical progression is best seen in table form, such as that put forward by Hoyd and Dicken (1972) in Table IV.

TABLE 4 .
SINCLAIR'S SUGGESTED LAND USE ZONES AROUND
AN EXPANDING URBAN AREA IN A DEVELOPED
ECONOMY

<u>ZONE</u>	<u>TYPE OF LAND USE</u>
1. (adjacent to urban area)	Land changing to urban use. Subdivision. May be held vacant by speculators. Some 'industrialized farming': poultry, greenhouses etc.
2.	Vacant land. Subdivision not begun. Zone of uncertainty, owners awaiting most profitable time to sell. Land may be leased temporarily for grazing or recreation.
3.	Field crop and grazing zone. Low level of intensity. Zone of transitory agriculture.
4.	Dairying and field crop zone. Outside 'area of anticipation' except at inner margin. But orientated to urban market. Major milkshed.
5.	Beyond specific urban influence. Part of nationally orientated agricultural system, e.g. specialized 'corn belt' agriculture.

Source: Lloyd, P.E. and Dicken, P.
 (1972) Location in Space: A
 Theoretical Approach to Economic
 Geography, p. 50.

From location theory it is commonly said that the individual location decision has 'forward' and 'backward' linkages to other decision. That is, a location decision is but one of a larger number of decisions, which arise during a period of time. Some of these decisions (eg: investment decisions) are intimately inter-twined with the actual location decision, others are independent and are often of considerably greater significance for the life pattern of a household, or the survival of a firm than the location decision. Therefore a farm can be considered a 'firm,' with the actual location decisions usually being made by individual farmers in the context of their own needs, assessments and experience, and above all else, in relation to the system they have chosen to operate.

As individuals as well as firms have more or less distinct notions about the future of their operations, an individual property owners decisions are related to his goals, of which he will usually have several. Whether, and how rapidly these goals are implemented will depend to a large extent upon the path taken. It could therefore be assumed that individual property owners will create a pattern of land use corresponding in part, to individual decisions.

Further to Sinclair's idea of a zone of uncertainty is the thought that farmers could forgo optimum profits at the present in light of expected high future returns, or they could sell part or all of their rural land to urban speculators who could be prepared to sit on the land until urban development occurred, thereby lowering the intensity of use. Therefore there may be a total reduction in returns from land due to speculation, particularly if the period between speculative purchase and development is lengthy. Consequently it is of interest to know whether this reduction in returns actually occurs in New Zealand. One way to find out, is to examine subdivision in an area where urban growth is taking place. This could be done by examining long term subdivisions where one would assume that holdings less than 0.8 hectares are likely to be

subdivided for urban uses in a short period of time, whereas holdings greater than 10 hectares are not speculative subdivisions. A study of holdings between 0.8 and 10 hectares could provide a background study for the urban/rural interface where one could examine the influence/effects on the pattern of land use on subdivisions, or vice versa, coupled with a study of the geographic characteristics of the population who live there.

However, other factors may affect the relationship between distance from urban areas and intensity of use, such as part-time farming. Part-time farming has been described in different terms by different writers on the subject. One writer's definition of part-time farming, Glosson (1966), has direct relevance to a study of urban/rural interface. She defined the part-time farmer as 'the occupier who derives a substantial off farm income besides farming.' Proximity to urban centres has encouraged the growth of part-time farming in New Zealand, particularly as the better agricultural land tends to be located close to the main urban centres, (Research Paper 2/77). Leamy (1974), points out that difficulties and conflicts seem likely to arise between rural and urban areas where:

- '(1) Expanding towns are centred in areas of good farming land, e.g. Hamilton, Tauranga, New Plymouth, Hawera, Napier, Oamaru;
- (2) Areas of good farming land separate existing urban zones from areas of low potential e.g. Christchurch, Hastings; and
- (3) Local patterns of access, topography or tenure encourage urban expansion into good farming land, e.g. Whangarei, Auckland, Blenheim, Mosgeil, Invercargill.' (ibid p. 190).

From this it can be seen that Hawkes Bay has two of the three main difficulties and conflicts in rural-urban land use competition. Thus in Hawkes Bay proximity to expanding urban areas, plus better agricultural land could lead to concentrations of intensive small holding agriculture around these urban areas.

Part-time farming can be divided into two main categories:

- (1) the gentleman or hobby farmer; and
- (2) the part-time farmer who supports his farm income by employment either full or part-time away from his property, usually in the urban area.

In New Zealand in our highly mobile and relatively compact society, 'the desire for normal development for housing plus the desire for a rural living life style has created in recent years a much larger peri-urban zone around the main urban areas than available statistics indicate. In turn these developments could create a situation where part-time farming becomes a norm rather than an exception. Only in areas more remote from the main centres is there a traditional adherence to full-time farming.' (Research Paper 2/77). It was found by Jowett (1976) in his study of small rural properties that of a total of 33,499 properties between 2 and 25 acres can be identified throughout New Zealand. Of these 6,481 were 'urban' holdings. The remaining 27,018 holdings averaged 9.51 acres (3.85 ha) in size. Of these, 75 percent had a dwelling on them and 68 percent were used as a regular residence. The predominant agricultural activity was grazing or keeping animals including poultry and pigs (59 percent), the growing of commercial crops being much less important (22 percent).

He further divided the number of holdings used for regular residence in three categories:

	<u>Number</u>	<u>Percent</u>
Occupier retired	3,881	21.1
Occupier in full-time non-farm employment	11,010	59.5
Occupier in part-time employment or full time farming	3,549	19.4
TOTAL	<u>18,440</u>	<u>100.0</u>

Source: Jowett, J.H. (1976):
Small Rural Properties. Part I

A Survey of distribution and uses.
Town and Country Planning Division
Ministry of Works and Development

He therefore suggests that the dominant pattern for such holdings is thus one of persons in full time non-farming employment, while presumably living in a rural environment, thereby creating a new phenomenon for part-time farming, that of 'rural urbanisation.' It was also found that among the full time employment groups, and those retired that 43 percent used their holding to provide supplementary income. This survey found that there are a far larger number of small rural holdings than the 1974 Agricultural Census showed due to agricultural census inclusion of properties within borough boundaries only. For example in the 1974 agricultural census, 7,420 holdings were identified, where as Jowett suggests that there could probably be somewhere in the region of 16,000 holdings with farm animals and a further 3,700 holdings with some crops. There are several factors behind the evolution of part-time farms, in New Zealand. The main factors being:

- (1) Labour Mobility: Governmental policies of full employment have created a degree of 'certainty' of employment in urban areas. This coupled with a decline in labour opportunities in the rural sector along with lower wages, has contributed to the rural to urban drift of the New Zealand labour force.
- (2) Availability of capital. The credit system (from the rural bank) is strongly orientated to full-time farming, mainly due to tradition. Part-time farmers, small holders, and investors make use of private sources of credit thereby creating a bouyant market due to the transfer of urban capital to rural areas.
- (3) Seasonal Employment and the Contracting Industry. Two types of contractor exist. One is a commercial concern, as in the spreading of

fertilisers by air, harvesting crops, etc. The other is a group of farm owning entrepreneurs, who also provide services to other farmers in services like ploughing, cultivation, harvesting. This phenomenon is well developed in the cereal-growing districts like Hawkes Bay.

- (4) Technical and Institution Changes. Advances in technology have led to a lessening of the labour force in agriculture, thereby allowing some farmers to obtain employment away from their property, whereas institutional changes can limit part-time farming operations, e.g. the poultry industry.
- (5) Desire for rural living. One escapes the 'disadvantages' of the city, without depriving oneself of the urban services and facilities one has become accustomed to.
- (6) Subdivision of the family land, due to a variety of economic and social reasons, the land is subdivided into non-economic divisions. These divisions may become economic depending on the use the land is put to.
- (7) Comparatively low agricultural land values compared with urban land values.

The inter-relationship of urban sprawl, land speculation, urban capital, and part-time farming has often created an unsatisfiable demand for rural holdings as well as placing new values on former agricultural land. As the value of land increases, land taxes and property rates increase, such that net farm returns decrease and returns to society may be reduced, depending on the availability and transfer of capital from urban to rural for the purchase of land, goods, services and inputs such as fertilizers. If one or any of the following goods, services and inputs are unavailable, the point will eventually be reached when the subdivision of land is inevitable.

Further to the argument of subdivision in the 'zone of uncertainty', is the fact that a farmer may subdivide his land due to reduced profits from high land rates, coupled with the expectation of high future profits from the sale of his land. This phenomenon has been noted throughout the world and according to Gregor (1964), this is particularly noticeable on the margins of all principal American urban centres.

It must be noted that Sinclair and speculation notwithstanding, one would expect subdivision on the urban fringe from von Thunens theory, that is intensive smaller plots, usually devoted to horticulture and/or supply of perishable goods to the urban market would be located on the urban fringe as they sought to gain advantages from locational factors such as minimum distance and access to the urban market. Added to these factors is the fact that these plots are usually small in an endeavour to equalize returns to inputs. It has been shown by Winn (1968), that the physical environment (soils and climate) played little part in the growth and location of intensive agricultural properties once the primary settlement of the Waitemata county had been completed. He showed that the present location of horticultural units is more a function of social and economic factors than of soil and environment.

Therefore as has been pointed out by Stonyer et al (1972) urbanization not only takes land out of agricultural production, but fertile land converted to urban use causes a shunting effect all the way back to land in the most extensive pastoral areas, as von Thunen, and Sinclair have suggested.

SUMMARY

Throughout the world competition between urban and rural land uses has led to spatially ordered patterns of land-use in the urban/rural fringe. According to Sinclair et al the most potent force influencing land use is that

of urban expansion.

The impact of urban expansion is felt in two ways:

- (1) rural land is lost to housing development and its related services and facilities.
- (2) demand for agricultural produce is increased, thereby stimulating the establishment of a variety of intensive agricultural enterprises.

This impact leads to the assumption that the value of land for agricultural purposes is lower close to an expanding urban centre and increases with distance as the likelihood of urban encroachment declines. This may lead to a reduction in returns from the land due to speculation, particularly if the period between speculative purchase and residential development is lengthy.

Thus recent work by Sinclair, Clawson and others has contributed to a theory of competition between urban/rural uses, but there has been little empirical testing of their ideas outside the United States. It is the aim of this study to consider the explanations and development of the theories and ideas of Sinclair and Clawson, by scanning classical theory, outlining their contributions, and setting hypotheses based on the theory, such that these hypotheses can be empirically tested in the New Zealand context. That is, to see if there are any patterns of land use in the urban/rural fringe of an expanding urban area and if this is so, do these patterns reflect the theory.

CHAPTER II

THE SURVEY

As mentioned in chapter one, there has been little or no empirical evidence to substantiate the theories of the spatial patterns of land-use around expanding urban areas in New-Zealand. This study sets out to examine the land-use trends around a rapidly expanding urban area, the Hawkes Bay Region on the east coast of the North Island of New Zealand (Figure 7). This region, the Heretaunga Plains, contains two major urban centres, Napier and Hastings, as well as the largest contiguous area of non-pastoral agriculture in New Zealand. The Heretaunga Plains has been classified as a special zoning area called Rural 'B' by the Hawkes Bay District Planning Scheme¹. For the purposes of this study, the boundaries of the Plains will be defined as the boundaries of the Rural 'B' zoning. The area is shown in detail in figure 8. This definition of the study area results in a total area of approximately 34,400 hectares.



The study is concerned with Plains land-use as at June 1977, and on any patterns of land-use that are present, along with the effects of the pattern of land-use on subdivision, incorporating the geographic characteristics of the population who live there. In other words, what are the influences on subdivision, and how has subdivision influenced land-use?

There is little factual evidence available on which to base judgements concerning the influence of section areas on the variability and intensity of agriculture. Evidence

1. Hawkes Bay County Council, Hawkes Bay County District Planning Scheme, Review No. 1, Napier 1970. The 1970 creation of the 'B' zone kept the 10-acre minimum lot size for the Plains which had been in force since the original plan in 1964, but the minimum to 50 acres for areas outside the Plains.

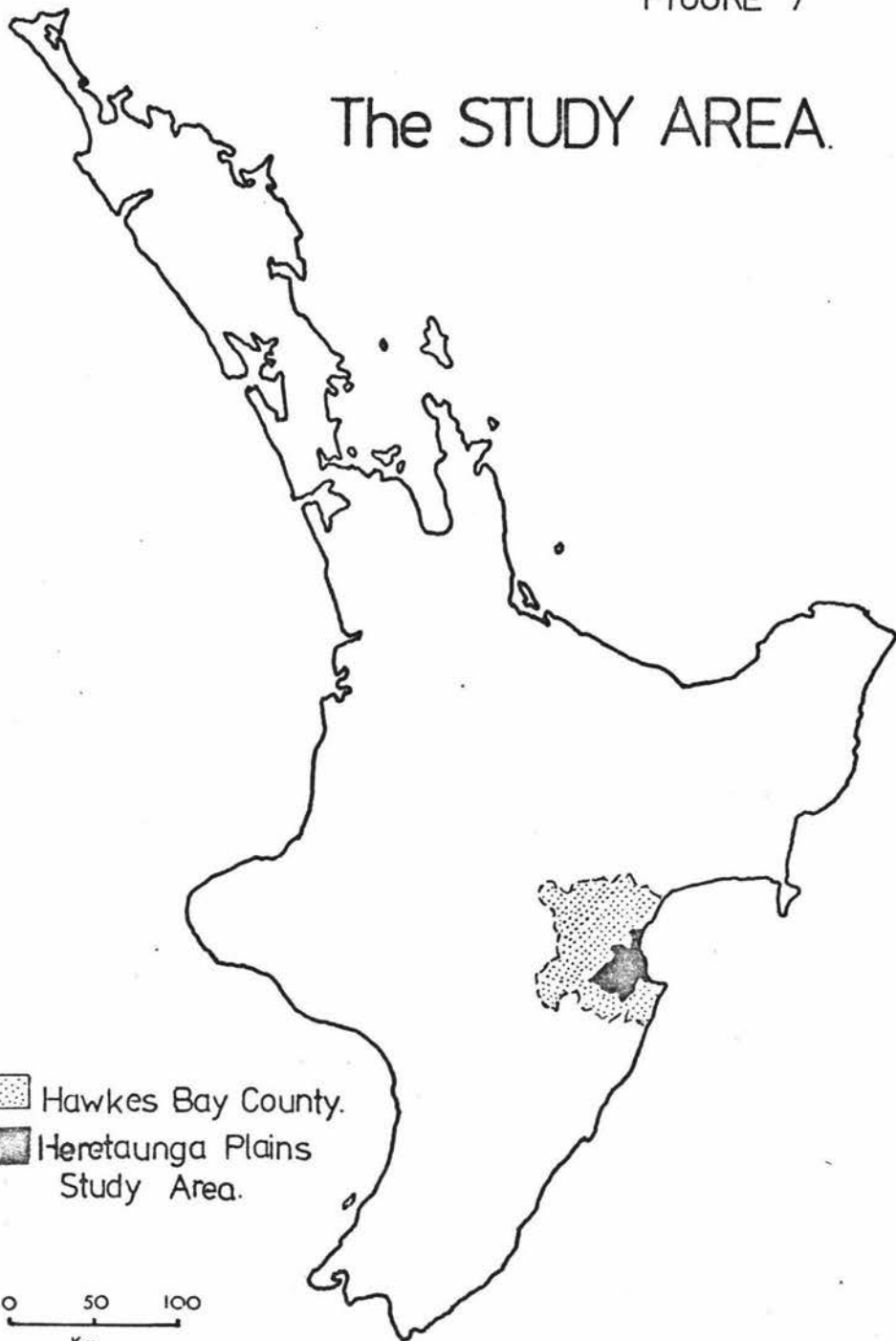
FIGURE 7

The STUDY AREA.

-  Hawkes Bay County.
-  Heretaunga Plains Study Area.

0 50 100
Km

M.J.S.



from the Waitemata (Winn, 1970), the Manawatu (Chiu, 1975) and Taupo (Crawford 1977) suggests that intensity of use and level of output is not lower on 10-acre sections than on larger sections. None of these studies however, give any indication of the extent of any variation of output and use with section size, since they are confined to studying only 10-acre sections, nor do any of these regions compare directly to the Heretaunga Plains in either predominant agricultural use, climate, or physiography.

Aim of the Study

The study will be divided into two main parts. Part one will be concerned with the social geography of the Plains people. It will look at the services and facilities used, along with standards of living, to provide an appropriate benchmark. As one would expect movement minimization with increasing distance from an urban area, the study will look at the relationships between distance and facilities, and distance and location.

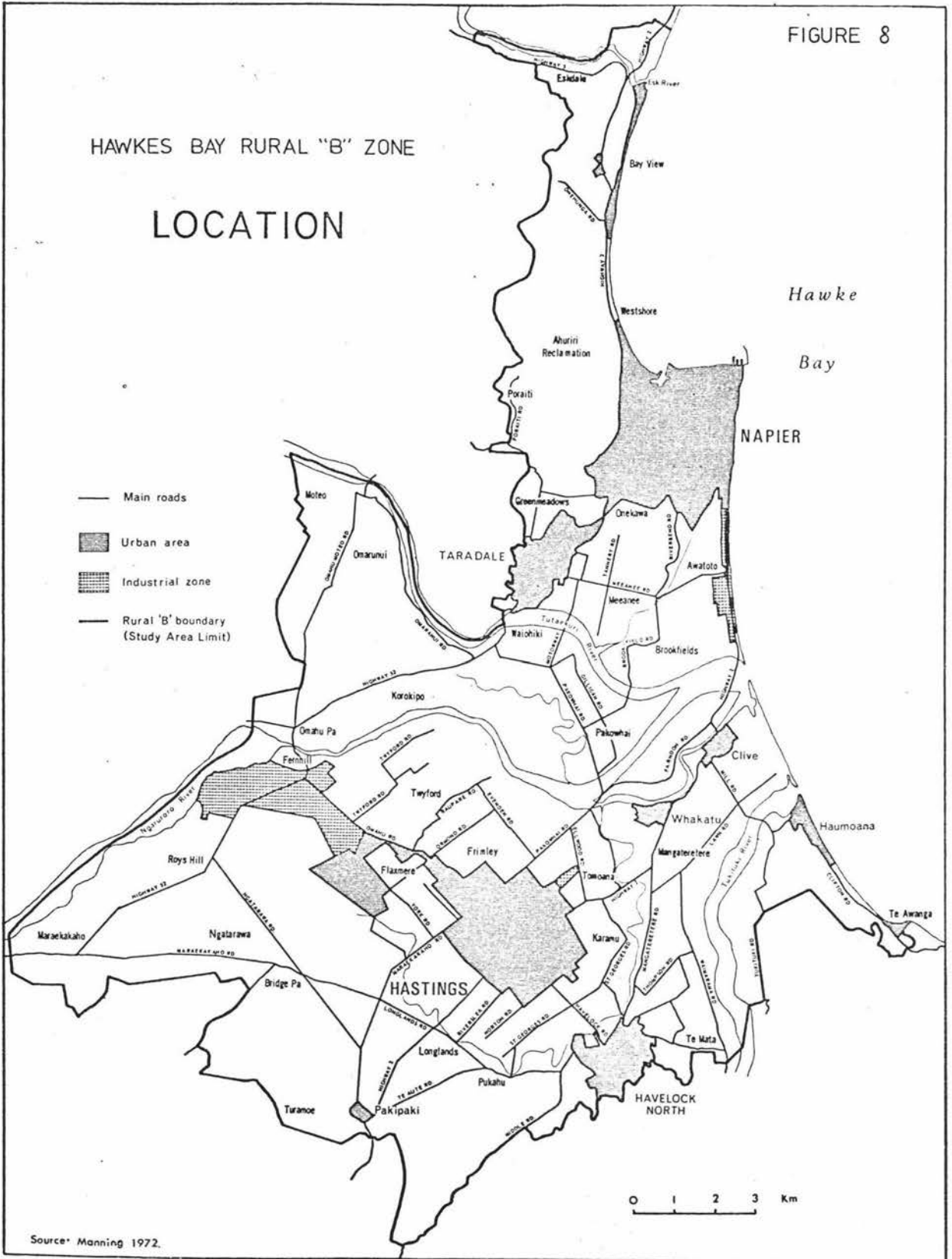
Part two will consist of a land-use study. The study sets out to find if land-use varies with size of property; for size of property gives an indirect measure of the intensity of use and economic rent of agricultural land. The study will look for any patterns of land-use that may be evident, by relating land-use and location with respect to the major urban centres, as well as seeing to identify the other influences that there may be on land-use. For example, do soil type and climate effect land-use? If not, then what does influence land-use and how do these influences relate to the theory?

If any patterns of land-use are evident, they will be used to compare and contrast speculative and intensive subdivisions, thereby seeing if patterns of land-use adhere to the principles of Sinclair's theory of patterns of land-use on the rural/urban fringe.

FIGURE 8

HAWKES BAY RURAL "B" ZONE

LOCATION



Hypotheses

If the main effects and degree of urban pressure on the economic use of rural land are:

- (1) no reduction in the intensity of use, then
 - (a) Sinclair's theory can be questioned, or it could apply to subdivisions less than 0.8 hectares, hence this could be the upper limit for subdivision control in the New Zealand context, or
 - (b) there is no harm done by speculation and subdivision;
- (2) there is a reduction in the intensity of use, then
 - (a) this would imply that there are problems between competing urban and rural uses, particularly if the reduction is not uniform, or
 - (b) that a new phenomenon is occurring in land ownership in New Zealand, that of 'rural-urbanisation.'

This study will have practical value by providing information in which planning re subdivision and the provision of facilities can be based, but it is not the intention of this study to explore the alternatives open.

To obtain the information necessary to test the hypotheses of the study in the particular conditions of the Heretaunga Plain, a survey was carried out of farmlets between 0.8 and 10.0 hectares in the rural 'B' zone of the Heretaunga Plains.

A farmlet was defined as a zoned rural residential holding of between 0.8 and 10.0 hectares in area which is used by a person or household as a full-time home. The reason to study holdings of this size was that any holding/farmlet less than 0.8 hectares was most likely to be subdivided for urban uses in a short period of time; whereas any farmlet greater than 10.0 hectares was not considered as it was thought that farmlets of this size were not speculative subdivisions.

In order to carry out a survey of the farmlets of the Heretaunga Plain, it was first necessary to find out how many of these farmlets there were. As there was no

census of farmlets in existence which would provide an accurate estimate of farmlets within the study area, much less a list of names and addresses of such farmlets, it was then necessary to compile a list of farmlets.

The problem of compiling a list of farmlets was overcome through access to the Valuation Department's records for Hawkes Bay County. A computer program was constructed such that, all properties between 0.8 and 10.0 hectares that were located in the rural 'B' zone, their size, location and the name and address of the owner were recorded on a separate file. From this, it was found that there were 1,984 properties between 0.8 and 10.0 hectares located in the rural 'B' zone.

Due to the large number of properties located in the study area, a random sample of 20 percent of these properties was drawn, amounting to 392 properties. Properties owned by the Hawkes' Bay Education Board (schools) and the Hawkes Bay County Council (parks and reserves) were excluded from the sample.

The Questionnaire

It was decided, due to the nature of this study and the paucity of information available, that some means of direct data gathering was needed. With a large sample universe it was decided, due to the time constraint of a thesis, that the most appropriate form of direct data gathering would be through the administration of a mail questionnaire to the 392 selected properties. A questionnaire suitable for a postal survey was designed. (See appendix A)

Pre-test

The questionnaire was pre-tested on ten farmlets between 0.8 and 10.0 hectares in the Kairanga County of the Manawatu for any ambiguities of question wording, structure and layout. Five farmlet owners were sent a questionnaire in the mail and another five owners were interviewed. Of the five mail questionnaires, four were completed and returned

within two weeks, the fifth being returned incomplete. Of the five interviews, only one resulted in a non response.

From this pre-test of the questionnaire, several minor alterations in wording and structure were made before the main questionnaire was printed and mailed. In addition it was recognised that the questions on income and expenditure of the 'farmllet enterprise' were difficult on account of the lack or absence of records kept. It was decided to include this section at the end of the questionnaire.

The Survey

The questionnaire accompanied by an introductory letter and a stamped return addressed envelope were sent to the sample in August 1977. (See Appendix A). One reminder letter was sent to those who had not returned the questionnaire three weeks after the initial posting.

Response Rate

Of the questionnaires sent, a total of 163 useable replies were received. Table 5 shows the percentage return of useable replies of the questionnaire by map grid reference for the separate divisions of the rural 'B' zone.

The percentage return of useable questionnaires was 41.58. Response from the different divisions ranged from 18.18 to 53.66 percent.

Reasons for nil responses to the questionnaire were: change of address, unknown at address of property, owner overseas, property sold, questionnaire returned unopened, questionnaire returned blank, as well as five written refusals.

Six replies were received three months after the initial mailing of the questionnaire. These were excluded from the analysis as the other returns had been collated.

TABLE. 5

RESPONSE TO MAIL QUESTIONNAIRE BY GRID REFERENCE

<u>Grid Reference</u>	<u>No. Sent</u>	<u>No. Returns</u>	<u>% return</u>
954	25	9	36.00
955	3	1	33.33
956	4	1	25.00
957	21	6	28.57
959	23	10	43.48
960	46	16	34.78
962	74	31	43.06
963	82	44	53.66
964	11	2	18.18
965	52	20	38.46
966	4	2	50.00
968	49	20	40.82
unknown	-	1	-
<u>TOTAL</u>	<u>392</u>	<u>163</u>	<u>41.58</u>

Response Bias

The response rate of 41.51% is not large enough to preclude the possibilities of biases in the estimates. Biases arise because different types of property may have different probabilities of response to the questionnaire.

Response bias was tested by comparing the mean area of farmlets of the respondents, with the mean of the 392 sample properties.

No significant difference was found ($t = 1.21$). From this, it was concluded that the 163 respondents were a representative sample of the population.

CHAPTER III

THE SOCIAL GEOGRAPHY OF THE SAMPLE FARMLETSAnalysis of Land-Use

For the purposes of analysis, the properties have been divided into three size categories:

- (a) Properties between 0.8 and 3.9 hectares,
- (b) Properties between 4.0 and 6.9 hectares,
- and (c) Properties between 7.0 and 10.0 hectares.

Table 6 shows the number of properties in the above categories by the Valuation Department's grid references.

TABLE 6

NUMBER OF PROPERTIES BY SIZE AND GRID REFERENCE

Map Grid Reference	Farmlet Sizes			Total
	A	B	C	
954	85	36	8	129
955	2	9	2	13
956	16	1	1	18
957	65	21	19	105
959	76	25	13	114
960	104	96	30	230
961	1	1	0	2
962	139	167	53	359
963	210	151	48	409
964	19	30	7	56
965	149	94	39	282
966	14	1	0	15
968	158	59	30	247
969	4	1	0	5
<u>TOTALS</u>	<u>1042</u>	<u>692</u>	<u>250</u>	<u>1984</u>

Of the 1984 farmlets 52.52 per cent are in size category A, 34.88 per cent are in size category B, and 12.6 per cent are in size category C.

Distribution of Farmllets

Figure 9 (located in the map pocket) maps the distribution of the 1984 farmllets on the Heretaunga Plains. It can be seen that the majority of these farmllets are located around the periphery of the major urban areas: Hastings, Havelock North and southern Napier, and there is a particular concentration of farmllets in the southern half of the rural 'B' zone, south of the Ngaruroro river. It is also evident from figure 9 that the smaller farmllets tend to be located nearer to the urban centres than larger farmllets. That is, the size of a farmllet can be said to influence location with respect to distance from an urban area. (refer page 41)

The Sample Farmllets

Table 7 sets out the 163 sample farmllets by size and grid reference.

TABLE 7
NUMBER OF SAMPLE FARMLETS BY
SIZE AND GRID REFERENCE

Map Grid Reference	Farmlet Sizes			Total
	A	B	C	
945	6	3	0	9
955	0	1	0	1
956	1	0	0	1
957	3	1	2	6
959	7	1	2	10
960	5	11	1	16
961	0	0	0	0
962	14	13	4	31
963	22	12	9	44
964	0	2	0	2
965	8	8	4	20
966	1	1	0	2
968	10	8	2	20
969	0	0	0	0
unknown	1	0	0	1
<u>TOTALS</u>	<u>78 (47.86%)</u>	<u>61 (37.42%)</u>	<u>24 (14.72%)</u>	<u>163 (100%)</u>

The percentage distribution of those farmlets that returned their questionnaires was very much in accordance with that of the total number of farmlets in the rural 'B' zone.

TABLE 8
PERCENTAGE DISTRIBUTION OF FARMLETS IN THE
RURAL 'B' ZONE FOR THE TOTAL NUMBER OF FARMLETS
AND THE NUMBER OF FARMLETS THAT RETURNED
USEABLE QUESTIONNAIRES

<u>Farmlet Size</u>	<u>%Total in Rural 'B'</u>	<u>% of Returns</u>
A	52.52	47.86
B	34.88	37.42
C	12.60	14.72
<u>TOTAL</u>	100.00	100.00

From figure 10 (located in the map pocket) which maps the On-Farmlet Employment of the sample farmlets, it can be seen that the distribution and location of the sample farmlets mirrors that of figure 8, where the majority of the farmlets are located around the periphery of the urban areas, with a particular concentration in the southern half of the rural 'B' zone, south of the Ngaruoro river.

Residence of Respondents

All but 15 of the 163 respondents resided on their farmlets. Of the 15 who did not one leased the dwelling on the farmlet. The other 14 farmlets did not have dwellings on them. Of these 14, six were in group A, seven in group B and one was in group C.

Age of Dwelling

The ages of the houses on the farmlets questioned ranged from 6 months old to over 100 years old. The average ages of the dwellings are set out below in table 9.

TABLE 9

AVERAGE AGE OF DWELLING BY FARMLET SIZE

A	37.81 years
B	27.73 years
C	33.02 years

Average age of all dwellings - 32.85 years

From this table it can be seen that the middle sized farmlets, i.e.: those between 4.0 and 6.9 hectares tend to have dwellings that have been constructed later than those on the other farmlets. All the same, the average age of all dwellings, 32.85 years represents some very recent dwelling construction.

Area Used for Housing Purposes

The area used for housing purposes includes lawn, roading, recreational facilities (such as tennis courts, swimming pools). Table 10 sets out the average approximate area used for housing purposes for the 3 categories of farmlets.

TABLE 10

AVERAGE AREA USED FOR HOUSING

<u>Farmlet Size (Hectares)</u>	<u>Average Area Used for Housing (Hectares)</u>
A	0.241
B	0.252
C	0.250
<u>Average of all farmlets</u>	0.248

It appears from this, that the average area used for housing purposes is much the same for all sizes of farmlets, the overall average used for housing purposes being in the vicinity of 0.25 hectares.

Further to this, we wanted to see if houses built recently (ie: less than 10 years) have larger housing areas than the older houses. These two factors were cross tabulated, as presented in table 11.

TABLE 11
HOUSING AREA IN RELATION TO AGE OF HOUSE

Housing Area (hectares)	Age of House		Total Number
	10 yrs and less	More than 10 yrs	
0.0 - .9999	1	3	4
0.1 - .2499	21	61	82
0.2500 - .3999	2	6	8
0.4000 -	8	21	29
<u>TOTAL</u>	<u>32</u>	<u>91</u>	<u>123</u>

*No answer = 25 (excludes those 15 farmlets that have no dwelling on them)

The following null hypothesis was put forward. That there is no association between Age of House and Housing Area. A chi square test was used. χ^2 was found to be 0.049 and degrees of freedom = 4. The null hypothesis can not be rejected as χ^2 was always $< .279$ (the 99% (.99) significance level). Therefore we can conclude that there is no association between the age of a house and the area used for housing needs.

Household Water Supply

The respondents were asked what was the source(s) of household water supply. Table 12 sets out their replies.

TABLE 12
SOURCE(S) OF HOUSEHOLD WATER SUPPLY

Farmlet Size	Bore	Store Rain	Community System	Spring	Bore & Store Rain	Bore & Comm. System	Spring & Store Rain	
A	56	5	7	2	4	-	-	74
B	51	2	3	-	1	1	1	59
C	19	-	2	1	1	-	-	23
<u>TOTAL</u>	<u>126</u>	<u>7</u>	<u>12</u>	<u>3</u>	<u>6</u>	<u>1</u>	<u>1</u>	<u>156</u>

The main source of household water supply of the respondents was predictable the use of bores, (80.8%) of households relied upon bores. This is not surprising as

the greater part of the Heretaunga Plains is underlain by an artesian layer, fed principally by seepage from the Ngaruroro river. Artesian water is readily available near the surface to all areas, excepting the Ngatarawa region in the west and the Omaranui and Ahuriri Bay View areas to the north.

The second most popular source of water supply was by means of a community system (7.7%). The majority of these farmlets were located in the Ngatarawa region.

The respondents were also asked if their present water supply was adequate. If the water supply was not adequate, what they propose to do about it? Only one respondent replied that his water supply was not adequate, and this was due to the lack of a pressure system from his bore. It was therefore concluded that the household water supply of the farmlets was adequate.

Dwellings Heating Supply

The respondents were asked what their households heating supply was based on. This information is recorded in Table 13.

TABLE 13
BASIS OF HOUSEHOLD HEATING SUPPLY

<u>Electricity</u>	<u>Electricity and Wood</u>	<u>Electricity and Gas</u>	<u>Electricity and Oil</u>	<u>Total</u>
49.66%	42.28%	2.02%	6.04%	149

As can be seen in table 13, of those respondents that answered the question on household heating, electricity was common to all. Of the combinations of householding heating with electricity, wood was by far the most common. Six per cent of the households had electricity/oil combinations and 2 per cent had electricity/gas combinations.

Dwellings Sewage Systems

Of the 156 respondents who replied to the question on their household's sewage system, 154 replied that their

sewage system was a septic tank. One replied that his households sewage was still on a night soil system, while the other respondent replied that his sewage was piped to a community scheme. It can be concluded from the above figures that the farmlets are considered as rural properties, as only one farmlet has its household sewage piped direct to a community scheme and the onus of providing a sewage system is obviously placed on the owner of the farmlet.

Distance to Nearest Town

One feature of rural living is the necessity to travel a longer distance to town for work, shopping and entertainment. The further the distance from the town or city centre, the less attractive the farmlet will be to the owner, in terms of travelling time and costs. Table 14 sets out the distance of the farmlets from the nearest town or city (population in excess of 5,000) centre. No farmlet is nearer than 1.6 km to the nearest town centre.

TABLE 14
DISTANCE TO NEAREST TOWN (POPN 5000+)

<u>Farmlet Size</u>	<u>1.6 — 5km</u>	<u>5 —10km</u>	<u>10—15km</u>	<u>>15km</u>	<u>Total</u>
A	38	25	8	3	74 (47.44%)
B	23	25	10	1	59 (37.82%)
C	10	12	-	1	23 (14.74%)
<u>TOTAL</u>	<u>71 (45.51%)</u>	<u>62 (39.74%)</u>	<u>18 (11.54%)</u>	<u>5 (3.2%)</u>	<u>156 (100.00)</u>

The table suggests that the majority of the farmlets, 85.3%, were located within 10 km of the nearest town centre. Of these farmlets, 53.4% were located within a distance of 5 km of the nearest town. This means that almost half (45.5%) of the farmlets of the respondents are located within 5 km of the nearest town centre.

A chi square test was then undertaken, the null hypothesis being that there is no association between distance from town and size of farmlet. Table 14 was used as the

basis for the chi square test, with the farmlets located at a distance of 10 km or greater grouped together (i.e: there were three distance groupings, 1.6—5km , 5—10km, and thirdly >10 km.

χ^2 was found to be equal to 22.16. It was found that the null hypothesis had to be rejected for, with 4 degrees of freedom $\chi^2 \gg 9.488$ is significant at the 5% level and with 4 degrees of freedom $\chi^2 \gg 18.465$ is significant at the 0.1% level.

That is, the calculated value is significant beyond the 0.1% level and the null hypothesis of no association between distance from town and size of farmlet can be rejected. What is the strength of this association? A measure of strength of association, V, was found to have a value of 0.26. This represents only a weak association, as $0 \leq 0.26 \leq 1.0$.

The evidence therefore suggests there is a weak relationship between distance from town and farmlet size, with the larger farmlets being located at a greater distance from town than the smaller farmlets.

Shopping Facilities

The respondents were asked (i) where they bought their daily food and service supplies (ie: bread, milk newspapers) and, (ii) where they bought the majority of their groceries and/or meat?

There responses are set out in tables 15(a), 15(b), and 15(c), which show the relationship between distance from nearest town and place of shopping for daily food, meat and weekly groceries.

TABLE 15(a)
PLACE OF DAILY SHOPPING AND
DISTANCE TO NEAREST TOWN

<u>Distance to</u> <u>Town (Km)</u>	<u>Local</u> <u>Dairy</u>	<u>Town</u>	<u>Place of Shopping</u>					
			<u>Rural</u> <u>Delivery</u>	<u>Town</u> <u>Delivery</u>	<u>1+2</u>	<u>1+3</u>	<u>2+3</u>	<u>1+2+3</u>
5	13	20	10	3	3	10	3	3
5 - 10	16	11	10	-	-	7	7	1
10 - 15	5	4	4	-	1	2	1	-
15	1	2	1	-	-	-	2	-

TABLE 15(b)
PLACE OF SHOPPING FOR GROCERIES
AND DISTANCE TO NEAREST TOWN

<u>Distance to</u> <u>Town (Km)</u>	<u>Place of Shopping</u>		<u>Others</u>
	<u>Local Shop</u>	<u>Town</u>	
5	30	32	3
5 - 10	28	25	2
10 - 15	10	5	1
15	3	3	-

TABLE 15(c)
PLACE OF SHOPPING FOR MEAT AND
DISTANCE TO NEAREST TOWN

<u>Distance to</u> <u>Town (Km)</u>	<u>Local</u> <u>Shop</u>	<u>Town</u>	<u>Freezing</u> <u>Works</u>	<u>Kill Own</u>	<u>Others</u>
5	24	24	8	6	3
5 - 10	20	22	5	8	-
10 - 15	8	5	1	2	-
15	1	3	1	1	-

From tables 15 (a), (b) and (c) it can be seen that between one-fifth and one-third of farmlet occupiers shop

for daily food in the nearest town, which for some is over 15 km away, and almost half the farmlet occupiers shop in the nearest town for meat and weekly groceries. More than half of the farmlets are more than 5 km away from the nearest town and even on the generous assumption that the average town dweller makes a 5 km journey to shops, it is clear that a considerable proportion of farmlet occupiers incur higher travel costs than those living in towns. It is probably reasonable to infer that because farmlets are a low density development, those occupiers who use local shops will travel further to the shops than the average town dweller. And those who use rural delivery simply transfer the increased distance costs to the retailer, who passes them back to the customer in the form of higher prices.

Age of Head of Household

Table 16 sets out the distribution of head of household by age and farmlet size.

TABLE 16
AGE DISTRIBUTION OF HEAD OF HOUSEHOLD

Farmlet Size	Age Groups in Years									TOTAL
	20-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	60+	
A	-	7	7	5	7	14	10	13	12	75
B	1	7	8	9	7	7	6	5	10	60
C	-	2	4	2	3	3	7	2	1	24
TOTAL	1	16	19	16	17	24	23	20	23	159

From this table it can be seen that there is a wide distribution in the age of the head of the household, from 26 years on, and that this distribution is weighted evenly throughout.

Number of Children Under 18 Years Old

In the questionnaire, the respondents were asked to record the age of their children. It was then decided to record the number of children under 18 years of age, as it was thought that most children above this age would have

left both school and home.

Table 17 sets out the number of children under 18 years by age of head of household and farmlet size.

TABLE 17
NUMBER OF CHILDREN UNDER 18 YEARS BY AGE
OF HEAD OF HOUSEHOLD

Farmlet Size	Age Groups of Head of Households							TOTAL
	20-25	26-30	31-35	36-40	41-45	46-50	51-56	
A	-	16	8	18	14	11	11	78
B	1	12	33	6	12	24	6	94
C	-	7	3	9	10	4	-	33
Total No. of children	1	35	44	33	36	39	17	205

As could be expected, the majority of children had parents (head of household) in the 26 to 56 year age group and there was an even distribution of the number of children throughout these age groupings.

Education of School Age Children

Questions about school age children were asked in order to find out what type of school the children from these farmlets went to; how far they travelled to school; and what mode of transport they use to get to school. The results are tabulated in the tables below, one for those children who are under 5 years old, another for those children 5 years old and over but under 12 years old, and the last one for those children 12 years and over but less than 18 years of age. These groupings were decided upon as they ran in conjunction with the New Zealand school system of Kindergarten, primary school and secondary school. Tables 18 (a), (b) and (c) record the results of these questions.

TABLE 18(a)
NUMBER OF CHILDREN AT KINDERGARTEN

A	8
B	9
C	5
Total	23

TABLE 18(b)
TYPE OF SCHOOL ATTENDED BY CHILDREN UNDER
12 YRS AND OVER 5 YRS OF AGE

<u>Farmlet Size</u>	<u>Country</u>	<u>Type of School</u>		<u>Total</u>
		<u>City</u>	<u>Private</u>	
A	15	23	-	38
B	28	22	4	54
C	12	4	-	16
<u>TOTAL</u>	<u>55</u>	<u>49</u>	<u>4</u>	<u>108</u>

TABLE 18(c)
TYPE OF SCHOOL ATTENDED BY CHILDREN UNDER
18 YRS AND OVER 12 YRS OF AGE

<u>Farmlet Size</u>	<u>City Day</u>	<u>Type of School</u>		<u>Total</u>
		<u>City Day</u>	<u>Private</u>	
A	30	1		31
B	27	2		29
C	13	1		14
<u>TOTAL</u>	<u>70</u>	<u>4</u>		<u>74</u>

From these tables it can be seen that the majority of secondary school children attend city day schools. Primary school children appear to be equally divided between country and city schools. It should be noted that table 18(b) does not take into account those pupils who attend intermediate schools. This could indicate that the majority of pupils under 10 years of age would probably attend country primary schools, while the others (those who attend intermediate schools) would attend city schools.

The distances that the children travel to school are compared with the distance the farmlet is from the nearest town. Tables 19(a) and (b) set out this information.

TABLE 19(a)
DISTANCE TO PRIMARY AND INTERMEDIATE
SCHOOLS FROM FARMLETS

<u>Distance to</u> <u>Town (Km)</u>	<u>Distance to School (Km)</u>			
	<u>0-5</u>	<u>5-10</u>	<u>10-15</u>	<u>15+</u>
5	63	-	-	-
5 - 10	30	3	-	-
10 - 15	8	7	1	-
15	3	-	-	-

TABLE 19(b)
DISTANCE TO SECONDARY SCHOOL FROM FARMLETS

<u>Distance to</u> <u>Town (Km)</u>	<u>Distance to School (Km)</u>			
	<u>0-5</u>	<u>5-10</u>	<u>10-15</u>	<u>15+</u>
5	56	5	-	-
5 - 10	10	16	3	-
10 - 15	-	3	10	-
15	-	-	2	3

The figures for distance travelled to school suggest that pupils who attend secondary schools have extra distance to travel.

Table 20 looks at the mode of transport used by children to attend school.

TABLE 20
MODE OF TRANSPORT USED TO GET TO SCHOOL (PER CENT)

	<u>Walk</u>	<u>Bike</u>	<u>School Bus</u>	<u>Private Car</u>
Primary School	17.3	26.9	26.9	28.9
Secondary School	13.3	42.2	42.2	2.3

The figures from Tables 19 and 20 suggest that although there is less distance to travel to primary school, the use of a school bus service may offset the extra distance travelled

to secondary schools. Not surprisingly, the most popular mode of transport used by primary school pupils, is that of the private car. The use of private vehicles drops away as the children attend secondary school, where the use of the push bike and school bus prove the most popular modes of transport. This use of the private car for children to attend primary school is not uncommon in New Zealand, both for country and city schools. Therefore one should not take too much notice of the fact that its use is common for the primary schools of the rural 'B' zone.

Distance Travelled to Work by Part-Time Farmers

The figures in table 21, relate to those farmlet occupiers who do not earn their living off their farmlets full-time.

TABLE 21
DISTANCE TRAVELLED TO WORK BY PART-TIME FARMERS

<u>Distance to Town (Km)</u>	<u>Distance to Work (Km)</u>				<u>Varies</u>
	<u>0-5</u>	<u>5-10</u>	<u>10-15</u>	<u>15+</u>	
5	17	10	5	3	2
5 - 10	4	12	4	5	5
10 - 15	-	3	5	1	1
15	-	-	-	3	1

The high numbers along the diagonal sloping from the top left to the bottom right in table 21, suggests a reliance on the nearest town by many of the farmlet occupiers for their employment away from the farmlet.

Entertainment

The questionnaire asked in question 18, what the households main forms of entertainment/recreation were. Table 22 sets out the response.

TABLE 22
MAIN FORMS OF ENTERTAINMENT OF
FARMLLET OCCUPIERS (PERCENTAGE)

Watch T.V.	Go to Movies	Go to Hotel/ Tavern	Go to a Club	Go to beach/ baths	Go on a picnic	Go to a sports club (summer)	Go to a sports club (winter)	Majority	Other *
36.17	2.74	3.65	11.55	13.98	8.20	6.69	9.12	3.34	4.56

* Other forms of entertainment/recreation were: horse riding, fishing, the movies and just being on the farmllet.

Table 22 shows that the main form of entertainment is staying home watching television. Other than this, the other forms of entertainment do require travel from the farmllet. Table 23 relates the distance travelled to entertainment from the farmllets, compared distance to the nearest town.

TABLE 23
DISTANCE TO ENTERTAINMENT FROM FARMLLETS

Distance to Town (Km)	Distance to Entertainment (Km)				Varies
	0-5	5-10	10-15	15+	
5	41	18	4	4	9
5 - 10	8	26	1	2	3
10 - 15	3	1	9	-	2
15	-	-	-	1	3

Once again the high numbers on the diagonal suggest a reliance on the nearest town for entertainment away from the farmllet.

Although not unexpected, the figures for distance travelled to shopping (Tables 15 (a), (b) and (c)), to secondary school (Table 19(b)), to work (Table 21), and to entertainment (Table 23) suggest that farmllet occupiers incur relatively high distance costs. The high numbers along the diagonals sloping from top left to bottom right in the tables also suggest a reliance on the nearest town by many of the farmllet occupiers. This serves to emphasise the point

that even using the nearest facilities, farmlet occupiers face high travel costs.

Attempts to quantify the extra distance costs incurred by farmlet occupiers are fraught with difficulty. However an indication of the level of extra-costs is obtained for the journey-to-work as follows. Assume that average journey length is the mid-point of each range in table 21, - 2.5, 7.5, 12.5 and 17.5 km. Next, assume that the average urban journey to work is 2.5 km. Then each journey-to-work of 7.5 km will cover an 'excess' distance of 5km (7.5 - 2.5) in one direction and 10 km in both directions. This amounts to an 'excess' of 50 km per week (assuming a 5 day working week) and 2400 km per year (assuming a 48 week working year). By the same reasoning, each journey-to-work of 12.5 km has an 'excess' distance per year of 4800 km, and each journey-to-work of 17.5 km has an 'excess' distance per year of 7200 km. Multiplying these figures by the number of journeys made over each distance for the sample farmlets alone, the total 'excess' distance travelled in one year is 213 600 km. Even if this were a gross over estimate there can be little doubt that 'excess' distance costs for journey to work for all farmlets on the Heretaunga Plains is at least 1 million km per year; they may even be of the order of 4 million km per year. Extra costs incurred for other journeys are likely to be considerably less because the frequency of travel is usually much lower for shopping and entertainment, than for journey to work.

As little of this extra cost is born by the public purse, the majority of costs being born by individuals privately, one is 'forced' to accept the view that distance from an urban area on the Heretaunga Plains is not a strong influence on the location decision of the farmlet occupiers in this study. Distances appears to offer no real barrier to the farmlet occupiers in their basic day-to-day life.

Further to this, the farmlet occupiers in the survey enjoy a similar, if not higher standard of living that those who live in urban areas; when one takes into account the day-to-day services and facilities that the majority have.

Occupations of farmlet Occupiers and their Spouses

Occupations of property owners were classified into six categories (Krause, E.A. (1971) p 77) namely; professional; semi professional; trade; clerical; sales and service personnel; worker and other. The criteria used to classify the occupations are as follows:-

- A. Professionals have
 - i) existing theories and skills
 - ii) training institutions
 - iii) community mandate
 - iv) code of ethics
 - v) clients welfare as the primary objective

- B. Semi-Professionals have characteristics as in (i) to (iv) of A, but differ from the Professional category on the following:-
 - i) shorter training period
 - ii) regular supervision on the job

- C. Trade. The primary objective of this occupational group is profit making.

- D. Clerical, Sales and Service Personnel have
 - i) training on the job

- E. Workers
 - i) Manual labour is required on the job

- F. Others. This category includes occupations not classified under the previous five categories. However, it was decided to further subdivide this 'other' category as follows: -
 - Orchardist/Grower
 - Farmer (sheep, dairy, pigs, poultry etc)
 and those in Retirement, as these were the occupational groupings of those who filled the 'other' category.

Table 24 sets out the occupational groups of the males

residing on the farmlets.

TABLE 24
OCCUPATIONAL GROUPS OF MALES
 (BY FARMLET SIZE)

<u>Farm-Profes- let sional Size</u>	<u>8.82</u>	<u>Semi Profes- sional</u>	<u>16.18</u>	<u>Trade</u>	<u>16.18</u>	<u>Clerical Sales & Service</u>	<u>7.35</u>	<u>Worker</u>	<u>13.23</u>	<u>Orchardist /Grower</u>	<u>22.06</u>	<u>Farmer</u>	<u>2.94</u>	<u>Retired</u>	<u>13.23</u>	<u>% of Total</u>	<u>47.89</u>
A	8.82	16.18	16.18	7.35	13.23	22.06	2.94	13.23	47.89								
B	13.21	20.75	15.09	5.66	5.66	26.42	3.77	9.43	37.32								
C	14.30	9.52	9.52	-	9.52	47.62	9.52	-	14.79								
% of Total	11.27	16.90	14.79	5.63	9.86	27.46	4.23	9.86	100%								

Table 24 shows that only 31.69 percent of the male respondents regard their occupation as orchardist/grower/farmer, compared with 58.45 percent whose occupations could be classified as urban based. The remaining 9.86 percent regarded themselves as retired. In other words, the survey indicated that the farmlet owners were from a wide range of occupations. Table 24 also suggests that size of farmlet does have some influence on the occupation of the owner. It can be seen that in group 'C', those involved in orcharding/growing, represent 47.62 percent of the males in this farmlet size group, whereas those in group 'B' represent 26.42 percent, and those in group 'A' represent 22.06 percent. From this, one can hypothesise that within the bounds of this study the larger the farmlet, the more likely the owners occupation will be related to agriculture, ie: orchardist/grower. (For a break down of occupations refer to Appendix B).

Question 21, of the questionnaire asked the respondents if they were engaged in any full time or part-time employment away from their property. Table 25 sets out their response.

TABLE 25.

EMPLOYMENT: FULL-TIME AND PART-TIME OF FARMLETOCCUPIERS (AS PERCENTAGES)

<u>Farmlet Size</u>	<u>Away from Farmlet</u>		<u>Full-time on Farmlet</u>		<u>Percentage of Total</u>
	<u>Full- time</u>	<u>Part- time</u>	<u>(Work)</u>	<u>(Retired)</u>	
A	52.73	22.97	9.46	14.86	46.54
B	44.26	21.31	24.59	9.84	38.37
C	45.83	16.67	37.50	-	15.09
<u>% of Total</u>	48.43	21.39	19.49	10.69	100.00

The evidence in table 25 shows that 69.82 percent of male farmlet owners are employed either full-time or part-time away from their farmlet, and only 19.49 percent actually earn their living by working their farmlet full-time. In fact, 48.43 percent of the owners are employed full-time away from their farmlets.

Table 25 also suggests that of those employed full time on their property, the greater proportion come from the larger sized farmlets, group C. For example, 37.50 percent of the farmlet owners in group C were employed full-time on their farmlets compared with 24.59 percent in group 'B' and 9.46 percent in group A. Therefore, one can hypothesise that, the larger the farmlet, the greater the probability that the owner will be employed full-time on his farmlet.

The distribution of farmlets by on-farmlet employment is mapped in figure 10 (located in map pocket at rear). From figure 10 it can be seen that there is a wide distribution of both full-time and part-time farmed farmlets through out the study area, reflecting the general pattern of farmlet location as noted in figure 8.

Wives in Employment

The respondents were asked in question 22(a) what, if any, was their wives occupation other than housewife? In question 22(b) they were asked if their wife's employment was full-time

or part-time (ie; less than 20 hours per week). Of the 163 farmlet owners who responded to the questionnaire, 4 were female. Of the 159 males, 13 were unmarried. Of the 146 wives, only 53 were in some form of employment. Table 26 sets out the occupational groups of all women in employment (other than housewives).

TABLE 26
OCCUPATIONAL GROUPS OF FEMALES (BY FARMLET SIZE)

<u>Farm-</u> <u>let</u> <u>Size</u>	<u>Profes-</u> <u>sional</u>	<u>Semi</u> <u>Profes-</u> <u>sional</u>	<u>Trade</u>	<u>Clerical</u> <u>Sales &</u> <u>Service</u>	<u>Worker</u>	<u>Orchardist</u> <u>/Grower</u>	<u>Farmer</u>	<u>Retired/</u> <u>Widow</u>	<u>% of</u> <u>Total</u>
A	3.45	31.03	-	31.03	3.45	20.69		10.35	50.88
B	-	17.65	-	29.41	-	41.18	5.88	5.88	29.82
C	-	-	-	9.09	9.09	63.64	9.09	9.09	19.30
<u>% of</u> <u>Total</u>	<u>1.75</u>	<u>21.05</u>	<u>-</u>	<u>26.32</u>	<u>3.51</u>	<u>35.09</u>	<u>3.51</u>	<u>8.77</u>	<u>100.00</u>

This table shows that 38.60 percent of females are employed in agriculture, ie: as orchardist/grower/garmer. This corresponds to the 31.69 percent of males who regard their occupations as agricultural. Other than this, the only similarity between male and female occupations is in that 52.63 percent of the females occupations can be classified as urban based compared with the 58.45 percent of urban based males occupations. As might have been expected, there is a greater proportion of females, employed in clerical/sales/service occupations than males. As well, the proportion of females employed in professional and trade occupations is lower than their male counterparts, whilst there is a slight increase in the proportion of females employed in semi-professional occupations when compared with their male counterparts (See Appendix for a more detailed breakdown of occupation categories).

Table 27 sets out the employment basis of wives in employment.

TABLE 27
WIVES IN EMPLOYMENT
(OTHER THAN HOUSEWIFE)

<u>Farmlet Size</u>	<u>Full-time</u>		<u>Part-time</u>		<u>Percentage of total</u>
	<u>Away</u>	<u>Home</u>	<u>Away</u>	<u>Home</u>	
A	26.92	7.69	42.31	23.08	49.06
B	18.75	6.25	37.50	37.50	30.19
C	-	27.27	9.09	63.64	20.75
<u>% of Total</u>	<u>18.87</u>	<u>11.32</u>	<u>33.96</u>	<u>35.85</u>	<u>100.00</u>

From table 27 it can be seen that 47.17 percent of wives in employment, do work at home; the majority probably on the farmlet as table 26 suggests, in that 38.60 percent of the women appear to work in agricultural occupations. On the other hand, 52.83 percent of the women are employed away from the farmlet.

Distance travelled to work

From table 21 it was found that there was a reliance on the nearest town by farmlet occupiers for their off-farmlet employment. The trend is the same for female workers.

Family Income

Now that we have seen into what occupational groups the respondents have been placed, it is of interest to find out what family income group the respondents are in.

It should be noted that replies to the family income question of the farmlet owners have two deficiencies:

i) 'family income' was not defined, and ii) whether the income was gross or net, was not specifically pointed out to the respondent. The author has interpreted family income in this study as the gross income earned by the respondent, and where the respondent was married to include that of the spouse. It should be noted that 53 spouses were in some form of employment. The following tables, 28(a), (b), (c) and (d).

set out the responses.

TABLE 28(a)
FAMILY INCOME GROUPING FOR THOSE WHO WORK FULL-TIME
AWAY FROM THE FARMLET

Farmlet Size	Income Groups in Dollars					Percentage of total
	\$5,000	\$5,000-\$9,999	\$10,000-\$14,999	\$15,000-\$19,999	\$20,000+	
A	13.89	25.00	36.11	16.67	8.33	50.00
B	3.85	50.00	23.07	11.54	11.54	36.11
C	-	30.00	30.00	10.00	30.00	13.89
% of Total	8.33	34.72	30.56	13.89	12.50	100.00

TABLE 28(b)
FAMILY INCOME GROUPING FOR THOSE WHO WORK PART-TIME
AWAY FROM THE FARMLET

Farmlet Size	Income Groups in Dollars					Percentage of total
	\$5,000	\$5,000-\$9,999	\$10,000-\$14,999	\$15,000-\$19,999	\$20,000+	
A	23.53	29.41	29.41	17.65	-	50.00
B	15.38	53.85	7.69	15.38	7.69	38.23
C	-	75.00	-	25.00	-	11.77
% of Total	17.65	44.12	17.65	17.65	2.93	100.00

TABLE 28(c)
FAMILY INCOME GROUPING FOR THOSE WHO WORK FULL-TIME
ON THEIR FARMLET

Farmlet Size	Income Groups in Dollars					Percentage of total
	\$5,000	\$5,000-\$9,999	\$10,000-\$14,999	\$15,000-\$19,999	\$20,000+	
A	30.00	10.00	50.00	-	10.00	34.48
B	9.09	54.55	18.18	9.09	9.09	37.93
C	-	62.50	25.00	12.50	-	37.59
% of Total	13.79	41.38	31.03	6.90	6.90	100.00

TABLE 28 (d)

FAMILY INCOME GROUPING FOR THOSE RETIRED AND/OR WIDOWED

Farmlet Size	Income groups in Dollars					Percentage of total
	\$5,000	\$5,000-9,999	\$10,000-14,999	\$15,000-19,999	\$20,000+	
A	37.50	50.00		12.50	-	72.73
B	33.33	33.33	33.33	-	-	27.27
C	-	-	-	-	-	-
% of Total	36.36	45.46	9.09	9.09	-	100.00

From table 28 (a), (b), (c) and (d) it is evident that the most common family income is in the range between \$5,000 and \$15,000, whether or not the respondents worked away from their farmlet or at home on it. As one might have expected, a high percentage of retired people (36.36 percent) said that they earned less than \$5,000 per year, although 45.46 percent said that their income was between \$5,000 and \$9,999.

It can be seen that there is a wide distribution of family incomes, in particular for those who work either full-time, or part-time away from their farmlets. These two groups include the majority of families whose incomes were in excess of \$15,000 per year. In table 28(a), 26.39 percent of the families had incomes greater than \$15,000 per year. In table 28(b), 20.58 percent of the families had incomes greater than \$15,000 per year, whereas, in table 28(c) only 13.8 percent of the families had incomes greater than \$15,000 per year, and in table 28(d) only 9.09 percent had incomes greater than \$15,000 per year. From this, one can conclude, that of those families living on farmlets between 0.8 and 10.0 hectares in size, those earning the larger family incomes are not those families who earn their income from working full-time on the farmlet, but those who are employed away from their farmlets either full-time or part-time.

Net Income

Tables 28 (a) (b) (c) and (d) referred to the family income of the respondents. The author has interpreted family

income as gross income. It is of interest to know whether the household obtained any net income from the farmlet during the previous twelve months. Net income was taken to be income remaining after all costs of production are subtracted from the gross income. Table 29 sets out the response to the net income question.

TABLE 29
NET INCOME OBTAINED FROM THE FARMLET

<u>Farmlet Size</u>	<u>Yes</u>	<u>No</u>	<u>Total</u>
A	38 (55.88)	30 (44.12)	68 (100.00)
B	37 (63.79)	21 (36.21)	58 (100.00)
C	21 (91.30)	2 (8.70)	23 (100.00)
<u>TOTAL</u>	<u>96 (64.43)</u>	<u>53 (35.57)</u>	<u>149 (100.00)</u>

The evidence in table 29 shows that of the 149 respondents, 64.43 percent obtained some net income from their property during the previous 12 months (July 1976 to July 1977). It is of interest to see that only 55.88 percent of the respondents earned some net income from properties between 0.8 and 3.999 hectares. This compares with 63.79 percent from properties between 4.0 and 7.999 hectares, and with 91.30 percent from properties between 8.0 and 10,000 hectares. From this, one can conclude that net income from farmlets is related to size of farmlet, in particular, the larger the farmlet the more likelihood there is of some net income being obtained from the farmlet.

Question 25 asked what proportion of the households total net income during the past 12 months was obtained from use of the farmlet, and what use of the farmlet contributed MOST to the net cash income obtained. The response to these questions are set out below in table 30.

TABLE 30
PROPORTION OF HOUSEHOLDS TOTAL NET INCOME
OBTAINED FROM USE OF THE FARMLLET

Farmlet Size	All	3/4	$\frac{1}{2}$ - 3/4	$\frac{1}{4}$ - $\frac{1}{2}$	$\frac{1}{4}$	Total
A	5(13.16)	3(7.89)	3(7.89)	7(18.42)	20(52.63)	38(39.58)
B	7(18.92)	3(8.11)	3(8.11)	5(13.51)	19(51.35)	37(38.54)
C	5(23.81)	4(19.05)	2(9.52)	2(9.52)	8(38.10)	21(21.88)
TOTAL	17(17.71)	10(10.42)	8(8.33)	14(14.58)	47(48.96)	96(100.00)

(percentages in brackets)

This table shows that of those who obtain greater than three-quarters of their total net income from their farmlet, the majority come from the larger farmlets, those between 8.0 and 10.0 hectares. The opposite runs true also. That is, the smaller the farmlet, the lower the proportion of total net income obtained from the farmlet.

Further, from table 30 it can be seen that it is possible for even a 0.8-3.9 hectare farmlet to provide a sufficient income to support a family. Furthermore table 28(c) suggests that it is not possible to dismiss these incomes as 'low' - there is a greater than .5 probability that incomes will be above \$10,000 a year.

What use of the farmlet contributed MOST to the net cash income obtained? Table 31 gives an account of this.

TABLE 31
USE OF THE FARMLLET CONTRIBUTING MOST TO THE NET CASH
INCOME OBTAINED

USE OF FARMLLET	FARMLLET SIZE			Total
	A	B	C	
Letting some of the land to someone else	8(21.05)	2(5.41)	2(9.52)	12(12.50)
Grazing or animal husbandry	6(15.79)	11(29.73)	5(23.81)	22(22.92)
Growing commercial crops	22(57.90)	24(64.86)	14(66.67)	60(62.50)
Industry (Exclude those above)	-	-		

Table 30(cont.)

<u>Use of Farmlet</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>TOTAL</u>
Business (retail/wholesale/ service BUT not sale of unprocessed agricultural produce	-	-		
Other (rent from house & bloodstock agency)	2(5.26)	-		2(2.08)
<u>TOTAL</u>	<u>38(39.58)</u>	<u>37(38.54)</u>	<u>21(21.88)</u>	<u>96(100.00)</u>

(percentages given in brackets)

The evidence in table 31 stresses the fact that the uses made of the farmlets to obtain net cash income, are related to agricultural production, in particular that of growing commercial crops, which account for 62.50 percent of the uses of the farmlets to obtain the majority of their net incomes, compared with grazing or animal husbandry (22.92 percent) as the second most common means to obtain net cash income from the farmlet.

How Did Respondent Come to Occupy the Farmlet?

Question 20 , asked the respondents whether they bought, inherited, leased or rented the land that they now use. Their replies are set out below in table 32.

TABLE 32

OWNERSHIP OF THE FARMLET

<u>Farmlet Size</u>	<u>Buy</u>	<u>Inherit</u>	<u>Lease</u>	<u>Total</u>
A	65	12	-	77
B	59	2	-	61
C	20	2	1	23
<u>TOTAL</u>	<u>144</u>	<u>16</u>	<u>1</u>	<u>161</u>

From table 32 it can be seen that only one respondent leases his farmlet. The majority of respondents (89.44 percent) actually bought their farmlets, while only 9.94 percent inherited their farmlets. Of those that inherited their farmlets, the majority inherited farmlets between 0.8 and 3.999 hectares.

Mortgages

Having ascertained that 89.44 percent of the respondents actually bought their farmlets, it is of interest to know whether the respondents needed a mortgage to buy their farmlet and if they did to find out details of that mortgage. The following tables 33(a), (b), (c), (d), (e) and (f) table the responses offered to the questions relating to mortgages.

TABLE 33(a)

	<u>Mortgage</u>	<u>Necessary</u>	<u>Type of Mortgage</u>			<u>No mortgage</u>	<u>Total</u>
			<u>1st</u>	<u>2nd</u>	<u>3rd</u>		
A	48	(42.48%)	47	20	2	23	71
B	45	(39.82%)	42	11	6	11	56
C	20	(17.70%)	20	6	3	3	23
<u>TOTAL</u>	<u>113</u>	<u>(100.00%)</u>	<u>109</u>	<u>37</u>	<u>11</u>	<u>37</u>	<u>150</u>

From table 33(a) it can be seen that 113 (75.33 percent) of the respondents did need at least one mortgage to help them purchase their farmlets. Of these mortgages 33.94 percent required second mortgages, and 10.09 percent required third mortgages to purchase their farmlets. (Two respondents failed to give any details of their mortgages)

TABLE 33(b)

TYPE OF LENDERS AND NUMBER OF MORTGAGES

<u>Lender</u>	<u>First Mortgage</u>		<u>Second Mortgage</u>		<u>Third Mortgage</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Bank	25	22.94	7	18.92	2	18.18
Govt. Institution	18	16.51	14	37.84	3	27.27
Insurance Company	4	3.67	1	2.70	-	-
Stock Firm	1	0.92	-	-	-	-
Other Firm	15	13.76	2	5.41	1	9.10
Vendor	5	4.59	2	5.41	3	27.27
Solicitor	34	31.19	5	13.51	-	-
Relative	4	3.67	5	13.51	2	18.18
Other Person	3	2.75	1	2.70	-	-
<u>TOTAL</u>	<u>109</u>	<u>100.00</u>	<u>37</u>	<u>100.00</u>	<u>11</u>	<u>100.00</u>

The evidence in table 33(b) suggests that Solicitors, Banks and Government Institutions (ie: traditional lenders in the farming sector, with the exception of relatives) were important lenders of finance for first mortgages, to the farmlet owners. These lenders account for 70.64 percent of all first mortgages. Of this, solicitors accounted 31.19 percent of these first mortgages. With the second mortgages, the dominance of solicitors declined as lenders and Government Institutions took over as the dominant lender. Again, Solicitors, Banks, Government Institutions plus relatives accounted for 83.78 percent of the second mortgages. With third mortgages, one can see the total decline of solicitors as money lenders, and the emergence of relatives, vendors and other firms namely building societies as money lenders for third mortgages along with the traditional lenders, Banks and Government Institutions.

Table 33(c) shows the number of each type of mortgage repayment arrangement made by the property owners.

TABLE 33(c)

TYPE OF MORTGAGE REPAYMENT

<u>Type of Repayment</u>	<u>First Mortgage</u>		<u>Second Mortgage</u>		<u>Third Mortgage</u>		<u>TOTAL</u>
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	
Table	90	66.67	23	63.89	6	66.67	119
Flat	45	33.33	13	36.11	3	33.33	61
<u>TOTAL</u>	<u>135</u>		<u>36</u>		<u>9</u>		<u>180</u>

As can be seen in table 33(c), approximately two thirds of the mortgage repayments, of the first, second and third mortgages were TABLE REPAYMENTS, the remaining payments being FLAT PAYMENTS. The majority of mortgages given by solicitors accounted for the high number of FLAT REPAYMENTS.

Table 33(d) compares the length of terms of the mortgages.

TABLE 33(d)
LENGTH OF TERM OF MORTGAGE (YEARS)

Type of Mortgage	<u>3yrs</u>	<u>3-6yrs</u>	<u>6-10yrs</u>	<u>10-15yrs</u>	<u>15-25yrs</u>	<u>25yrs</u>	<u>TOTAL</u>
First	9	23	4	11	23	13	83
Second	3	9	3	3	3	1	22
Third	-	1	2	1	-	-	4
	<u>12</u>	<u>33</u>	<u>9</u>	<u>15</u>	<u>26</u>	<u>14</u>	<u>109*</u>

From this table it appears that of the 109 replies, the most common length of time for repayment was between 3 and 6 years, followed by 15 - 25 years, even though there is a wide distribution of repayment times. It must be noted, that some of the respondents use their bank overdrafts as a means of pseudo-mortgage, thereby having an indefinite period of time for repayment. This accounted for a further 8 replies.

* It is to be noted, that a number of respondents omitted further information about their mortgages. Some because they could not recall the relevant information as they had already paid them off, and others for reasons better known to themselves.

Table 33(e) puts forward the interest rates of the mortgages lent to the farmlet owners. This table has grouped the interest rates into four categories, for computational convenience.

TABLE 33(e)
INTEREST RATES OF THE MORTGAGE

Type of Mortgage		<u>5%</u>	<u>5-8%</u>	<u>8-11%</u>	<u>11%</u>	<u>TOTAL</u>
First	No	8	32	41	15	96
Mortgage	%	8.33	33.33	42.71	15.63	100.00
Second	No	1	12	18	1	32
Mortgage	%	3.13	37.50	56.24	3.13	100.00
Third	No	1	4	3	3	11
Mortgage	%	9.09	36.37	27.27	27.27	100.00
TOTAL		<u>10</u>	<u>48</u>	<u>62</u>	<u>19</u>	<u>139</u>

The evidence from table 33(e) suggests that the most common rates of interest on the mortgage repayments were between 8 and 11 percent, and between 5 and 8 percent.

Although 75.33 percent of the farmllet purchases required mortgages, the percentage of debt to the current market value appeared to be low. Table 33(f) sets out the responses to the question on the percentage of debt relative to current market value on the mortgaged properties.

TABLE 33(f)
PERCENTAGE OF DEBT RELATIVE TO CURRENT MARKET
VALUE ON MORTGAGED FARMLETS

	<u>20%</u>	<u>21-30%</u>	<u>31-40%</u>	<u>41-50%</u>	<u>51-60%</u>	<u>61-70%</u>	<u>70%</u>	<u>TOTAL</u>
Number	31	35	15	3	1	3	3	91
%	34.07	38.46	16.48	3.30	1.09	3.30	3.30	100.00

The evidence in table 33(f) shows that the percentage of debt to the current market value is low as 72.54 percent of the mortgaged properties had debts lower than 30 percent of the current market value.

Reason for Purchase of the Farmllet

Part of question 21 asked the respondents why they settled for horticulture farming. There were 105 replies to this question, and it was assumed that the replies related to the reason for purchase of the farmllet. Table 34 sets out this response.

TABLE 34
REASON FOR PURCHASE OF THE FARMLET

<u>REASON</u>	<u>NUMBER</u>	<u>PERCENTAGE</u>
Inheritance	8	7.62
Like farm life	46	43.81
All trained for	8	7.62
Hobby	6	5.71
Part time	13	12.38
Retirement	7	6.67
Dont like city life	14	13.33
Other (future home)	3	2.86
<u>TOTAL</u>	<u>105</u>	<u>100.00</u>

The most common single reason given by the respondents for the purchase of their farmlets was that they liked farm life. This was taken to imply that they preferred a rural environment to that of an urban environment. Coupling these two reasons (like farm life, and don't like city life) it is seen that 57.14 percent of the respondents purchased their farmlets for one of these two reasons.

Reasons for purchase, such as those mentioned above, and others like part-time, future home and hobby farms need not necessarily be associated with optimal use of farming resources. On the contrary, the emphasis on 'rural environment' and favourable conditions for the bringing up of children, suggest that the farmlets are to serve recreational purchases and a style of living. How the land is used and to what intensity it is farmed, will be discussed in Chapter IV.

Table 35 outlines stated unforeseen advantages and disadvantages.

TABLE 35
UNFORSEEN ADVANTAGES AND DISADVANTAGES IN RURAL
FARMLET LIVING

<u>ADVANTAGES</u>	<u>DISADVANTAGES</u>
Investment	Capital cost
Rural living	Roading
Rural environment/Open Spaces	Distance from recreation
Privacy	Travelling time
Hobby	Extra work involved/time
Opportunity to develop commercial asset	Water table
Quality of the land	Poor returns from money invested
Inexpensive living	Lack of housing
Protection from inflation	Lack of capital
Property has become self-sufficient	Local market prices
Supplements income	
Increase in land value	

It should be remembered that many of the respondents are urban people, used to urban ways, and the advantages of a rural way of life far outweigh (in their minds) any disadvantages that might have occurred. Most went into the investment

decision with their "eyes open", and were prepared for most of the set backs that might have arisen. Not one of the respondents would settle for any other mode of living that is available to them at present.

CHAPTER IV
FARMLLET USE JULY 1976 TO JULY 1977

A Functional Classification of Rural 'B' Farmlets

The rural 'B' farmlets are not easily classified into functional groupings (orchards, cropping units, pastoral units) for a majority of farmlets do not confine themselves to a single agricultural activity. While some farmlets have become specialized in a single general activity, (eg orcharding or process cropping) many farmlets carry on a remarkable diversity of farming activities, whereas some farmlets are not involved in any farming activities at all. It is not uncommon to find fruit trees, vegetables, and sheep all on a single farmlet. Data from the questionnaire was analysed to show the participation of rural 'B' 'farmers' in the different agricultural activities. Tables 36(a), (b) and (c) show the results of this analysis by size and category of farmlet.

TABLE 36(a)
ANALYSIS OF OCCURRENCE OF DIFFERENT GENERAL
FARMLLET ACTIVITIES FOR FARMLETS BETWEEN
0.8 AND 3.9 HECTARES IN SIZE

	Farmlets on which the activity is done		Farmlets on which activity is of some economic importance		Farmlets where the activity is dominant	
	No	%	No	%	No	%
Orcharding	18	24.32	18	24.32	15	20.27
Market Gardening*	23	31.08	22	29.73	17	22.97
Process Cropping*	7	9.46	7	9.46	6	8.11
Dairying	-		-		-	
Sheep farming	13	17.57	11	14.86	5	6.76
Beef Cattle	9	12.16	7	9.46	2	2.70
Other inc. pigs, poultry, vines, horses forestry	16	21.62	13	17.57	9	12.16

Sample size = 74

* On many farmlets the distinction between process and market crops is not made in the field, but only at the point of sale, for many varieties of these crops are suitable for both canning and fresh consumption.

TABLE 36 (b)

ANALYSIS OF OCCURRENCE OF DIFFERENT GENERAL FARMLET
ACTIVITIES FOR FARMLETS BETWEEN 4.0 AND 6.9 HECTARES IN SIZE

	Farmlets on which the activity is done		Farmlets on which activity is of some economic importance		Farmlets where the activity is dominant	
	No	%	No	%	No	%
Orcharding	20	33.33	19	31.67	18	30.00
Market Gardening*	12	20.00	12	20.00	9	15.00
Process Cropping*	6	10.00	5	8.33	4	6.67
Dairying	-		-		-	
Sheep farming	22	36.67	17	28.33	8	13.33
Beef cattle	15	25.00	9	15.00	3	5.00
Other incl. pigs poultry vines, horses forestry	9	15.00	5	8.33	5	8.33

Sample size = 60

TABLE (c)

ANALYSIS OF OCCURRENCE OF DIFFERENT GENERAL FARMLET
ACTIVITIES FOR FARMLETS BETWEEN 7.0 AND 10.0 HECTARES IN SIZE

	Farmlets on which the activity is done		Farmlets on which activity is of some economic importance		Farmlets where the activity is dominant	
	NO	%	No	%	No	%
Orcharding	11	45.83	9	37.50	9	37.50
Market Gardening*	5	20.83	5	20.83	4	16.67
Process Cropping*	6	25.00	6	25.00	4	16.67
Dairying	-		-		-	
Sheep farming	8	33.33	4	16.67	-	
Beef Cattle	4	16.67	3	12.50	1	4.17
Other, incl pigs, poultry, vines, horses, forestry	5	20.83	3	12.50	2	8.33

Sample size = 24

Orcharding occurred on approximately one third of the farmlets, sheep farming on just over one quarter of the

farmlands, and market gardening on one quarter of the farmlands. Process cropping occurred on only 12 percent of the sampled farmlands.

Analysis of the occurrence of different general farmland activities, by farmland size, shows that size does have some bearing on the type of activity undertaken. From tables 36 (a), (b) and (c), it can be seen that there is a significant increase in the percentage of properties undertaking orcharding as an activity as the size of the farmlands increases.

Market gardening as an activity carried out on the farmlands decreases in popularity as the farmlands increase in size. It is most common as an activity on farmlands between 0.8 and 3.9 hectares in size.

Process cropping, on the other hand, represents about 10 percent of the activities carried out on farmlands between 0.8 and 3.9 hectares but in larger farmlands, its popularity as an activity increases to 25 percent.

Of the above mentioned activities, most are of some economic significance to the farmland and in general are the dominant activities of the farmlands.

Pastoral activities, with the exception of dairying, occur on all sized farmlands, with the medium sized farmlands (4.0 - 6.9 ha) proving the most popular, followed closely by the larger sized farmlands (7.0 - 10.0 ha). Although these pastoral activities are carried out throughout the rural 'B' zone, their significance to the farmlands economies is considerably less than orcharding, market gardening or process cropping. The frequency of pastoral activities as dominant activities on farmlands is small.

In general it can be said that, the more intensive the form of agriculture undertaken on the farmlands the more likely it is that these activities will be the dominant activity of the farmland. Further, market gardening proves more popular on the smaller sized farmlands (0.8 - 3.999ha) than the larger sized farmlands, whereas both orcharding and process cropping occur with increasing popularity on the larger sized properties.

Figure 11 (located in the map pocket at rear) maps the land-use of the farmlets on the basis of dominant farmlet activity. Figure 11 reflects the patterns above. From figure 11, the majority of orchard 'dominated' farmlets are located around the periphery of Hastings, while a smaller cluster of pastoral 'dominated' farmlets are located around Ngatarawa and Bridge Pa. In general, there appears to be no specific pattern of land-use based on location.

Pastoral Activities

One would expect pastoral activities to occupy that land not otherwise required for more lucrative activities, as nearly any other agricultural use is likely to bring greater profits, if the land is suitable and if there is a market for the product. This coupled with the fact that the farmlets could be uneconomic for pastoral activities, as the Heretaunga Plains provides good agricultural soils and established markets for more intensive farms of agricultural production. Table 37 sets out the range of pastoral activities carried out on the farmlets.

TABLE 37

PASTORAL ACTIVITIES

<u>Farmlet Size</u>	<u>Farmlets that have Pastoral Activities</u>		<u>No. farmlets with Activity</u>				<u>Farmlet let</u>		<u>Other</u>
			<u>Sheep</u>	<u>Cattle</u>	<u>Horses</u>	<u>Pigs</u>	<u>Sheep</u>	<u>Cattle</u>	
A	24	32.43%	10	8	7	3	3	4	3
B	31	51.67%	22	13	5	5	2	1	1
C	8	33.33%	7	4	1	2	-	-	-

The evidence in table 37 suggests that a high percentage of the farmlets are involved in some form of pastoral activity. Of the farmlets between 4.0 and 6.9 hectares in size, approximately 52 per cent are involved in pastoral activities. The most common pastoral activity is that of sheep farming. Although a large number of the farmlets participate in pastoral activities, one would assume that these activities would be run on a casual/hobby basis.

Table 38 gives more detailed information on stocking rates for pastoral activities.

TABLE 38
AVERAGE STOCK NUMBERS/HECTARE BY FARMLET SIZE

<u>FARMLET SIZE</u>	<u>STOCK</u>			
	<u>Sheep</u>	<u>Cattle</u>	<u>Pigs</u>	<u>Horses</u>
A	10.3	3.7	1.7	1.3
B	11.1	0.4	0.4	0.8
C	9.7	2.0	1.9	0.4

From table 38 it can be seen that intensity of stocking varies only minimally with size of farmllet for both sheep and cattle. The variation in pig stocking rates arises because there was one commercial piggery in the smallest and largest size categories which create a large bias in a small sample. The decline in stocking rates for horses as size of farmllet increases is caused by the presence of two stud farms in the smallest size category and the recreational nature of keeping horses. This leads to the fact that one could earn a living full-time from a small sized farmllet if he were to train race horses and/or run a stud farm.

By converting stock numbers to a standard base (ewe equivalents), an indication of overall intensity of pastoral use can be obtained. The standard carrying capacity formula based on ewe equivalents per hectare was established with the following livestock conversion table 39.

TABLE 39
LIVESTOCK CONVERSION TABLE - EWE EQUIVALENTS

<u>STOCK TYPE</u>	<u>CONVERSION RATE</u>		
Ewes	1.0		
Hoggets	0.6	0.8	(Average due to large numbers of whether hoggets and overall diversity of flock type).
Other	0.8		
Cows	6.0		
Calves	3.0	5.0	(Average due to diversity of stock type)
Bulls	5.0		
Other	4.0		

(Horses and pigs were omitted from the conversion due to the bias already mentioned)

Table 40 outlines the ewe equivalents/hectare for the farmlets.

TABLE 40
EWE EQUIVALENTS/HECTARE

	<u>FARMLLET SIZE</u>		
	<u>A</u>	<u>B</u>	<u>C</u>
Sheep	8.24	8.88	7.76
Cattle	18.50	18.00	10.00
<u>Average EE/ha</u>	<u>13.4</u>	<u>13.4</u>	<u>8.9</u>

Table 40 indicates that for small and medium sized farmlets the stocking rate is 13.4 ewe equivalents/hectare, but the rate falls for larger farmlets to 8.9. For the farmlets surveyed, the average stocking rate is 11.9 ewe equivalents/hectare. This figure compares with an average of 11.5 ewe equivalents/hectare on 10 acre sections in Taupo area (Crawford, 1977) and 4.9 ewe equivalents/hectare on 10 acre sections in the Manawatu (Chiu, 1975).

The stocking rates given above are likely to underestimate the real intensity of stocking. The figures are calculated on the basis of number of stock divided total area of farmlet. However tables 36(a), (b) and (c) suggest that pastoral farming is the dominant activity, and presumably occupies more than half the land on the farmlet (on about a quarter of the farmlets engaging in pastoral activity). At most, half the land area is likely to be used for pastoral activities and the real stocking rate is probably more than double (ie about 24 ewe equivalents/hectare overall. with a higher rate of 27 ewe equivalents/hectare on small and medium farmlets.)

The evidence on pastoral farming suggests that intensity of use in pastoral activities on the Heretaunga Plains farmlets is considerably higher than in the Manawatu and Taupo areas. There is some evidence that intensity of use declines as size of farmlet increases.

Poultry

A number of farmlets carried poultry. Of these 9 sold their eggs and of these 9 farmlets only 2 sold their eggs to the egg floor, and these were on size A properties.

Crop Assemblages

The classification of farmlets according to farmlet activities is a generalization. Within each of the general farmlet activities, there is a large number of different assemblages of crops ranging from apricots to courgettes, and other farmlet products from beef to chickens. For simplicity, each of these will be called 'crop' (including such activities as chicken raising, lamb fattening, nursery plant production). Although several rural 'B' farmlets specialized in one activity, few produced only one crop.

TABLE 41
NUMBER OF CROPS OF FARMLLET CROP ASSEMBLAGES (1976-77)

Farmlet Size	Number of Crops Grown							
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8+</u>
A	10	19	4	4	1	1		
B	6	8	9	5	1		2	
C	3	3	3	3	3	2		1
<u>TOTAL</u>	<u>19</u>	<u>30</u>	<u>16</u>	<u>12</u>	<u>5</u>	<u>3</u>	<u>2</u>	<u>1</u>

Most farmlets sampled, grew assemblages of from two to six crops, although a large number of farmlets have specialized in a single crop. These single crop farmlets, were in general, those that were run on a hobby basis, and the income from the crop (farmlet) netted less than a quarter of the family income.

The questionnaire discovered many different crops on rural 'B' farmlets. Tables 42(a) (b) and (c) list the crops found on sample farmlets with their frequency of occurrence noted.

TABLE 42(a) CROPS ENCOUNTERED ON SAMPLE FARMLETS (0.8-3.9 ha)

A. Major Crops

	<u>No. of farmlets with crop</u>	<u>No. of farmlets where it is the principal crop</u>	<u>Mean ha cultivated</u>
Apples	15	9	0.91
Pears	6	2	0.65
Peaches	7	1	0.38
Plums	8	1	0.35
Strawberries	2	2	0.87
Asparagus	1	5	1.42
Beans	3	1	0.10 *
Carrots	1		3.24 *
Peas	1		*
Tomatoes	10	5	0.30
Sweet corn	1	1	0.51
Maize	1	1	1.82
Potatoes	3	2	1.28

*sample too small, or too oddly distributed for mean to be used

B. Other Crops

	<u>No. of farmlets with crop</u>
Pumpkin	2
Blackberries	2
Raspberries	2
Boysenberries	2
Apricots	2
Nectarines	1
Cherries	1
Cabbage	1
Nursery	1
Pastoral activities	24
Poultry	25

TABLE 42(b) CROPS ENCOUNTERED ON SAMPLE FARMLETS (4.0-6.9ha)

A. Major Crops

	<u>No. of farmlets with crop</u>	<u>No. of farmlets where it is the principal crop</u>	<u>Mean ha cultivated</u>
Apples	17	12	2.71
Pears	11	3	1.27
Peaches	12	5	1.99
Plums	7	1	
Strawberries	-	-	
Asparagus	2	1	3.04
Beans	1	-	0.81 *
Carrots	3	1	1.21
Peas	-	-	
Tomatoes	2		0.91
Sweet Corn	3		1.08
Maize	3	2	2.70
Potatoes	3		2.43

*Sample too small, or too oddly distributed for mean to be used

B. Other Crops

	<u>No. of farmlets with crop</u>
Pumpkin	1
Blackberries	1
Raspberries	1
Boysenberries	1
Nectarines	1
Cauliflower	2
Cabbage	2
Celery	1
Lettuce	1
Leeks	1
Barley	1
Pastoral activities	31
Poultry	9

TABLE 42(c) CROPS ENCOUNTERED ON SAMPLE FARMLETS (7.0 - 10.0 ha)

A. Major Crops

	<u>No. of farmlets with crop</u>	<u>No. of farmlets where it is the principal crop</u>	<u>Mean ha cultivated</u>	
Apples	8	1	4.45	
Pears	8	2	1.38	
Peaches	7		1.70	
Plums	6		0.61	
Strawberries	-	-		
Asparagus	1	1	8.09	*
Beans	1	1	1.45	*
Carrots	1		0.81	*
Peas	2		1.46	*
Tomatoes	3		1.55	
Sweet Corn	2		0.40	
Maize	1	1	6.27	
Potatoes	6	3	2.79	

*Sample too small, or too oddly distributed for mean to be used

B. Other Crops

	<u>No. of farmlets with crop</u>
Pumpkin	4
Citrus	2
Nectarines	2
Cherries	1
Cauliflower	1
Gherkins	1
Courgettes	1
Cabbage	1
Barley	1
Pastoral Activities	8
Poultry	3

The grouping of crops into assemblages presents a confusing multiplicity of combinations. From tables 42(a), (b) and (c) there are 32 different crops listed, and within the tables it can be seen that market gardening is predominant in the smaller sized farmlets, whereas orcharding and process cropping increase in frequency as the size of farmlet increases. The mean area of the crops cultivated also increases with increasing farmlet size, as one would expect.

Actual cropping production is shown in table 43.

TABLE 43

CROP PRODUCTION BY FARMLET SIZE AND EMPLOYMENT OF FARMER

<u>Farmlet Size</u>	<u>Apples</u>	<u>Pears</u>	<u>Peaches</u>	<u>Potatoes</u>	<u>Tomatoes</u>	<u>Maize</u>
A <u>Farmer full-time on farm</u>	36.8	49.4	8.64*	35.5*	-	-
<u>Farmer part-time on farm</u>	33.3	28.2	18.0*	-	-	-
B <u>Farmer full-time on farm</u>	41.2	72.3	29.7	-	-	-
<u>Farmer part-time on farm</u>	33.9	32.2	19.9	-	26.3	9.6
C <u>Farmer full-time on farm</u>	49.5	30.0	32.9	52.7	50.2	-
<u>Farmer part-time on farm</u>	-	-	-	25.1	49.5*	9.0*

*Sample too small and figures to be treated with caution

From this, it can be seen in general the yield per hectare increases with size of farmlet and the yield per hectare is higher on farmlets where the farmer works full-time on the farmlet than on farmlets where the farmer works only part-time on the farmlet.

Another indication of the influence of part-time farming on intensity of land-use, is where the average area of farmlets in production are compared for orcharding and cropping. The greater the area of the farmlet used for orcharding and cropping the greater the intensity of land-use. Table 44 shows this information.

TABLE 44
AREA OF FARMLLET USED FOR ORCHARDING AND CROPPING

<u>Farmlet Size</u>	<u>Employment</u>	<u>Average area used for Orchardng and Cropping (ha)</u>	<u>Percent of farmlet used for Orchardng and Cropping</u>
A	Full-time	2.0	71.4
	Part-time	1.23	60.9
B	Full-time	4.99	94.7
	Part-time	3.77	69.3
C	Full-time	7.35	84.8
	Part-time	7.05	78.9

Clearly in all categories, part-time farming uses a lower proportion of land than full time farming. This proportion of land used, varies with the size of the farmlet thereby providing an additional indication that as far as orcharding and cropping is concerned, intensity of use increases with farmlet size.

Gross Income

Whether the farmlet is worked full-time or part-time does not emerge as a factor in pastoral activities, as only two farmlets were not used for this type of farming (farmed on a full time basis). The significance of this factor as a variable in the intensity of use of farmlets is further emphasised by comparing gross revenues of farmlets by employment of farmer (Table 45).

TABLE 45
GROSS REVENUE, FARMLLET SIZE AND EMPLOYMENT OF FARMER

<u>Farmlet Size</u>	<u>Employment</u>	<u>GROSS REVENUE (+\$'000)</u>								
		<u>0-1</u>	<u>1-2</u>	<u>2-4</u>	<u>4-6</u>	<u>6-8</u>	<u>8-10</u>	<u>10-20</u>	<u>20-30</u>	<u>30+</u>
A	Full-time	2	-	1	-	-	1	2	2	4
	Part-time	13	4	10	-	-	2	3	2	-
B	Full-time	-	-	-	-	-	3	2	4	4
	Part-time	8	7	5	3	-	1	7	1	-
C	Full-time	-	-	-	-	-	1	1	-	6
	Part-time	1	-	2	-	-	4	1	1	1

From table 45, the majority of full-time farmers have gross

incomes in excess of \$8,000 per annum, whereas the majority of part-time farmers obtain gross figures less than this figure. However, some part-time farmers can obtain yields as high as full-time farmers and can therefore obtain returns as high or higher than larger farmlets.

Labour on the Farmlets

Further indicators of the intensity of use of part-time farmlets compared to full-time farmlets, is through analysis of the input of labour into the farmlet. Table 46 shows the type of labour used on the farmlets.

TABLE 46
LABOUR EMPLOYED ON FARMLETS

Farmlet Size	Owner Employment	Family			Non-Family	
		Owner	Wife	Children	Permanent	Casual
A	Full-time	17	2	-	4	2
	Part-time	35	31	12		13
B	Full-time	16	4	1	1	2
	Part-time	27	20	12	-	19
C	Full-time	10	4	1	20	1
	Part-time	10	8	8		11

From table 46, it can be seen that a large number of farmlet occupiers, use family (wife and children) labour in their running of the farmlet. This is particularly evident of part-time farmers. Those farmlets that employed permanent non-family labour were in general, the larger sized farmlets. All farmlets employed casual non-family labour, usually during some seasonal period and part-time farmers appeared to depend more on casual labour than do full-time farmers.

A more detailed analysis of the intensity of labour that the farmlet owners put into their farmlets is shown in table 47.

TABLE 47

MAN DAYS PER MONTH WORKED ON FARMLETS BY OWNERS

Farmlet Size	Owner Employment	Man days worker per Month						Seasonal	Variable
		0-5	6-10	11-15	16-20	21-25	26-30		
A	Full-time	-	-	-	-	3	13	1	1
	Part-time	8	6	4	3	4	2	2	6
B	Full-time	-	-	-	-	1	12	1	2
	Part-time	10	8	3	-	-	-	3	3
C	Full-time	-	-	-	-	1	6	2	1
	Part-time	-	3	1	2	1	-	1	2

Clearly in all categories, part-time farmers work a lower proportion of days per month than their full-time counterparts. Even so, some part-time farmers do put in as many man days worked per month as full-timers.

A chi square test with the null hypothesis that there is no relation between man days worked per month on the farmlets and size of farmlet was run. This null hypothesis was accepted.

Climatic Considerations

The climatic regime of Hawke's Bay while slightly more extreme than many other New Zealand regions is ideally suited to a wide range of agricultural activities; activities as diverse as viticulture, cropping and pastoral activities. Although the "Heretaunga Plain is reported to have an annual rainfall variability of 70 percent during January to April, in contrast to 44 percent for all New Zealand stations" (New Zealand, Ministry of Works, 1970, p. 13), actual temperature differences are slight and rainfall only fluctuates marginally. From this we can conclude that climatic conditions do not influence land-use activities from one area of the plains to another, as climatic conditions are constant over the Heretaunga Plain.

Soil Considerations

Many crops and uses occupy Plains land. Most uses are suited to the environmental conditions of the land. Others are made to fit, or the land altered. Thus it is of interest to

see if the soils of the Heretaunga Plains influence farmllet production, and if so, how?

The soils of the Heretaunga Plain are alluvial in origin, and some areas consist of alluvium lifted from the sea, most recently with the 1931 Napier earthquake. Until the twentieth century and substantial river control works, the major Plains streams altered course regularly, leaving a complicated array of soils of different ages, depths and consistencies. Thus any classification of Plains soils is of necessity, done at a very large scale, as pockets of soils of different classes often occupy areas of only a few square yards.

The questionnaire asked for information about soil types on the farmllet and table 48 relates soil type to dominant farmllet activity.

TABLE 48
SOIL TYPE AND FARMLLET ACTIVITY

<u>SOIL TYPE</u>	<u>ACTIVITY</u>									
	Sheep	Cattle	Horses	Pigs	Poultry	Cropping	Horticulture	Viticulture	Forestry	Other
Sandy loam	4		3	1		5	11		1	1
Clay loam	9	2			1	8	13			3
Silt loam	5	5	1			7	22	1		
Clay loam on sand						1	1			1
Deep clay							1			
Peat soils		1				1				1
Alkaline soils	2									
Sand	1			1						
Mixed	4	1	1		1	8	3		1	2

A chi square test was then run on table 48, with the null hypothesis that there is no association between soil type and farmllet activity. It was found that the null hypothesis could not be rejected, and therefore it was concluded that there is no significant effect of soil type on activity and the present location of farmllets is more a function of social

and economic factors than of soil and environment.

Are Returns from Investment of Money and Labour Worth it?

To conclude the questionnaire, the respondents were asked their opinion on whether the returns from the investment of their money and labour were worth while. This question was included to gauge the feelings of the farmlet owners towards small rural farmlets.

The respondents were divided on whether their farmlet purchases were 'worth it'. Some said they were, and others said they were not. Some were divided and said that although returns were not worth it at present, they expected that they will become so in the future.

The reasons behind these divided views are:

- (i) returns from their money and labour are uneconomic
- (ii) returns from their money and labour are economic
- (iii) as an investment the farmlet is worth it, for it is an easy means of 'beating' inflation.

Although the respondents were divided as to whether returns from money and labour were worth it, all were unanimous that the satisfaction of living in a rural environment and producing from the land, more than compensated for any economic ills that may have prevailed.

This concludes the research. Chapter V sets out the studies findings related to the hypotheses.

CHAPTER V

SUMMARY AND CONCLUSION

The main objective of this study was the investigation of the patterns of land-use in the urban/rural fringe of an expanding urban area. The study was divided into two parts. Part one looked at the social geography of the farmlot occupiers, paying particular attention to the relationships between distance and facilities, distance and location. Part two consisted of a land-use study and paid particular attention to land-use and size of farmlot; as size of farmlot gives an indirect measure of the intensity of use as well as seeking any patterns of land-use that became evident.

As found in other studies (Chiu 1975, Crawford, 1977) the shift to the countryside on the urban periphery is a spillover from the urban process. Survey evidence indicated that farmlot occupiers motivation was to reside in a rural environment. The majority gave this reason for the farmlot purchase. Compared to urban and suburban dwellers the area used for housing purposes by the farmlot occupiers was found to be greater. The bulk of the farmlot occupiers had occupations unrelated to agriculture. The occupational and age groupings of the farmlot occupiers was exceedingly varied.

The life style of the farmlot occupiers, whilst enjoying all the benefits of a rural environment was in no way disadvantaged in terms of basic day-to-day facilities and services, except in terms of distance from urban centres. The survey indicated that farmlot occupiers incur higher transport costs than those living in towns, but all were unanimous in that the benefits of living in a rural environment more than offset any distance/transport disadvantage.

The survey showed that only about 20 per cent of the farmlot occupiers earned a living by working on their farmlot full-time. Of these, the survey showed that the larger the size of farmlot the greater the probability that the owner would be employed full-time on the farmlot. Of the others, about 70 percent were employed either full-time or part-time away from the farmlot while the remaining 10 per cent had retired.

The location and distribution of farmlets in the rural 'B' zone was mapped in Figure 9. This shows that the majority of farmlets are located around the periphery of the major urban areas and there is a particular concentration of farmlets in the southern half of the rural 'B' zone, south of the Ngaruroro river. It is also evident from the map that the smaller farmlets tend to be located nearer to the urban centres than larger farmlets.

The majority of farmlets in the study area do not confine themselves to a single agricultural activity, diversity of farming activities is more characteristic. It was found that market gardening, orcharding, process cropping and pastoral activities, with the exception of dairying, occur on farmlets of all size. The significance to the farmlet economies is considerably less for pastoral activities than for market gardening, orcharding and process cropping. However, the survey also indicated that the intensity of use in pastoral activities, whilst lower than market gardening, orcharding and process cropping on the Heretaunga Plains farmlets, is considerably higher than in the Manawatu and Taupo areas.

Whether the farmlet is worked full-time or part-time does not emerge as a factor in pastoral farming because there are no farmlets used for this type of farming which are farmed on a full-time basis. However the survey showed in table 43 that in general the yield per hectare increases with size of farmlet and that yield per hectare is higher on farmlets where the farmer works full-time on the farmlet than on farmlets where the farmer works only part-time on the farmlet.

A further comparison of full-time and part-time farmers showed that the majority of full-time farmers have gross revenues above \$8,000 per annum whereas the majority of part-time farmers obtain gross revenues below this figure. However this is not to say that part-time farmers cannot obtain yields as high as full-time farmers or that small farmlets can not obtain returns as high or higher than larger farmlets.

The survey clearly showed for orcharding and cropping that in all size categories part-time farming uses a lower proportion of land than full-time farming. The proportion of

land used was also found to vary with size of property giving further indication, that as far as orcharding and cropping are concerned, intensity of use increases with farmlet size.

From this, a table of intensity of use was drawn up. (The uses are listed in decreasing order of intensity).
Most intense.

Orcharding and Cropping by full-time farmer on farmlet size 7.0 - 10.0 ha

Orcharding and Cropping by full-time farmer on farmlet size 4.0 - 6.9 ha

Orcharding and Cropping by full-time farmer on farmlet size 0.8 - 3.9 ha

Orcharding and Cropping by part-time farmer on farmlet size 7.0 - 10.0 ha

Orcharding and Cropping by part-time farmer on farmlet size 4.0 - 6.9 ha

Orcharding and Cropping by part-time farmer on farmlet size 0.8 - 3.9 ha

Pastoral farming (by part-time farmer) on farmlets of any size.

*Cropping includes process cropping and market gardening.

From the above it can be concluded that land-use does vary with size of farmlet as well as with on-farmlet employment. A land-use pattern did emerge, one in which location and size of farmlet were related to the distance from the urban area as well as to the intensity of use the farmlet was put to, which is itself influenced by the occupation of the farmlet owner. However, a generalized series of 'rings' about Hastings did occur with orcharding and vegetable production (chiefly market gardening) occupying the area closest to Hastings, then process cropping, with some pastoral activities generally further out. (This can be seen in figure 11).

The factors that influence this land-use pattern were found to be social and economic rather than physical as was found by Chiu 1975, Crawford 1977, and Winn 1968.

From Sinclair's theory we would expect that the value of

land for agricultural purposes to be lower close to an expanding market and to increase with distance away. Although this factor is true for the smaller sized farmlets (the majority of them are located closer to the urban areas) this theory could be discounted due to the fact that there are a large number of farmers earning a full-time living off their farmlet close to Hastings City. This can be clearly seen in Figure 10. From this study it would appear that value of land for agriculture on the Heretaunga Plain would be more dependent on size of farmlet and occupation of farmlet owners than on distance.

From the above table on intensity of use, the three most intense uses on the farmlets were those farmlets where the farmer farmed full-time on the farmlet and with intensity being further based on size of farmlet. Therefore it was concluded that there is a reduction in the intensity of use on the farmlets of the rural 'B' zone as 80 percent of the farmlets in the study were either farmed part-time or not at all. No problems between competing urban and rural uses were evident; therefore it was the conclusion of this study that a new phenomenon is occurring in land ownership in Hawkes Bay, that of 'rural-urbanisation'.

Taking a closer look at Sinclairs theory, it could be argued that 'rural-urbanisation' is an extension of urban expansion providing the increased capital necessary to purchase land that is expected to become urbanized sometime in the future. Quite a few of the farmlet owners mentioned the advantages of buying their farmlets as hedges against inflation with a view to steadily increasing land values. This in itself relates to Sinclairs 'anticipated' value but as to creating a 'zone of uncertainty' there is no evidence from this study, for the majority of farmlet owners worked their farmlets either part-time or full-time. The majority of those farming part-time did so by choice, not by need and they did not appear interested in subdividing their farmlet for future gains. This then excludes the idea of speculative subdivisions. It can also be concluded that Sinclair's theory of a 'zone of uncertainty' around an urban area does not reflect the pattern of land-use evident in this study of farmlets 0.8 - 10.0 hectares in the Hawkes Bay rural 'B' zone.

Part-time farming or 'rural-urbanization' as noted by Jowett (1976) and Research Paper 2/77 is creating a 'peri-urban' zone around major urban areas, due in part to our highly mobile and affluent society. There are many reasons why a person may desire to live in a rural environment not the least common being to 'get away from the city'. It was found in this study that 57 percent of all farmlet owners bought their farmlet because they prefer rural living to urban living. While it is not the intention of this study to get involved in the politics relating to part-time farming/speculative subdivision and the future availability of agriculture land, the author wishes to note that 'rural-urbanization' appears to be on the increase in the Hawkes Bay rural 'B' zone. This is seen when one notes the diverse occupations of the part-time farmlet occupiers. It appears that farmlets used for part-time farming satisfy a need for a section of society in that they provide a lifestyle associated with farming; a rural environment enjoyed by them without the implication of full-time farming. How society copes with this demand remains at present unanswered.

APPENDIX A - THE QUESTIONNAIRE

Some comments on the Questionnaire

The questionnaire was printed into a 12 page booklet. At first appearances the questionnaire looked too large but by the manner in which it was filled out it would appear that length was not as great a deterrent to replies as was anticipated.

Letter to Farmlet Owner

Geography Department,
Massey University,
Palmerston North.

Phone 69 099 Ext. 634

Dear Sir or Madam,

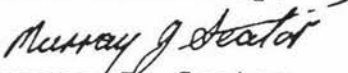
THE GEOGRAPHY OF FARMLETS BETWEEN 2 AND 25 ACRES

I am writing to ask for your help in an enquiry to find out the social and economic geography of 'farmlets' between 2 and 25 acres. I hope that you can assist me by completing the questionnaire enclosed and returning it post-haste in the stamped envelope provided.

Your answers will be treated confidentially and all data reproduced will be in the form of generalized statements and statistical tables.

You may feel that your farm is unsuitable in some way, or that some of the questions do not apply in your particular case. Could you please then return a partially completed questionnaire rather than provide a nil return for either of the above reasons.

Yours sincerely,


Murray J. Seator,
Postgraduate Student.

Reminder Letter to those who had not returned their questionnaire after three weeks.

Geography Department,
Massey University,
Palmerston North.

Phone 69099 Ext. 634

Dear Sir or Madam,

THE GEOGRAPHY OF FARMLETS BETWEEN 2 AND 25 ACRES

You will recall recently receiving a survey enquiry on the Geography of Farmlets between 2 and 25 acres which you were asked to complete and return to the Geography Department at Massey University.

As I have not yet received your reply it is possible that you decided to put it aside until you had some free time. This letter is to remind you of the importance of the study and to ask you once again to complete and return your response as soon as you are able. This would help us considerably.

If you have any problem in answering any of the questions, or have mislaid your questionnaire, please do not hesitate to write and ask the Geography Department for assistance using the stamped reply-paid envelope that you received with your questionnaire.

If you have already replied, thank you for your help.

Yours faithfully,

Murray J Seator

M.J. Seator,
Post Graduate Student

DEPARTMENT OF GEOGRAPHY MASSEY UNIVERSITY

SOCIAL AND ECONOMIC CHARACTERISTICS OF FARMLETS.

Name (optional)

Location of Farm/Farmlet

Description of the Property

1) What is the total area of your property? _____ acres

2) a) Does the property described above have a dwelling on it? YES NO

If no: continue with Question 14.

b) If Yes: is the dwelling used as one of the following: (please tick one)

Regular Home	<input type="checkbox"/>
Weekends and/or holiday	<input type="checkbox"/>
Rarely or not at all	<input type="checkbox"/>

3) a) If the dwelling is NOT your regular home, do you intend to live there? YES NO

b) If yes: when will it be (please tick one)

Within 1 year	<input type="checkbox"/>
Within 3 years	<input type="checkbox"/>
Within 5 years	<input type="checkbox"/>
More than 5 years	<input type="checkbox"/>

4) If you do not reside in the dwelling on the property, does anyone else live in a dwelling on the property as their regular home right now? YES NO

5) If YES: when did the householder begin living there as his or her regular home
Month Year

a) How old is the house? Year

b) If the house is mature, has it been substantially renovated in the last 5 years? YES NO

c) Do you intend making improvements to your house? YES NO

6) What is the approximate area used for housing purposes (include: Lawn, roading, recreational facilities e.g. tennis courts, swimming pools etc.)
..... ac/sq. ft.

7) What is the source(s) of HOUSEHOLD water supply?

Bore
Store rain
Community Scheme
Dam
Spring
Stream
River
Other (specify)

.....

8) a) Is the present water supply adequate? YES NO

b) If NO: What is proposed action?

.....

.....

9) What is your households heating supply based on?

Electricity	
Gas	
Combination Gas/ Electricity	
Other (specify)	

10) What is your household SEWERAGE system?

Night Soil	
Septic Tank	
Piped direct to river/stream	
Piped to Community System	

11) What is the nearest town (of 5000 or more people), and how many miles by road is it from the property to the centre of this town?

TOWN

MILES

12) Where are your daily food and service supplies (i.e. bread, milk, newspapers) obtained from?

Local Dairy/Shop	
In Town	
By Rural Delivery	
Other (specify)	

13) Where are the majority of your Groceries and/or meat bought at a:

Local Supermarket?		
City Supermarket?		
City Store/Butcher?		
Local Store/Butcher?		
Other (specify)		

.....
GROCERIES MEAT

14) Please indicate what age group you are in?

20-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	60+
-------	-------	-------	-------	-------	-------	-------	-------	-----

15) Are you married?

YES NO

16) Do you have any children?

YES NO

If NO: continue with Question 18)

If YES: What are their ages?

And what types of school do your school-age children attend?

Childrens Age	Less than 5 yrs	6-10 yrs	11-12 yrs	13-18 yrs.
School Type	(intended)			
Country School				
City Day School				
Boarding School				
Other (specify)				

17a) How far are the nearest schools from your property?

Primary School MILES

Intermediate School MILES

Secondary School MILES

b) How do your children get to and from school? (exclude boarding school)

Walk	
by Bicycle	
by School Bus	
by Private Car	

18) What are you and your households main forms of entertainment/recreation?
(Please tick as many as appropriate)

Watching T.V.	<input type="checkbox"/>
Going to the Movies	<input type="checkbox"/>
Going to a Hotel/Tavern	<input type="checkbox"/>
Going to a Club	<input type="checkbox"/>
Going to the beach/baths	<input type="checkbox"/>
Going on a picnic	<input type="checkbox"/>
Going to a Sports Club (summer)	<input type="checkbox"/>
Going to a Sports Club (winter)	<input type="checkbox"/>
Other (specify)	<input type="checkbox"/>

19) How far do you have to travel for your main forms of entertainment?
MILES

20) Did you buy, inherit, lease or rent the land that you know use?

Buy	<input type="checkbox"/>
Inherit	<input type="checkbox"/>
Lease	<input type="checkbox"/>
Rent	<input type="checkbox"/>

21) Are you engaged in any full time or part time employment away from your property?

Full Time	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Part Time	YES <input type="checkbox"/>	NO <input type="checkbox"/>

a) What is the location of your place of work, or if more appropriate your base/headquarters?

b) If YES: What is your occupation? (Please be specific) :

c) What is the road distance from home to work? MILES

d) What is your most frequent means of transport to work (Tick ONE only)

Private Car	<input type="checkbox"/>
Public Transport	<input type="checkbox"/>
Other (specify)	<input type="checkbox"/>

If NO: Why did you settle for horticulture farming?

Inheritance	<input type="checkbox"/>
Like farm life	<input type="checkbox"/>
All you were trained for	<input type="checkbox"/>
As a hobby	<input type="checkbox"/>
As Part-Time	<input type="checkbox"/>
In Retirement	<input type="checkbox"/>
Don't like the city	<input type="checkbox"/>
Other (specify)	<input type="checkbox"/>

22a) If, you are married, what if any, is your wife's occupation other than housewife?

Occupation

b) Is it Part-time (i.e. less than 20 hrs/week) or Full-time?

Part-time	<input type="checkbox"/>
Full-time	<input type="checkbox"/>

23) What Family income group are you in?

Less than \$5000	5000-9999	10,000-14,999	15,000-19999	19,000+

24) Did the household obtain any NET cash income during the last 12 months from the use of the property? (Net cash income = income remaining after all costs of production are subtracted from the gross income). YES NO

25) If YES: a) What use of the property contributed MOST to the net cash income obtained?

Letting some of the land to someone else	
Grazing or animal husbandry (include pigs/poultry)	
Growing commercial crops	
Industry (exclude grazing, animal husbandry or commercial cropping)	
Business (retail wholesale, service but NOT sale of unprocessed agricultural produce)	
Other (please state)	

and b) What proportion of the households total net cash income during the last 12 months was obtained from use of the property?

All net income	
Over 3/4 but not all	
Between 1/2 and 3/4	
Between 1/4 and 1/2	
Less than 1/4	

FOR PROPERTY OWNERS

If not a property owner, please continue with Question 32.

26) In retrospect do you feel that the decision to buy this property was a wise one?

YES NO

27) What, if any, are the advantages and disadvantages that were not foreseen when buying this property?

a) Advantages:

.....

.....

.....

b) Disadvantages:

.....

.....

28) Was a mortgage necessary for the purchase of the property?

YES NO

29) If YES: a) Could I ask you details of the mortgage?

Type of mortgage
Type of Lender:

	1st	2nd	3rd
bank			
govt. institution			
insurance co.			
stock firm			
other firm			
vendor			
solicitor			
relative			
other person			

b) What was the interest rate?
What was the term (in years)?
What was type of repayments? (i) Table (Principal & Interest)
(ii) Flat (interest only)

	1st	2nd	3rd

30) In your opinion what proportion of the current market value of land and improvements does your mortgage borrowing represent?

Less than 20%	21-30%	31-40%	41-50%	51-60%	61-70%	71% & over

31) Are your farming operations accepted as a farm business for taxation

YES NO

LAND USE

32) What kind of soil do you have? (Please tick the appropriate answer)

Sandy loam	
Clay loam	
Silt loam	
Clay loam on sand	
Deep clay	
Peat soils	
Alkaline soils (loams)	
Sand	
Don't know-other-mixed	

33) What are the main and secondary farm enterprises?

	Main	Secondary
Sheep		
Cattle		
Horses		
Pigs		
Poultry		
Cropping		
Horticulture		
Viticulture		
Forestry		
Other (specify)		

.....
.....

SHEEP (if not applicable please continue with question 36)

PIGS (If not applicable please continue with question 40).

39) How many pigs, if any, do you normally carry?

sows and gilts	
boars	
other pigs	

HORSES (If not applicable please continue with question 41).

40a) How many horses belonging to you do you have on the farm?

TYPE	NUMBER
Mare(s)	
Stallion(s)	
Gelding(s)	
Others	

b) For what main and secondary purpose are these horses for?

	MAIN	SECONDARY
Recreation		
Breeding (Stud)		
Racing		
Farm work		
Other (specify)		

POULTRY (If not applicable please continue with question 42).

41a) How many birds do you normally have?

CHICKENS	DUCKS	TURKEYS	GEESE

b) Are these birds housed or on free range?

Housed Free Range

c) Are any of the eggs sold?

YES NO

If YES: Are they sold privately or through the egg floor ?

Privately
Egg Floor

GRAZING (If not applicable please continue with question 43)

42a) Was the farm or part of the farm let for grazing to livestock, between June 1975 and June 1976? and between June 1976 and June 1977?

YES NO
YES NO

b) If YES: What was the type and number of livestock, price received per head per week and what was the length of time they were let to graze?

LIVESTOCK	JUNE 1975/76			JUNE 1976/77		
	Number	Length of time (wks)	Price received per head per week	Number	Length of time (wks)	Price received per head per week
Sheep						
Cattle dairy beef						
Horses						
Other (specify)						

FORESTRY (If not applicable please continue with question 44)

43) Could I ask you details of your forestry programme?

YEAR OF PLANTING	SPECIES	AREA (acres)
1973 and earlier		
1974		
1975		
1976		
1977 intended		

CROPPING/ORCHARDING (If not appropriate please continue with question 57).

44) How long have you been engaged in crop farming/orcharding here?

45) Were you in agriculture before? here?

Yes, here	
Yes, other area	
No	

If YES: What kind of agriculture before?

.....

46) When was this land first put into intensive cropping/orchard?

Pre 1900	<input type="checkbox"/>
1900—World War I	<input type="checkbox"/>
1920's	<input type="checkbox"/>
1930's	<input type="checkbox"/>
During World War II	<input type="checkbox"/>
1945—50	<input type="checkbox"/>
1951-55	<input type="checkbox"/>
1956-60	<input type="checkbox"/>
1961—65	<input type="checkbox"/>
1966—70	<input type="checkbox"/>
1971—75	<input type="checkbox"/>
1975—77	<input type="checkbox"/>

47) Do you practice any form of crop rotation? YES NO

48) If YES: What is it? (please be specific)

.....
.....
.....

49) To whom do you sell your crops? (i.e. Markets, Boards, Canneries etc.)

.....
.....
.....
.....
.....

50) What crops did you cultivate between June 1975 and June 1976?
and between June 1976 and June 1977?

What was the total area under production for each crop (acres)?
and What was the total yield (Kilos) for each year?

CROP	YEAR (Please tick)		MAIN CROP	OTHER CROPS	(Please tick)	
	JUNE 75- JUNE 76	JUNE 76- JUNE 77			AREA (acres)	YIELD (Kilos)
Apples						
Pears						
Peaches						
Plums						
Strawberries						
Boysenberries						
Asparagus						
Beans						
Carrots						
Peas						
Tomatoes						
Other (specify e.g. cabbage beetroot etc.						

51) If you deal with a cannery, which crops do you sell to them?

- a)
- b)
- c)
- d)

52) For what particular things has the cannery been of aid to you? (Tick as many as appropriate)

- None
- Planting
- Crop types/seed
- Fertilizers
- Soil tests
- Sprays & pesticides
- Harvesting
- New ideas
- Finance/credit advances
- getting started
- Other (specify)

53a) Do you grow any special varieties and/or crops exclusively for the cannery?

YES NO

b) If YES: What are they?

- a)
- b)
- c)
- d)

- 54) Have you ever taken the cannery's advice on fertilizers? YES NO
- 55) Do you ever use the cannery's machinery/trucks? YES NO
- 56) Do you have a contract with any cannery? (verbal also) YES NO

GENERAL QUESTIONS

- 57) Do you belong to any farmers organisations and/or Co-ops? If so which one(s)?

LABOUR

58) What labour do you employ on your farm? (Include yourself, your family and outside labour)

	FAMILY			NON-FAMILY	
	owner	Wife	Children	Permanent	Casual
Full-time					
Part-time					
Normal hrs/wk					

b) and, what months do you require the most labour?

59a) How many man days labour paid between JUNE 1976 and JUNE 1977?
 MAN DAYS

b) How many woman days labour paid between JUNE 1976 and JUNE 1977?
 WOMAN DAYS

60) How many days do you work yourself each month on the farm?

0-5 days	
6-10 days	
11-15 days	
16-20 days	
21-25 days	
26-30 days	
seasonal	
very variable	
don't know	
don't work on own farm	

61) Did you employ any agricultural contractors last year? YES NO

62) If YES: What were the operations?

63) Please indicate the following (by ticking appropriate boxes)

Do you use a:	Your own	Lease one	Use Processors
1 truck?			
2 tractor?			
3 sprayer?			
4 fertilizer spreader?			
5 harrow?			
6 plough?			
7 pea harvester?			
8 seed drill?			
9 rotary hoe?			
10 spring type cultivator?			
11 hurricane (hawk) picker?			
12 irrigation equipment?			

64) Have you consulted any advisory services regarding your farming operations?

YES NO

If YES: From whom, and how often was advice sought, and was the service of practical use to you?

	From Whom	Number of Times	Whether useful	
			YES	NO
Ministry of Aq & Fisheries				
Cannery				
Catchment Board				
Other (specify)				

65) If you have a truck, what do you use it for? Do you use it commercially?

.....

.....

.....

66) What has been the most important innovation, to you, the farmer?

Bulk handling	<input type="checkbox"/>
new spray procedures	<input type="checkbox"/>
weed control	<input type="checkbox"/>
better machinery (generally)	<input type="checkbox"/>
mechanical harvesting	<input type="checkbox"/>
better plant varieties	<input type="checkbox"/>
grassing down	<input type="checkbox"/>
running farm as a business	<input type="checkbox"/>
permanent crops	<input type="checkbox"/>
intensive planting	<input type="checkbox"/>
irrigation techniques	<input type="checkbox"/>
other (specify)	<input type="checkbox"/>

67) How much would you estimate the yearly gross revenues of the farm, to be in general terms?

\$0-999	<input type="checkbox"/>
\$1000-1999	<input type="checkbox"/>
\$2000-3999	<input type="checkbox"/>
\$4000-5999	<input type="checkbox"/>
\$6000-7999	<input type="checkbox"/>
\$8000-9999	<input type="checkbox"/>
\$10,000-19,999	<input type="checkbox"/>
\$20,000-29,999	<input type="checkbox"/>
\$30,000 +	<input type="checkbox"/>
not producing this year	<input type="checkbox"/>

68) Could I ask you some details of your farm expenditure?

EXPENDITURE	1975/76	1976/77
Cash wages: permanent		
casual		
Interest		
Rates		
Stock purchases		
Stock foods		
Fertilizer		
Lime		
Seeds		
Fuel, oil, grease		
Cartage		
Contracts		
Repairs & maintenance		
Farm requisites		
Heat & light		
Accountancy		
Telephone		
Insurance		
Other expenses		
Total depreciation		

69) What is the total value of your plant and machinery? \$.

70) Do you consider that returns from your investment of money and labour are worth it? why?

.
.
.
.

APPENDIX B

OCCUPATIONS OTHER THAN FARMER OF FARMLAND OWNERS
AND THEIR WIVES (BASED ON KRAUSE, 1971)

Professional

Accountant
 Chemist
 Company Director
 Dentist
 Doctor
 Engineer
 Lawyer
 Landscape Architect
 Manager
 Pilot
 Solicitor
 Vet

Wives
 Dietician
 Lawyer
 Physiotherapist

Semi-Professional

Display Artist
 Jockey
 School Teacher
 Social Worker
 Technical Officer

Nurse
 Secretary
 Technician
 Typist

Trade

Agricultural Contractor
 Block layer
 Builder
 Chef
 Electrician
 Garage Proprietor
 Mechanic
 Panel Beater
 Printer
 Real Estate Agent

Shop Owner

Appendix B (Cont.)

Retail Store Owner

Watch Maker

Clerical, Sales and Service Personnel

Baliff

Clerk

Civil Servant

Sales Manager

Cashier

Clerk

Sales Assistant

Worker

Freezing Worker

Gardener

Labourer

Nurseryman

Truck Driver

Cooks Assistant

Machinist

Nurseryworker

Waitress

Other

Retired

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




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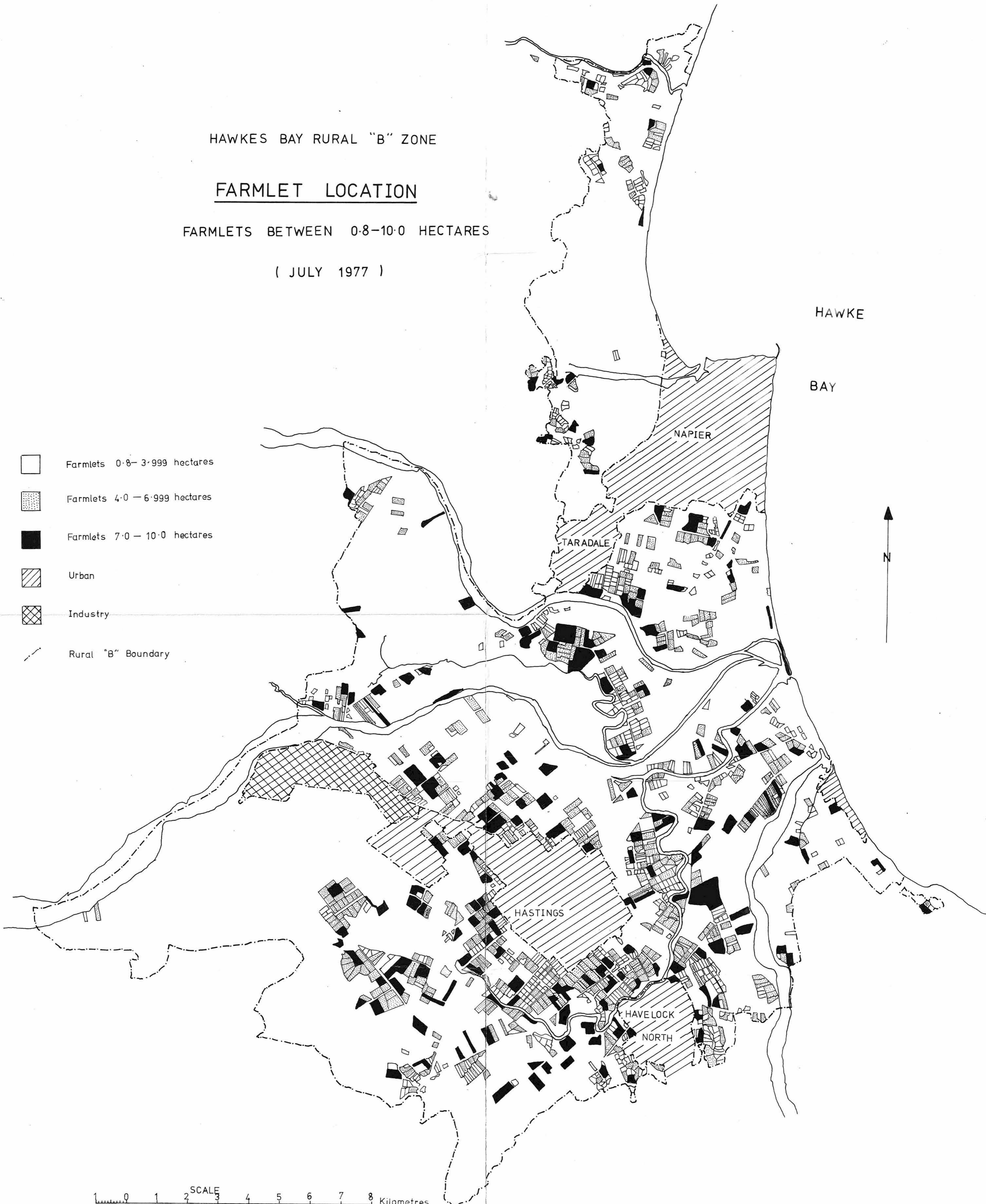
HAWKES BAY RURAL "B" ZONE

FARMLET LOCATION

FARMLETS BETWEEN 0.8-10.0 HECTARES

(JULY 1977)






-  Farmlots 0.8-3.999 hectares
-  Farmlots 4.0-6.999 hectares
-  Farmlots 7.0-10.0 hectares
-  Urban
-  Industry
-  Rural "B" Boundary

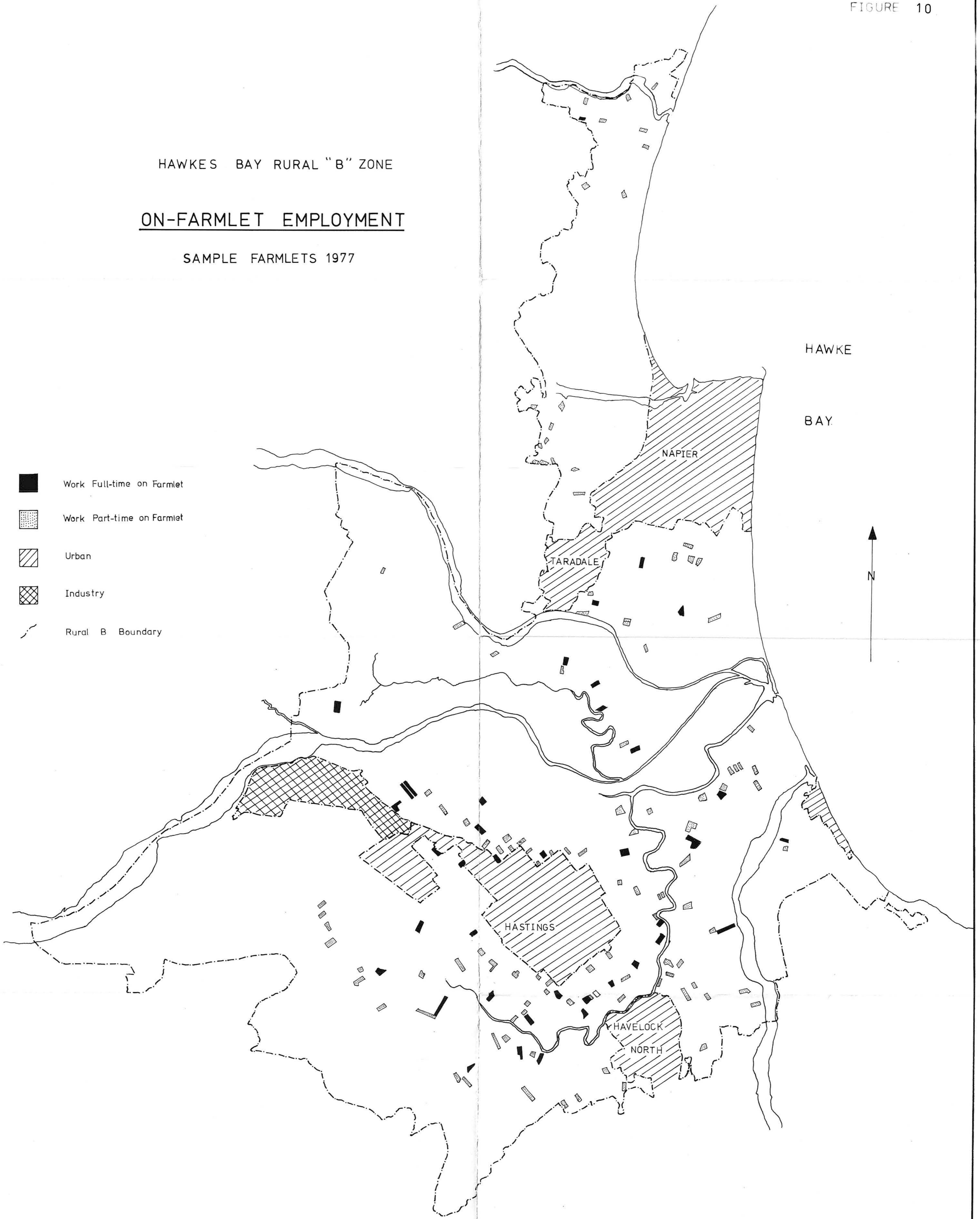


SCALE 0 1 2 3 4 5 6 7 8 Kilometres

HAWKES BAY RURAL "B" ZONE
ON-FARMLET EMPLOYMENT
SAMPLE FARMLETS 1977

HAWKE
BAY

-  Work Full-time on Farmlet
-  Work Part-time on Farmlet
-  Urban
-  Industry
-  Rural B Boundary



1 0 1 2 3 4 5 6 7 8 Kilometres

HAWKES BAY RURAL "B" ZONE

LANDUSE
SAMPLE FARMLETS 1977.

