Volume 2

Rural Community Resilience and
Climate Change: BACKGROUND PAPERS

Report to the Ministry of Agriculture and Forestry,

New Zealand

Ann Pomeroy

Centre for Sustainability: Agriculture, Food, Energy, and Environment

University of Otago

with

James Newell

Monitoring and Evaluation Research Associates

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INTRODUCTION

This report is a companion volume to an analysis undertaken for the Ministry of Agriculture and Forestry (MAF) on rural community resilience and climate change. It provides background to, and a context for, the information in the main report. This second volume gives an overview of changes experienced by rural communities over the past three decades, together with an analysis of demographic and labour market change in rural New Zealand from 1981 to 2006. The in-depth background information also profiles Hawkes Bay and North Canterbury which were the location of case study interviews and focus group meetings. The papers also include a short review of international literature on community resilience.

The papers are as follows:

I. DEFINING AND UNDERSTANDING COMMUNITY

> *Rural communities are diverse and dynamic, with varying prosperity and demography. Distances from services and markets, infrastructure, and low population density affect the way different rural communities live and work* (MAF 2011b).

Bell and Newby's (1971) influential exploration of the definition of community[1] concludes that there is little agreement among sociologists about how community is defined, although 'location' and 'social connection' feature in the work of most academic commentators who have an interest in community. Similarly Raymond Williams' (1976:65-66) discussion of community points to the complexity of the concept which includes notions such as 'common organisation' and 'set of relationships' and 'a sense of common identity and characteristics'.

Communities of place and interest

> *We all live somewhere and local roots and identities crafted through place are still part of most people's everyday life* (Ashton and Thorns 2007).

According to the Oxford English Dictionary a community is "*a group of people living in the same place or having a particular characteristic in common*". In the context of rural and local communities the Oxford Dictionary defines community as "*a particular area or place considered together with its inhabitants*". It further defines community as "*the people of a district or country considered collectively, especially in the context of social values and responsibilities*". The word is often used to refer to a group that is organised around common values and is associated with social cohesion within a shared geographical location, generally in social units larger than a household.

In the context in which 'community' is used in this study, the term is applied in a geographic sense and refers to the groupings of people resident in a particular place (some of whom may commute to work elsewhere), but account is also taken of the social and cultural aspects of 'community' implied by Ashton and Thorns above. The associations with place are strong for those with several generations of family ties, but are particularly powerful for those with centuries-long ancestral and spiritual links (turangawaewae).

Rural communities are often seen as synonymous with farming communities, and vice versa. Campbell (1995:2) writing about rural sustainability during the Australian farm crisis of the eighties and early nineties, notes: "A common and limiting tendency is to conflate agriculture with rural, and consequently farmers with rural people. Furthermore, we often talk of 'the farmer' or 'the family farm', as if these were homogeneous social entities, easily-imagined and described according to familiar stereotypes or caricatures". As the analysis in Chapter 5 below shows, only 32% of the working population that was resident in New Zealand's rural areas in 2006 was engaged in the primary industries[2]. Of those, many lived in households where income earners worked outside the primary sector, or ran other businesses or held other jobs not connected to agriculture. In other words, rural people have a varied array of occupations and interests, many of which are not located in a rural community.

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[1] Bell and Newby's analysis references George Hillery Jnr's scrutiny of 94 definitions of community, published in *Rural Sociology* vol. 20, in 1955.

[2] The most recent population data available is from the latest Census held 2006.

Communities can also include the people who do not live within the geographic boundaries of an area, but who work there. Of the jobs available in rural areas in New Zealand in 2006, 50% were in primary industry[3] (Chapter 5, Table 2). New Zealand's rural communities evidently include numerous people who commute from urban areas.

Rural communities in New Zealand are often considered to consist of those people who reside within the catchment of a local social focal point such as a primary school. Schools are important because common concerns around educating the next generation and maintaining school property brings people together.

However defined, within geographic communities are many 'communities of interest' (that is, groupings of people who come together with an interest in a common activity) which may overlap or expand beyond the geographic community. Liepins (1998:78) describes rural communities as tending to be a "constellation of smaller, complexly connected communities".

A study of a rural community in Northland (Mangakahia) highlights the need to recognise that land ownership gives people who may not be resident in a community of place, the right to have a say and participate in community affairs (Scott *et al* 1997). In this study some marae trustees did not live in the community but were closely involved in community affairs and decision-making.

Having networks which extend outside the community has pluses and minuses. It can be a positive avenue for additional resources, but it may also be a drain when landowners lack a social stake in the community. New Zealand's forestry communities are a case in point. They have often not bound together in the way farming communities bond as their focus has been on meeting the needs of industry, not the needs of people and families (McClintock and Taylor 1983). Similarly farm managers (particularly of dairy farms) who move frequently are seen by other residents to have little stake in their communities. Nevertheless, as communities of place and with many having an interest in agriculture, people in rural communities do usually draw together when there is a recognised need.

Wikipedia (as at 30 April 2011) comments in its definition of community that "Since the advent of the Internet, the concept of community no longer has geographical limitations, as people can now virtually gather in an online community and share common interests regardless of physical location". However, given that many people who live in New Zealand's rural communities have inadequate access to the internet, physical location is still a key component of community, particularly during adverse events or natural disasters. When residents become isolated and cut-off from the rest of the district or region due to a disaster of some kind, the way the local community comes together can be a key factor in enabling people to survive, cope and recover.

Context is a critical element in determining how people use and understand the term 'community'. Scott *et al*'s study noted that "if asked about 'community relations' most people interpreted this to mean relationships between *all* people living in a particular location" (Scott *et al* 1997, my emphasis), or in other words, the community of place as defined above. But this was not the only way that people thought about community. Rosemarie Smith's (1991) analysis of identity and class discrimination in a rural area shows that communities have many social groupings, and this was also reflected in Scott *et al*'s Mangakahia study. When dealing

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[3] See Appendix A: Glossary and abbreviations

with local issues Scott *et al* note that people would immediately differentiate between various social groupings. For example, an issue over water management in Mangakahia saw a differentiation between Pākehā farmers and Māori. The length of time people have lived in a community can also be a point of differentiation particularly in terms of people feeling included or excluded in social activities.

Certainly rural communities, as communities of place, contain many social groupings, communities of interest and 'sets of relationships'. Shared interests may arise from the shared locality and/or a common cultural and historical identify, or through networking with others with similar interests or concerns (Ministry of Social Policy 2001).

The moral value of community ideals

As Carolyn Morris (1993) points out in her anthropological thesis on the divisions which split Taranaki's coastal rural communities when their local dairy companies amalgamated, 'community' is also more than a geographic entity. Her study showed how the rhetoric around the concept of community was used to persuade people to take certain actions (in this context vote for or against amalgamation), justify this action, and persuade others to act one way or another (Morris 1993:168-9). In Morris's analysis, actions based on the idea that it was 'for the good of the community' endowed the stance taken as one of moral superiority. 'Community good' became a powerful rationale for (in this example) opposing change and resisting the imposition of outside economic forces. Her analysis suggests that understanding the social and cultural pulling power of the concept 'community' is important as it can be used as a platform for action.

II.   RURAL COMMUNITY CHANGE IN NEW ZEALAND

New Zealand's rural communities have been subjected to a range of shocks as a consequence of the loss in the seventies of traditional export markets, the oil crisis and then droughts and other adverse events in the eighties and nineties (Darnhofer *et al* 2010). The neo-liberal reforms and the changes in economic management after 1984 impacted on New Zealand's primary industries, and irrevocably changed rural (and urban) society.

As well as documenting some of the key changes in New Zealand's rural communities from the eighties, this paper provides an insight into changes in the relationship between the agricultural (and forestry) industries and the rural communities in which they are located. It illustrates and increases understanding of the role that rural communities play in supporting primary sector responsiveness to climate change.

THE RELATIONSHIP BETWEEN RURAL COMMUNITIES AND THE PRIMARY SECTOR

> *Rural communities (rural people and rural businesses) are at the heart of the primary sector and are an important part of the New Zealand community and economy* (MAF 2011b).

Only a small proportion of New Zealand's population is employed in the primary industries (see Paper III below). Despite this, because of the importance of primary industry to the New Zealand economy[4], the mutual dependence of particularly the agricultural sector and rural communities and the relationship between rural social conditions and agricultural production is well recognised (Gillies 1979, Webber and Rivers 1992, Walker and Bell 1994:32-33, Pomeroy 1993:5). The connections have been reflected in MAF's key policy statements for many years reflecting the importance policy makers place on the continuance of mutual supportive interaction. For example MAF's (1991) *Sustainable Agriculture Policy* observes that "Rural communities are critical to sustainable agriculture" (p17) and "better preparedness for adverse events enhances the stability of farm income and lessons the resulting disruption and damage to affected rural communities" (p vii).

Liepins' (1998) analysis of rural communities in New Zealand and Australia, including work undertaken for MAF on the impact of agricultural change on rural economies and societies, led her to acknowledge that the social and cultural structure of rural communities is strongly influenced by the agricultural sector. She also concluded that:

> *Interdependency between the agricultural and wider populations is maintained through the social interaction and voluntary community work that is done constantly…*
> *agricultural and horticultural populations both contribute to, and receive the benefit of this interaction and work* (Liepins 1998:84).

MAF's 2009-12 focus on 'strengthening rural communities' through tools such as effective rural civil defence planning, supporting community capacity to respond to adverse climatic events, and improvements in the telecommunications infrastructure, reinforce a historical belief that rural communities and primary industry are interconnected. MAF's current goals of "a vibrant rural community" and "connected and resilient rural communities" (MAF 2010) and the requirement on MAF to provide "analysis and advice on legislation, institutional

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[4] Agricultural and forestry exports made up 68% of total merchandised exports from New Zealand by value in 2011 (http://www.maf.govt.nz/news-resources/statistics-forecasting/international-trade.aspx)

arrangements, and on policy and operational initiatives in relation to the sector, rural communities and other stakeholders" (MAF 2010: 56) likewise suggest that not only are the primary industry sectors and rural communities mutually reliant, but they are recognised as so by policy makers.

Nevertheless, as both Liepins' (1998) and Bedford *et al*'s (1999: xi) research shows, there have been major changes to the traditional structures of economic and social interdependency in rural New Zealand. The economic linkages between the farming and forestry sectors and their rural communities have loosened, and while social linkages in most communities are still strong, major pressures on these links had emerged by the end of the twentieth century. These changes and pressures may be an issue for building and maintaining resilient rural communities and ensuring the continued resilience of the farm and forestry sectors.

The literature on disaster management certainly implies that whether or not the agriculture and forestry sectors can cope with adverse events[5] from climate variability and the climate extremes accompanying climate change, is dependent on the relationships these primary sector industries have built with their rural communities, and particularly on how primary producers interact with others in their local communities. Smith *et al* (2011) identify the importance of mutual support in building resilience and improving responses to adverse events. Elsewhere Associate Professor Willie Smith notes, however, that the shift of services and staff from small rural centres to larger centres, and the disintegration of many traditional community structures increases the vulnerability of the local population to climate change and other adversity (Smith 2007:1). A diminished resource base and service infrastructure makes it harder to take advantage of climate change opportunities.

So while there is a strongly embedded idea that rural communities and the primary sector provide mutual support to each other, more recent critiques identify that: "the tangible sense of interdependency and mutually supportive interactions between farming and local communities can no longer be asserted with confidence" (Joseph *et al* 2001:16; and see also Joseph *et al* 2004). Due to the social and economic changes which have taken place both in the primary sector and in rural communities the linkages between the two sectors are no longer clear cut.

The changed nature of the interaction between the primary industries and rural communities leads Joseph *et al* to observe that while in some places the traditional serving linkages between agriculture and the local rural community continue and new ties centred on employment and social cohesion have emerged, in other places the rural community and its agricultural hinterland have become de-coupled. Here the traditional forms of economic and social dependency have been replaced by new forms of interdependence (Joseph *et al* 2001:23). Mutual support between agriculture and the rural community is clearly important in terms of coping with climate change, but the relationship is also complex and as variable as rural communities themselves.

THE CHANGING STRUCTURE OF NEW ZEALAND'S RURAL COMMUNITIES

Further to the changes noted above, research commissioned by MAF in 1998-1999 identified that rural communities have undergone major change and a "*run-down of social capital as a result of 15 years of restructuring of services and the economy*" (Bedford *et al* 1999:87). This and other literature, particularly independent analysis by Taylor Baines and Associates,

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[5] For example, droughts, floods, landslips, snowstorms, cyclones, tornadoes, wildfires, and so on

document key rural social and community change in a number of small New Zealand rural communities. Although these studies did not include the case study communities of the current research, the study results are useful in providing a general sense of rural social and community change in New Zealand, and the potential impact of such change.

FORESTRY COMMUNITIES

Many of New Zealand's forestry settlements such as Kawerau, Kinleith, Kaingaroa, Tokoroa, and Murupara, were developed in the 1950s to house and service the needs of the timber industry. Research undertaken in the 1980s established that these special purpose communities had different structures from nearby farming communities, and tended to lack social connectedness. McClintock and Taylor describe them as 'synthetic communities' dominated almost entirely by the forestry sector. At the time of their study, few other businesses had penetrated their boundaries (McClintock and Taylor 1983:39). The dependence of these communities on the forestry industry for their economic and social welfare (with resident's housing provided by the forest companies) was seen to have hindered the growth of interdependent networks of reciprocal obligations and social capital, although where volunteerism was strong it contributed to social cohesion among residents (McClintock and Taylor 1983:81-82).

The research was updated in the 1998 when Taylor Baines and Associates undertook a series of case studies of rural resource-based communities. With major restructuring and privatisation of the forestry sector the settlements that had predominantly housed workers formerly employed by the Forest Service were, 15 years later, struggling to survive. The following decade suggests a similar trend. Kawerau with 8,784 people in 1981 had fallen to 7830 in 1996 and 6,921 by 2006. Kinleith stayed steady at 228 people between 1996 and 2006, while Tokoroa dropped from 1,038 to 807 over the decade, and Kaingaroa dropped from 579 to 486 in the same period.

Murupara

Murupara in the Bay of Plenty, which began as a small rural service centre for Ngāti Manawa and a small dairy farming community, grew with the advent of forestry, from 762 people in 1956 to become a 'booming town' with 2,670 people by 1966 (McClintock 1998:2). The community peaked at 3,000 people in 1981. Following major restructuring of the forestry industry, logging crews were recruited from elsewhere in the region, and with the on-going exodus of redundant workers, the community declined. This impacted on the retention of retail and other services and also saw houses being shifted to other locations (McClintock 1998:9-11). With the weakening of the economic base of the community, the ties that had held the community together also weakened. While new people arrived "*they are often from different iwi*", and there was a perceived loss of leadership. "*Not only are there fewer people capable of administering community organisations, but it is also more difficult to get a community project started*" (McClintock 1998:13). By 2006 the population of this community had fallen to 1,836.

Tuatapere

Similarly Tuatapere, a Southland forestry community that flourished while logs from the indigenous forests were easily accessed by local saw-millers, also declined as the resource depleted, extraction rules changed, and the need for increasingly sophisticated and expensive equipment saw most of the 25 local mills close. Loss of jobs and falling population saw retail

and other service closures, and this was compounded by local customers shopping in larger centres. Farm work in this district also declined with conversions to dairying reducing the need for part-time and contract labour. Moves to horticulture and tourism were insufficient to turn around an on-going decline in numbers (McClintock and Fitzgerald 1998:18). From a peak of 954 people in 1966 (912 in 1981), the population of this community had fallen to 582 by 2006.

FARMING COMMUNITIES

Kurow

In 1997 an analysis of the Kurow community in the Upper Waitaki Valley (North Otago) noted that the population had declined by 30% since 1981 due to closures of the railway, the Waitaki Catchment Commission, a special school in the area, and the Post Office; the downsizing of Electrocorp New Zealand's workforce; and farm amalgamations following deregulation in the farming industry (Kraack and Liepins 1997:2)[6]. At that time young families were leaving the area, and this impacted on the local school. Young people also left the district in search of employment opportunities or to undertake further study. Although the town was a 'popular place to retire' this meant the population was aging and many of these people were said to have 'little extra cash to spend in the community'. Many services once offered in Kurow became centralised in Oamaru 55 minutes away, or required travel to the cities of Dunedin or Christchurch. Local people felt that decisions affecting Kurow were made by people with little connection to the area.

On the positive side, with the completion of the Waitaki Valley irrigation scheme there was an increase in dairy farming. The traditional sheep farms also diversified by establishing 'Farm Stays' and other tourism ventures, or expanding into activities such as deer farming and organic honey production. The community also took on new projects to attract people to their community. These included a festival week, the beautification of the town, and the school hosting Japanese exchange students. At the time of the study, many people were actively working to improve participation in community affairs. The local tennis club, for example, established a tournament with other tennis clubs in the district enabling children to be matched with others of similar ability and providing them with a more enjoyable experience. A local radio station in the area was set up to create different kinds of training opportunities for the school children.

A major issue for the community was that fewer people "*means that all of the different groups and community run services, such as the fire brigade and ambulance are stretched*" (Kraack and Liepins 1997:7). Community groups were struggling to get members: "*There are less people in Kurow but the same number of groups and committees. This means that the people who are still living in Kurow have to participate in more groups and often suffer from burnout*" (Kraack and Liepins 1997:7). Enthusiastic newcomers such as contractors and seasonal workers often started new projects that long term members were then left to complete.

Despite the frenetic community life of some residents, other residents did not participate. Some newcomers found it difficult to be accepted into the community ("*Not a local until you have lived in the area for 40 years*"), while for others it was for financial reasons, lack of child care, new and not connected into the informal information networks, different work patterns (of

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[6] Kurow was established in the 1920s as the base for building the Waitaki Dam, the first in a series of hydro-electrical plants on the Waitaki River. In 1996 it had a population of 414 people. This had declined to 339 by 2006.

dairying versus sheep production), and pressure of work as more women entered the paid workforce (Kraack and Liepins 1997:8).

Clandeboye

The community of Clandeboye in South Canterbury is based on dairy farming supplying the local milk powder factory. The factory evolved from a small locally supplied plant to one which is now the largest in the world drawing on supplies from dairy farms throughout the east coast of the South Island. The area now contains a school and little else, and the factory employees commute from mid-Canterbury (including Timaru), Temuka, Geraldine and North Otago. Alongside the expansion of the factory has been the expansion of dairy farming in the district through the amalgamation of small dairy properties and herds. According to the dairy company[7] direct involvement with the community was minimal because they did not have a local income stream – revenue was from exports. The company did, however, feel it had considerable indirect community involvement through providing income to local dairy farmers.

Community action against environmental issues at the dairy factory sparked some cohesion, but research undertaken in 1998 described the community as:

> *no longer being 'close knit'. In Clandeboye the church, local store, tennis club and former dairy factory houses had all gone. Respondents spoke of* [formerly] *being involved in a range of community activities all of which centred on Clandeboye and none of which exist today. There is no longer a community spirit* (Little *et al* 1998a:18).

From a population of around 130 people in 1981, by 2006 the area had too few people to appear as a discrete locality in the census figures.

Waitaki Plains

An analysis of a community transformed by irrigation water from sheep and cropping to dairying from the late seventies on the lower Waitaki Plains (North Otago) is in some contrast to the Clandeboye community. Irrigation gave farmers on the Waitaki Plains "*more product options, freeing them from a restrictive climate, allowing them to strive for product excellence and encouraging more comprehensive market decisions*" (Little *et al* 1998b:7). The patterns of landownership changed. Pastoral farmers who had used water primarily as insurance against drought retired and made way for younger farmers. The newcomers were mostly North Island dairy families and Dutch immigrant dairy farmers who had the finance and/or fortitude to cope with the massive debts from converting sheep properties to dairying (Little *et al* 1998b:6). In the late eighties they were joined by dairy corporates Tasman Agriculture and Applefields which purchased multiple land holdings. "*For some farmers it was a relief to sell their farms but what was not welcomed was the loss of family identity and local ownership*" (Little *et al* 1998b:7).

The switch from pastoral/arable to dairy farming transformed the system of farming. Apart from fertiliser, there were fewer inputs in dairying than in other farming systems, and the industry provided the transport of farm product, all to a single point. This was accompanied by a change in the social structure of the community. Fewer contractors were used, and the type of contract work changed. Where previously sheep farms had been 'one person' units, the dairy farms hired multiple workers with various partnership agreements that provided stepping

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[7] In the late nineties the Clandeboye plant was owned by Alpine Dairy Products. It is now (2011) owned by Fonterra.

stones to farm ownership for those seeking it. While elsewhere dairy farm owners tended to be absentee landlords, in this district many dairy farm owners also worked alongside their staff.

Sharemilkers hired by corporate owners also tended to be contracted for six rather than the usual three-year period. Bringing their families to the area gave some stability to the community, although this over-loaded schools at the junior level. The majority were seen as being in the district "*only to promote their own career paths*" (Little *et al* 1998b:18). Over time the need to shift community activities from fitting in with the sheep farming cycle to fitting in with dairying routines, was recognised.

Social divisions emerged when dairying arrived as dairying was not a highly rated occupation (Little *et al* 1998b:18), and a 'them and us' attitude prevailed. Newcomers found it difficult to meet people, and tended to socialise with other newcomers. Initially there were few younger sharemilkers, while workers tended to be young single men who worked long hours for low pay for 12 months then moved elsewhere. 'Old-timers' resented the newcomers who were seen as 'takers' not 'givers', and did not value the community assets for which the district had worked and fundraised. The authors note that in some parts of the Waitaki Plains area there was a sense of community well-being, and a range of sports clubs and services, but in other parts this was missing. While the population of the area grew from around 600 in 1981 to nearly 700 in 1996, it has since remained more or less static, and continues to host a large transient element.

Otautau

From the late seventies Western Southland has experienced successive waves of economic restructuring in farming, forestry, dairying, mining, local government, railways and social services (Taylor *et al* 1998:6). Otautau's population grew steadily to a peak of 950 people in 1976 then steadily declined to 729 in 2001, then increased slightly in 2006 to 753 people. These population shifts are accompanied by a marked change in the labour market of the community. Taylor *et al* note that with the technological changes that have come with intensified sheep and beef production, fewer labour units are used on the farms. The people who formerly provided farm labour have moved out of the area. The newcomers who have moved in to take advantage of the cheap housing:

> *do not necessarily provide a pool of labour suitable for, or interested in, casual employment on farms, Casual and contract labour now comes from a wide catchment including Otautau, Tuatapere, Ohai and even Invercargill, and is usually supplied through an agricultural contractor…Overall, workers are generally more mobile, with people such as forestry workers, shearers and freezing workers travelling considerable distances to work* (Taylor *et al* 1998:8).

Taylor *et al* also found that dairying brought a mobile population: "*the great majority of newcomers had been in the area less than ten years*" (Taylor *et al* 1998:8). Most of the local dairy farm women had been only four years on their current property and some had shifted four times in the previous ten year period. This gave little time for them to contribute locally and few had close social ties. Taylor *et al* comment that dairy farming families tended to socialise with other dairy farming families as their work patterns were similar. While dairying

had brought new families into the area "*they do not always have the time, or feel welcome to take part in community activities*" (Taylor *et al* 1998:17)[8].

Ownership of forestry and agricultural processing and servicing from outside the district (and region) meant that profits were no longer retained in the area. The loss of professional and managerial staff as a consequence of economic restructuring also deprived the area of people who had formerly taken key roles in community organisations. Increased numbers of beneficiaries also created a more obvious class structure and social divisions (Taylor *et al* 1998:9).

Just as labour, tradespeople, teachers and other professionals came into the area to work on a daily basis, locals commuted from Otautau to work in other centres including Invercargill. This has meant much retail and other business activity (such as banking) shifted to Invercargill. Newcomers and those who had been in Otautau for a short time were "*seen to have less obvious loyalty to local shops and services*". Families also travelled ever larger distances to enable their children to participate in sport and cultural activities. "*They will go to the city for shopping or sport, whereas their parents did not do this*" (Taylor *et al* 1998:17).

The increased commuting into Otautau to work also meant fewer families, and fewer people available to undertake community and social activities, or provide leadership:

> *There is a lack of volunteers today, with fewer people to take responsibility in community organisations and leadership. The same people tend to work on different committees. Central government pushes local communities to do more but with less funding* (Taylor *et al* 1998:17).

According to some of the residents, where once people knew everyone this was no longer the case (Taylor *et al* 1998:15).

Other trends include women being involved in off-farm employment. While there was a strong commitment to community activities, many of the women who might have provided social support and worked in community organisations in the past were now working in paid employment.

There was also a shift in the kind of activities that rural people participate in.

> *Traditional organisations such as the RSA* [Returned Services Association]*, Federated Farmers and WDFF* [Women's Division Federated Farmers now Rural Women] *are facing considerable pressure from population and lifestyle changes*…[and] *racing clubs, which have been an integral part of rural Southland, providing considerable employment in the past, are also finding it hard to survive* (Taylor *et al* 1998:17).

Participation in these organisations was replaced by participation in sports and children's activities.

Roxburgh-Teviot

Roxburgh township had a population of 741 in 1996 (an 8% increase over the previous decade), and is part of the wider district of Teviot (the 1996 Teviot population of 1173 had

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[8] As Smith (1991) has observed, permanent residents (i.e. farmers) make less effort to welcome people they know or think are not going to remain in the district long-term.

declined by 14% over the decade). The Teviot district (Central Otago) is dominated by sheep production and horticulture (stone and pipfruit orchards). It contains a number of small place-based communities whose residents have established strong social structures and facilities in each area (Liepins 1998:21). Like other rural districts these settlements lost transport, postal, banking and health services, as well as trades in the post-eighties era. Local businesses in these settlements were perceived as being reliant on income generated by the agriculture/horticulture communities and highly susceptible to any adverse changes occurring in these industries.

The 69 farms in the district ranged from 200 to 10,000 ha, with only the largest employing permanent labour. Liepins (1998:37) notes that over time permanent employees were replaced by casual staff and contractors. Small family sized horticultural units were also being replaced by larger operations. There were around 39 orchards in 1997 (down from 56 units in 1986) with 10 orchards accounting for most production. Managing with less labour and working for longer hours, together with the greater complexities of increasingly technical standards and management requirements created considerable stress for many producers and orchardists.

Business providing agriculture-related services to farms and orchards were being adversely affected by an increased tendency for farmers and orchardists to undertake their business dealings in larger urban centres outside the district (Dunedin is 80km from Roxburgh, and Alexandra 25 km). Famers and orchardists recognised their decision to use services from outside the community (assisted by improved roading and telecommunications) impacted on local jobs, but their concern was to be economically efficient (Liepins 1998:23-29).

The farm and orchard population was seen as making important contributions to the local communities by organising and participating in social activities, and maintaining public facilities and infrastructure (particularly the local fire and ambulance services). The local business community in the townships contributed strongly to the schools, sport and other voluntary groups within their communities, making significant donations of time and money. On the other hand the same few were carrying these voluntary group committees. Liepins (1998:82) quotes respondents from a focus group discussion:

> *I don't want to be on any more committees. I've done it since I've been here - 16 years. I'm worn out of committees*." and "*because everyone is struggling they haven't got time to do anything else. They're trying to survive themselves without getting too involved in another social event*".

People most likely to lack social connections and most likely to be excluded from community activities were the low income and single parent households. Itinerant workers were sometimes unable to get income for food and accommodation when poor weather conditions meant seasonal work did not eventuate (Liepins 1998:81).

These rural communities "*were recognised as a tenacious social phenomenon made up of people who support local activities and maintain the local social and economic infrastructure*" (Liepins 1998:79). An example was the fund raising undertaken by the Millers Flat community to purchase their historic general store (which is still functioning in 2011). Within these place-based communities the population clustered into groups and social networks of people with common areas of interest. Some of these were occupational (farmers, fruit pickers, the 'business' people) others emerged to meet shared needs such as health services (older

people) sport and recreation (parents with children). Liepins notes that the younger families in the Teviot were seen to have different interests (due to changing work habits, travel patterns and material values) compared to those that older respondents remembered from when their families were young.

Rural Central North Island

Research cited in MAF's study of North Island communities in the decade 1986-96 (Taumarunui, Whakatane and Tirau[9]), identified that:

> *Across the three communities, respondents noted implicitly the importance of investment in 'social capital', and spoke particularly about the importance of voluntary organisations and their contributions to the community. They virtually all noted that this social capital had been run down in recent decades, and that this had implications for the economic development of the community* (Bedford *et al* 1999:81).

Respondents recognised the decreased ability of agriculture to generate employment and the growing reliance of farm families on town jobs. Traditional links were seen to persist between the agricultural sector and the commercial centres of the Taumarunui and Whakatane districts, with new ties centred on employment. The shift to large corporate dairy holdings in Tirau brought social change with contract milkers (and some seasonal labour) replacing farm owners.

Changes to farm management practices required under the Resource Management Act introduced much acrimony at what was then seen as wasteful expenditure. As in the South Island, increased production did not mean increased local retail turnover or increased spending on local services.

Having purchased a house many people in the more depressed rural communities found they were unable to sell up and move (Bedford *et al* 1999:75). Women involved in the Māori Women's Welfare League revealed that their lives revolved around helping people overcome problems of unemployment, dependency and family violence (Bedford *et al* 1999:73-76).

The growth in lifestyle blocks in the vicinity of Whakatane was seen as increasing land values, but also providing a counter to rural population decline and increasing people's sense of security. These blocks were taken up as much by retiring farm owners as by 'townies'.

For some farmers with an uneconomic holding, one way of exiting farming was to sell to a forestry company. This was unpopular with remaining farmers and the local community as the shift to forestry impacted on maintenance of rural infrastructure including roads and schools, local marketing and processing, and labour required by the company was provided by outside workers, not local people. These issues were also raised in a study of rural communities in the Waipaoa Catchment near Gisborne (Donaldson *et al* 1997:12-13).

Because the township of Tirau is located within one hour of three cities and 14 towns, it attracts businesses that cater for the passing commuter and tourist traffic including art galleries and cafés. However, the increased mobility that has helped give this locality a new

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[9] Taumarunui had a population of 3,006 in 1996 and 2,619 in 2006. It is hill country sheep/beef farming with a forestry hinterland, Whakatane district consists of a secondary urban, and other urban centres, together with a dairying/horticulture/fishing and forestry hinterland, Tirau's population was 753 in 1996 and 732 in 2006. It is a dairying community and centre which attracts businesses serving the traffic passing through on the state highway.

lease of life was seen by some residents as contributing to a decline in the 'sense of community'. The common sense of purpose found in communities such as Taumarunui which provide services to their farming hinterlands, was thought to be lacking in Tirau. "It [Tirau] is too close to Matamata and Putaruru to have ever been called a farming town. Everything for farmers is in the larger centres" (Bedford *et al* 1999: 82).

Other changes

New Zealand's farming communities saw significant changes in the pattern of land use and rural employment by the end of the century. There was significant growth in horticulture and viticulture, expansion of exotic forestry plantations (as part of the farm, as well as corporate production forests), new forms of livestock production (such as deer), and diffusion of dairying into areas formerly dominated by sheep and beef farming (Bedford *et al* 1999:83). While large-scale corporate agriculture and forestry had emerged, family farming continued to figure prominently.

Family farms, as both economic and social units, continued to inter-relate with the communities in which they were located. In more remote areas farms had become both fewer and larger, and there had often been an alteration in the commodities produced. In areas within commuting distance from large urban areas there were more small-holdings bringing new 'voices', different ideas and "new possibilities for both co-operative development as well as conflict in rural areas" (Bedford *et al* 1999: vii).

Much was made of off-farm sources of income and in particular off-farm employment as a strategy for maintaining the economic viability of family farms at this time. However, the interconnectedness of farming and other business predates the removal of subsidies. A survey of 10% of pastoral farmers in Waitomo and Central Hawkes Bay counties in 1984 (prior to deregulation) showed that 30% of the farms had non-farm or off-farm businesses and sources of income (Pomeroy 1986:154), 19% of farmers had off-farm work including some working in businesses that they owned (Pomeroy 1986:226) and 33% of spouses of farmers had off-farm work at the time of the study (Pomeroy 1986:231). These trends may have always been widespread, but not reported. In 1976, for example, Talbot reflected:

> *Within a radius of about twenty miles of town, we see that many rural women are returning to paid employment. Many young marrieds have found it natural to return to their old job, or indeed never to leave them… Many younger women have just grown up in an age of doing their own thing and have preferred to keep working* (Talbot 1976:8).

Similarly Taylor *et al* (1997:1) observed that:

> *Employment off the farm has been evident in the NZ farming scene for many years. For instance it has long been a common means by which farm males acquired capital for farm ownership. During the last two generations…. young farm women have tended to use their qualification and their skills to work off the farm. Farm women have also looked to increase their economic independence, and to pursue their own goals, in the same way as their urban peers.*

Irrespective of the longevity of these trends, off-farm work was seen as an entrenched part of farm family incomes and work patterns by the end of the century. A survey that included sources of off-farm income for the 1992/93 financial year found that working off-farm was

common for all farm types (Rhodes and Journeaux 1995:1) with the income received regarded as essential for the household or farm business. A meta-analysis of reports to MAF on social issues and farm performance showed from 33% to 73% of the farms in these surveys engaged in off-farm employment (Underworth and Ripley 2000:17).

At the same time as farms (as production units) reduced their demand for labour from the wider community, farm families also increased their demand for job opportunities in the same community (Bedford *et al* 1999:8-9). Further changes to rural communities came with withdrawal of central and local government services, stock market collapse, closures and job losses associated with deregulation and state restructuring, technological innovation which contributed to the centralisation of bank branches and other businesses away from the smaller rural communities, and improved roading which enabled people living in rural areas to work and shop in urban centres (Underworth and Ripley 2000:11, Bedford *et al* 1999).

There was also a 're-engineering' of the social infrastructure of rural communities. While rural communities experienced the contraction of the public sector they did not have a corresponding expansion of private and voluntary provision. Instead individuals and community were asked to do more. This call for people and communities to "take responsibility" carried with it demands for leadership and sustained levels of voluntarism in communities (Joseph and Chalmers 1998). By the late nineties:

> a 'sense of community' and the willingness to make community contributions were being stretched and strained as fewer people were involved to carry the burden of committee work and more people were showing signs of financial stress (Liepins 1998:81).

At the same time women became less available for volunteer work which had implications for institutions that relied on the organisational skills and energies of farm women (Bedford *et al* 1999: vii).

The voluntary sector was seen to provide "*the life blood of a scattered rural community*", and while stating that this was work "*that tax funded social services can or should not attempt to provide*" one researcher observed that little attention was paid to these organisations "*which are often very subdued and low-key in their activities*" (Davison 2006: 83).

> *The turbulent 1980's had spawned casualties and gaps in the networks and safety nets that underpin a healthy community. It is often the Non Government Organisations (NGO's), formally constituted or informally assembled, that ease the burdens and assist the vulnerable in rural communities made up of self-sufficient individuals un-used to asking for help* (Davison 2006: 83).

An analysis of farm and non-farm families from the mid-Rangitikei in the late nineties exemplifies these changes. Gilling (1999) lists a slew of changes which impacted on the district's communities in the previous ten years, including significant changes in the culture of farm families, the relationships between the generations, between men and women and between people and institutions. The author signalled that these changes had severely undermined the communities' stocks of social capital. The account notes, however, that by the end of the nineties there was resurgence and a lifting of spirits, so that: "*now, at least, 'we all talk openly about how we are struggling'*" (Gilling 1999:76). The changes were seen to have had a major impact in terms of depleting the community's social capital, but by sticking together, and maintaining the social connections, people were able to mark time until there

was an improvement in the economic outlook. By the end of the decade with improved climatic conditions and as adjustments to the market have kicked in, communities were able to start rebuilding and replenish their energy, and families could once more get on with their lives.

Unlike overseas were farming and forestry activities declined in importance, at the end of the twentieth century New Zealand agriculture continued to remain important alongside the growth of other functions and economic activities in rural areas (Liepins 1998:4). In New Zealand diversity and difference have become the hallmarks of rural communities rather than uniformity and sameness (Bedford *et al* 1999). Agriculture, rural populations and ways of gaining a living were all considerably more varied than in the immediate post-war period to the mid-eighties. Community capacity to meet the formal and informal needs of rural communities also differed. Many smaller rural communities had become increasingly fragile while larger communities and those with a solid and diversified economic base, strong leadership, and most of all citizens who participated socially and in an active cohesive voluntary sector and/or marae, were demonstrating resilience.

III. STATISTICAL REVIEW – DEMOGRAPHIC AND LABOUR MARKET CHANGE IN RURAL NEW ZEALAND 1981-2006

Against the backdrop of the literature on rural community change, information predominantly from the NZ Census of Population and Dwellings (but also other official sources) is used as a way of building understanding of the extent of particularly the demographic and labour market changes which have occurred in rural New Zealand over the past three decades.

Comment on the data and definitions

Except where otherwise specified, analysis and illustrative Tables and Figures in this section have been prepared by James Newell (2011). The desktop statistical review uses the traditional (Statistics New Zealand) concept of 2006 urban-rural settlement hierarchy as a standard for consistency (see Appendix B for methodology, and Appendix C for definitions).

Urban influence

An urban/rural profile classification developed by the Department of Statistics uses the 2006 census to categorise *rural areas* on the basis of the degree of *urban influence*. This has been measured using travel to work commuting relationships to categorise the degree of urban influence on areas defined as rural into areas with *high, moderate or low urban influence* and areas which are *highly remote or isolated*. It also uses travel to work commuting relationships to redefine *secondary and minor urban areas* into '*satellite urban communities'* and '*independent urban communities'* (see also Appendix B).

Rural districts and rural areas

The term 'rural district' has been coined to provide a means of differentiating between 'rural areas' defined as 'areas outside population centres of 300 or more people', and 'rural areas' defined as 'areas outside population centres of 1,000 or more people' – both of which have been used by Statistics NZ at various times. To avoid confusion the term '*rural areas*' in this report refers to rural centres and rural districts combined i.e. areas outside population centres of 1,000 or more people. The term '*rural district*' as used in this report refers to areas outside population centres of 300 or more people.

NATIONAL LEVEL SUMMARY – RURAL COMMUNITIES 1981-2006

Size of rural population

While the size of the New Zealand's rural population has grown from 458,560 in 1981 to 563,916 in 2006 (a 23% increase), the proportion of New Zealand's population that lives in rural areas has changed little - declining from 15% to 14% over the 25 year period. This means around one in eight New Zealanders live in rural New Zealand.

Some 86% of the rural population live in rural districts, 14% in rural centres (Figure 1a). Figure 1b graphically presents the distribution of rural population according to the degree of urban influence.

Figure 1a: Population change (%) in rural districts and centres 1981-2006
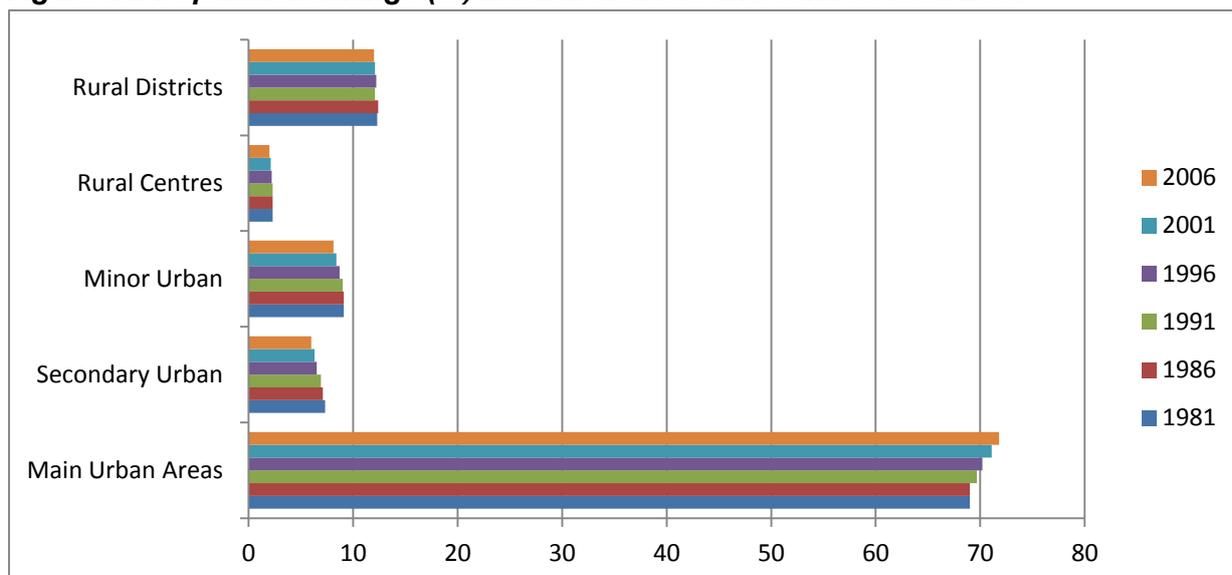
(Source: Statistics New Zealand)

Figure 1b: Population change (%) in rural areas with different urban influences1996-2006
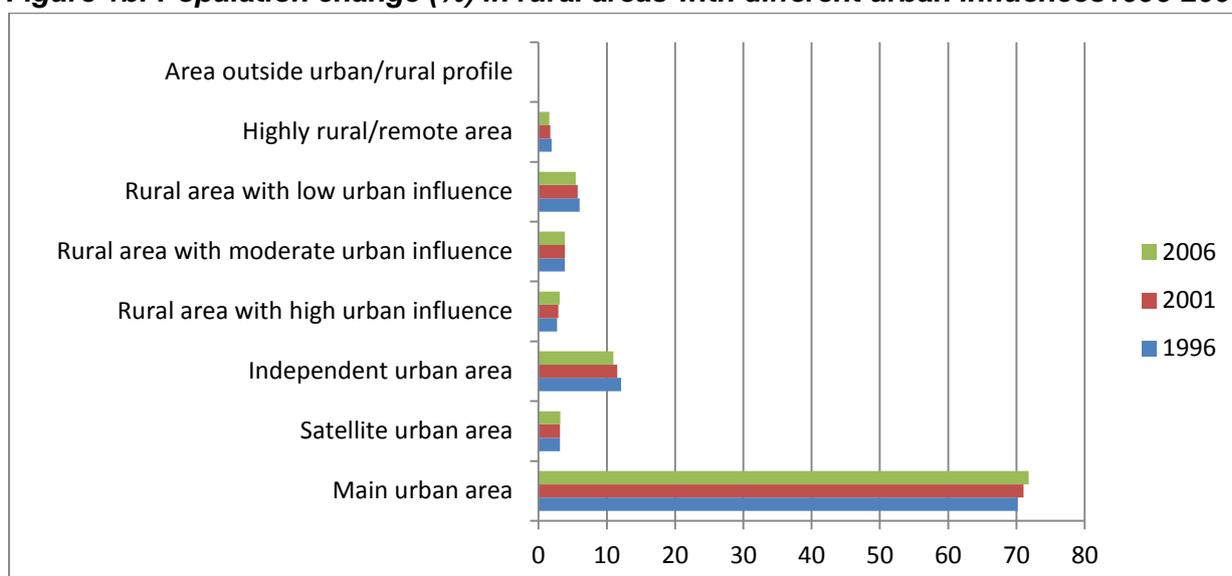
(*Source: Statistics New Zealand*)

Ethnicity

The ethnic composition of rural communities has changed little in the 1991 to 2006 period. People of European or New Zealand ethnicity predominate. More Māori live in minor urban areas (23%) and rural centres (24%), than live in rural districts (15%).

Few Pacific or Asian people live in rural areas (1% each). This representation of the resident population does not capture the increasing number of Pacific peoples who come to New Zealand on a seasonal basis to provide labour for the horticulture, agriculture and forestry industries.

Age structure

The age structure of New Zealand's rural areas has changed dramatically from the traditional pyramid form of 1981, where cohort size decreases more or less steadily with age from a very broad base of school-age children/teenagers (Figure 2a). By 2006, the age pyramid of rural areas had by stages evolved to one with heavy over-representation of mature working age adults over 35 years and their children (Figure 2b).

Figure 2a: Age composition by gender (%) of rural areas in 1981
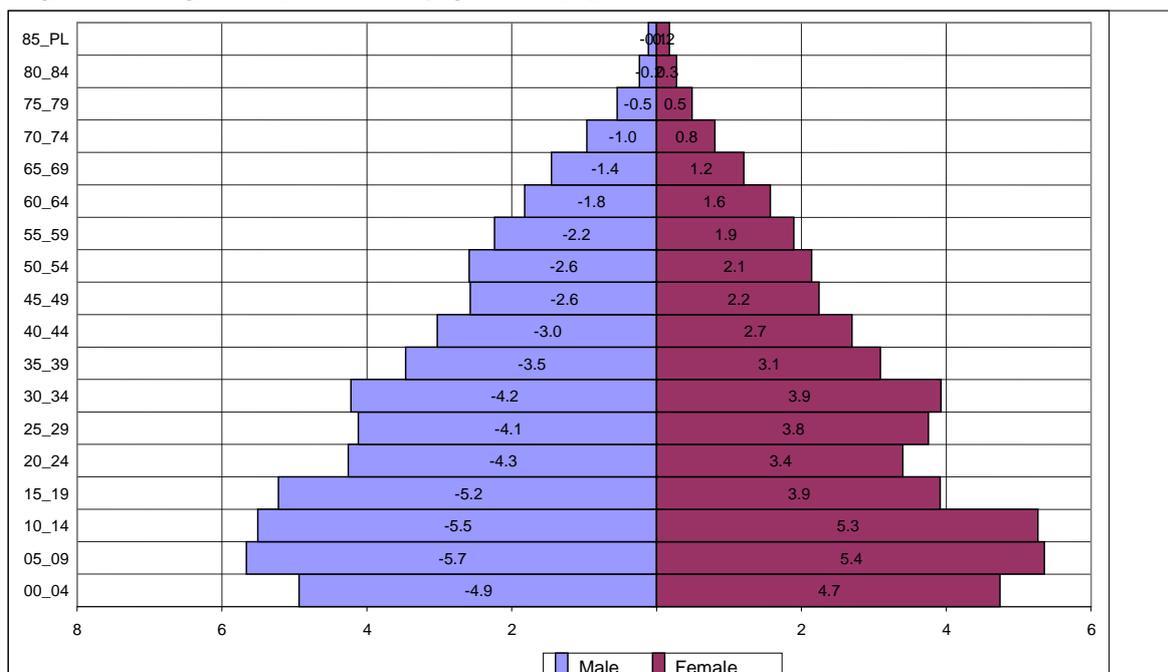

Figure 2b: Age composition by gender (%) of rural areas in 2006
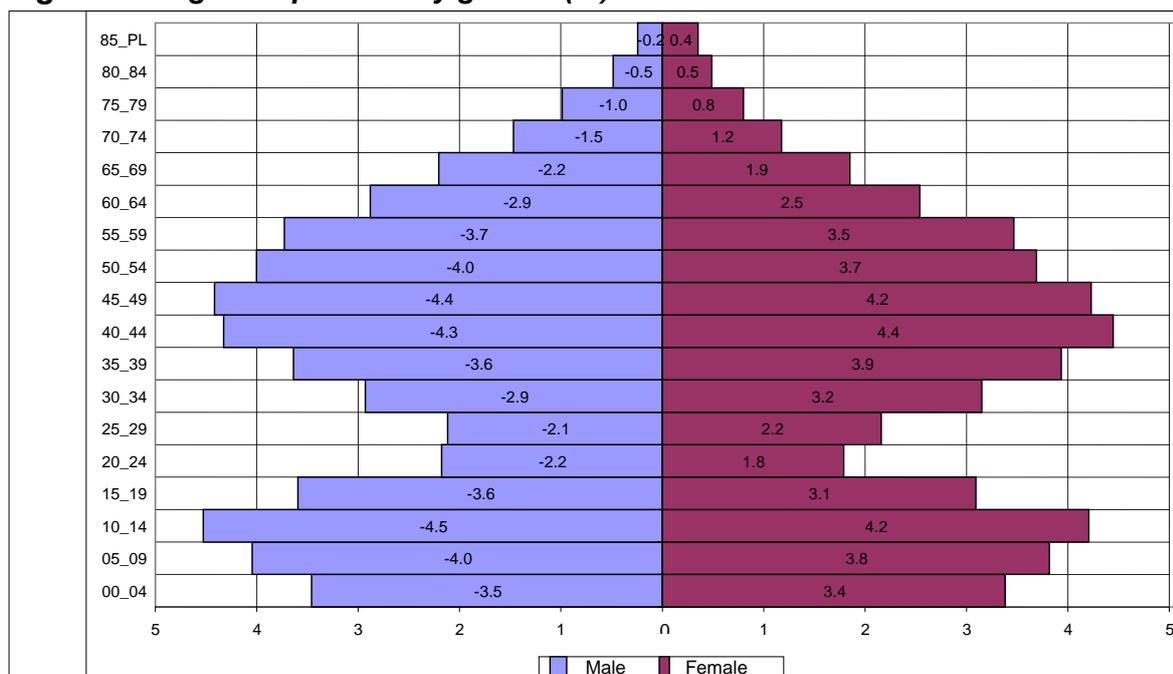
Rural areas have a distinctively higher proportion of adults aged 40 to 64 and children aged 5 to 14, but a much lower proportion of 20 to 29 year old residents than urban communities (Figure 3). This is generated by very high rates of net out-migration of people 15 to 24 years, and is balanced by high net in-migration of people aged 25 to 44 together with their children. Retirees from rural areas often relocate in rural centres, minor or secondary urban areas.

Figure 3: Comparison of age distribution (%) rural and urban areas 2006
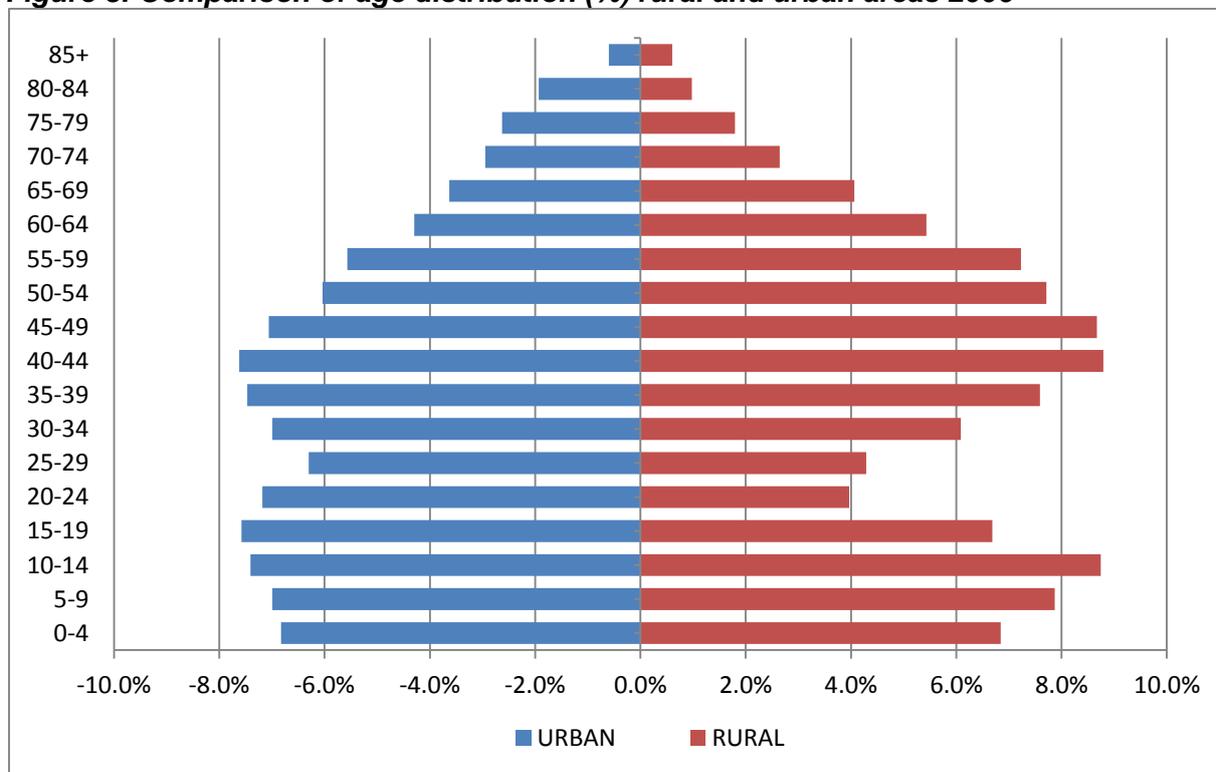
The age distribution of Māori whether in urban or rural areas is very different from the non-Māori population in two ways: there are fewer elderly – a reflection of the persistent disparity in health status between Māori and non-Māori (National Health Committee 2010:57) and a much greater proportion of Māori children and young people under 20 years. Rural areas have even greater proportions of 5-14 year old Māori children than urban areas.

Young rural Māori adults 20-29years, like non-Māori rural adults, tend to migrate from rural to urban areas.

Household composition

Paralleling the transformation of rural areas from a pyramid shape to one dominated by post-youth working age adults and their children is a shift away from 'couples with children' households (Figure 4). The proportion of households in rural areas with children almost halved between 1981 and 2006, but population growth has sustained the size of the school age population over time. Compared with urban areas, rural areas have a lower proportion of one person, one parent family and non-family households balanced by a higher proportion of couples with or without children. By 2006 the dominant household types in rural New Zealand were couples with and without children and one-person households (Figure 4).

Figure 4: Household type composition (%) for rural areas 1981, 1991 and 2006
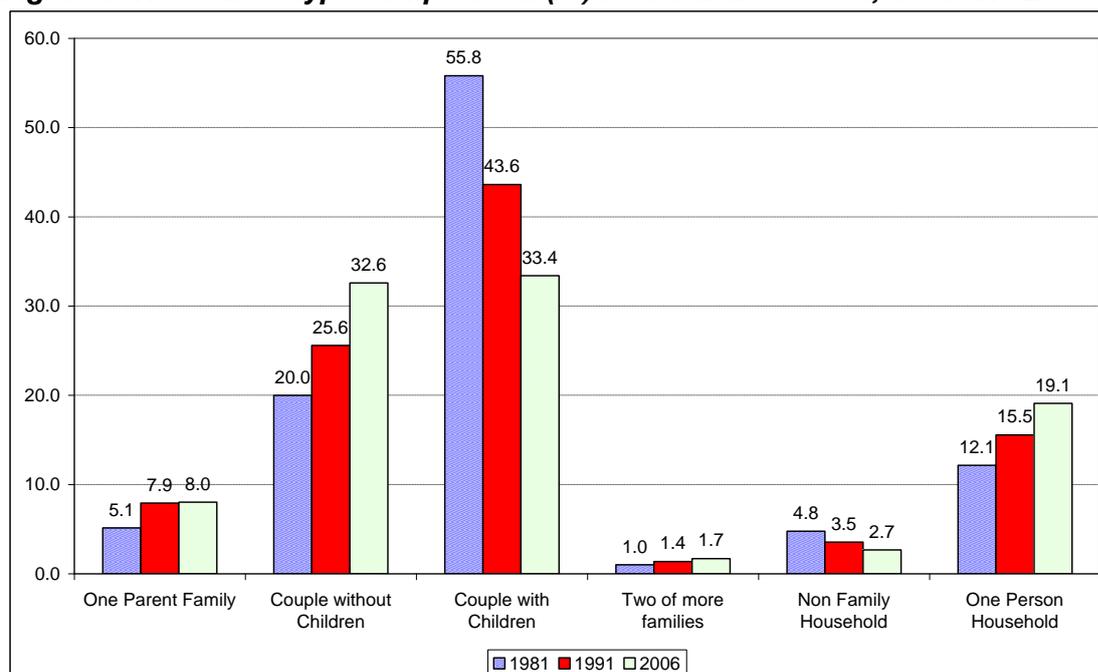
Socio-economic

An analysis by the National Health Committee shows that there is some variation in deprivation by rurality. Independent urban areas have the highest levels of deprivation whist the lowest levels of deprivation are in the rural areas with high urban influence. Generally the populations of rural areas tend to be less deprived than those in urban areas (National Health Committee 2010:60). The Committee points out, however, that Māori make up a larger proportion of those in high deprivation areas than non-Māori. Of those living in rural areas that are in the two most deprived deciles, over half are Māori: "*Socioeconomic deprivation and Māori ethnicity are each strongly correlated with a range of poor health outcomes*" (National Health Committee 2010:61).

Income

In 2006 the (pre-tax, annual) median personal income for residents of rural districts, while generally lower that for those living in main urban areas, was higher than for those living in minor urban and rural centres, except for the group over-65 years of age. Incomes of this older age group mostly reflect those staying on in the primary industries post-retirement age (Figure.5). Rural areas with high urban influence have the highest median income reflecting lifestyle residents commuting to urban areas for work (Table 1).

Table 1: Median Personal Income 2006	$
Main urban area	25,000
Satellite urban area	21,800
Independent urban area	21,000
Rural area with high urban influence	28,600
Rural area with moderate urban influence	25,200
Rural area with low urban influence	24,300
Highly rural/remote area	23,100
Area outside urban/rural profile	25,200
Total New Zealand	**24,400**

(*Source: Statistics New Zealand*)

Figure 5: Median personal income per capita by age and settlement type in 2006
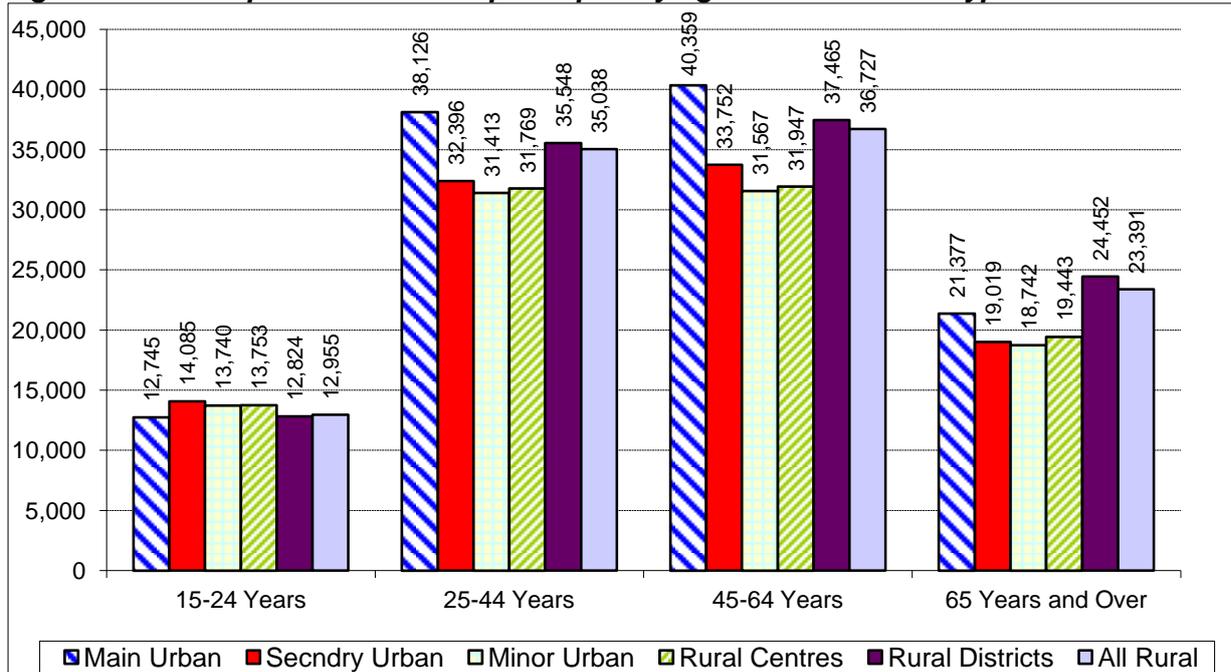
Employment

Status

Rates of self-employment, with or without employees, were two to three times higher in rural than in urban areas in 2006 (Figure 6). Self-employed and employers as a proportion of the working population have increased gradually in urban communities between 1981 and 2006, but remained at about the same ratio in rural communities (Figure 7).

Figure 6: Employment/work status by settlement type in 2006
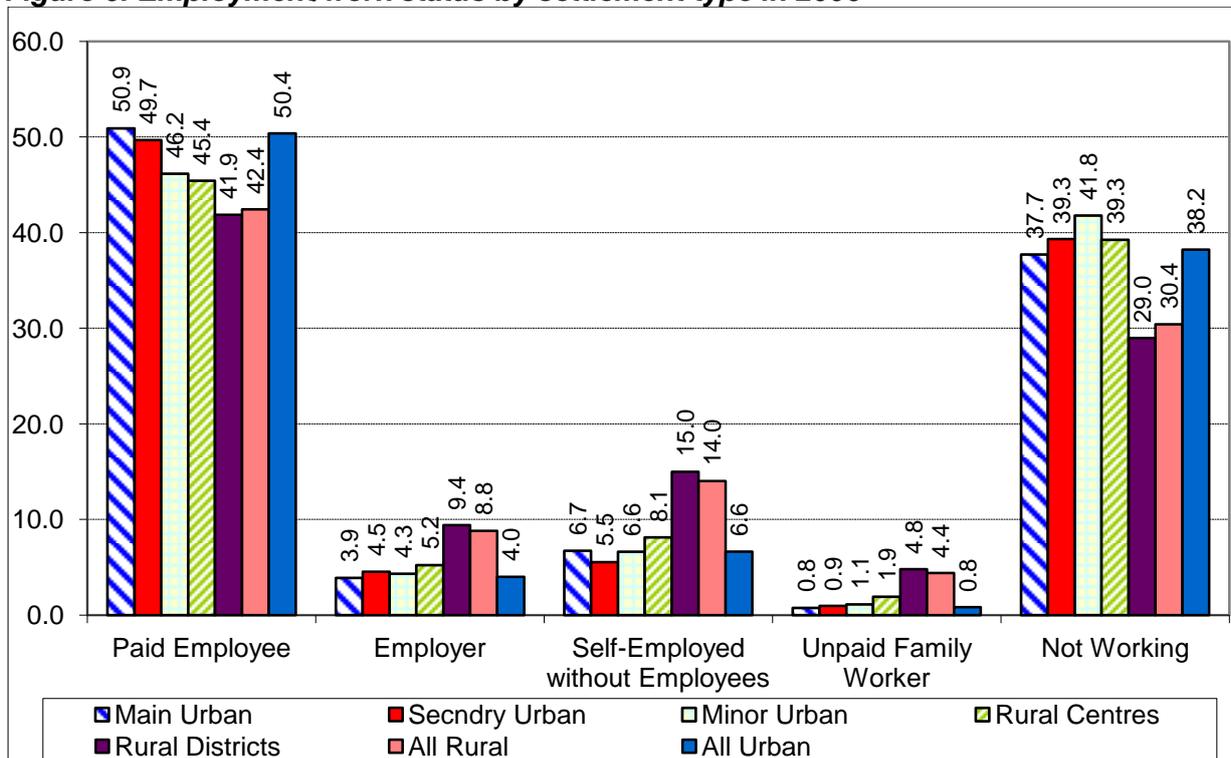
Figure 7: Proportion of the working population who are employers or self-employed without employees for rural and urban areas 1981-2006
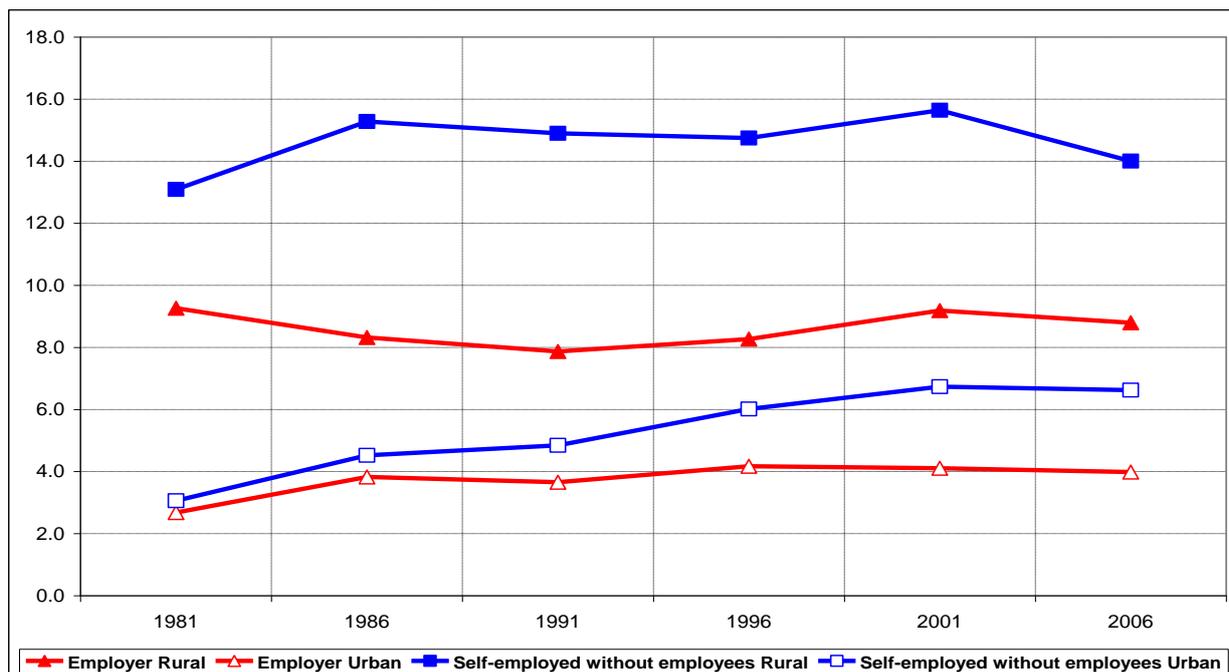
Multiple Job holding

Multiple job holding rates grew rapidly in rural communities between 1981 and 2001 but dropped sharply between 2001 and 2006 (Figure 8). Multiple job holding rates also increased in urban communities over this period, but overall were less than half those of rural communities in 2006. Multiple job holding rates for rural centres match more closely those of urban areas than rural districts.

Figure 8: Trends in multiple job holding rates for rural and urban areas 1981-2006

24
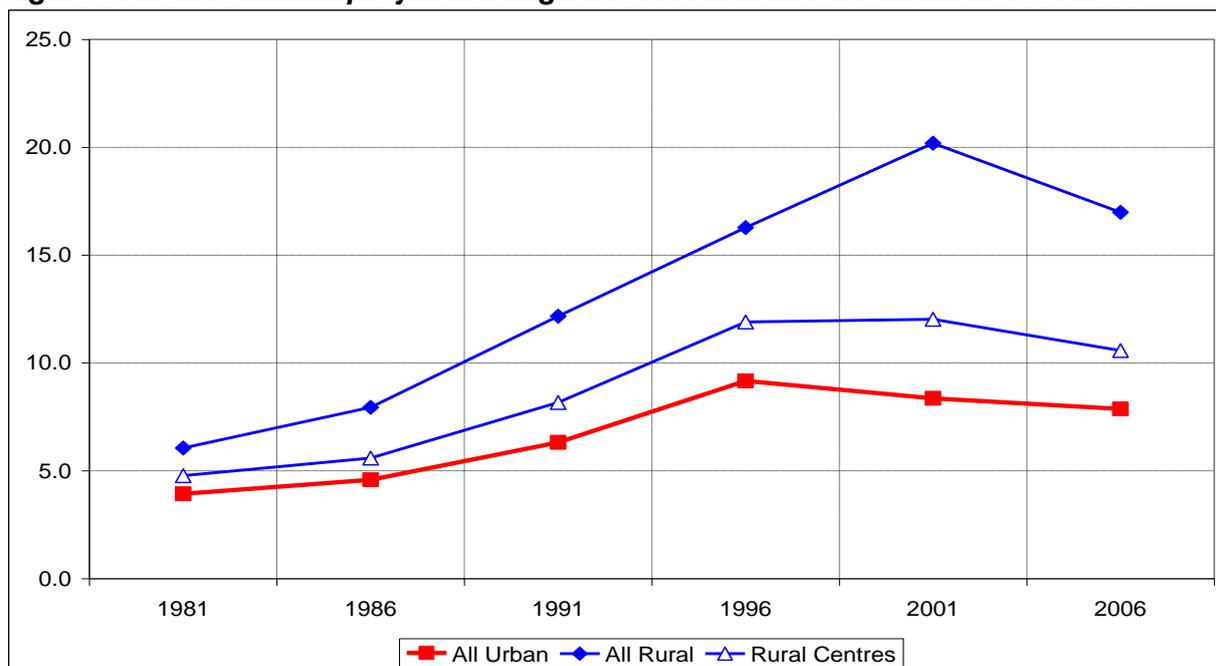
Location of work and residence

Just under half of the jobs (49%) located in rural areas (i.e. districts and centres combined) were in agriculture, while just under a third of rural residents were employed in agriculture in 2006 (Table 2). The 'agriculture, forestry and fishing' industry and manufacturing sectors in rural districts draw on residents of rural centres and minor urban areas. This is indicated by the finding that a much higher proportion of jobs by location of workplace activity rather than location of worker were in rural districts for those industry sectors (Table 2).

It seems most likely that residents of rural areas help sustain a rural lifestyle by contributing to a range of services located outside rural areas. These are notably in: construction; retail trade; transport, storage and warehousing; professional or technical services; education and training; health care and social assistance and other services. A much higher proportion of jobs by location of worker rather than by location of workplace of activity were in rural areas for these industry sectors (Table 2).

The 'agriculture, forestry and fishing' industry sector only contributes 13% of rural centre jobs by workplace and 14% by rural centre residence to total jobs, compared with 53% and 34% respectively for residents of rural districts.

With such a small proportion of the population involved in primary industry and manufacturing, it is unsurprising that a large 59% of New Zealand's rural residents are employed in service industries.

Work in rural centres

Rural centres are local hubs for jobs in accommodation and food services as well as education and training, drawing on workers living in rural areas. Like rural district residents, residents of rural centres contribute to urban areas through employment in construction, professional and technical services. Another significant minority are the relatively well paid professional/skilled rural residents who complement any rural based activity with skilled employment in urban workplaces.

Other features of the industry profile of rural centre jobs as at 2006 include:
- 14% in 'accommodation and food services' (compared with only 4% of rural district jobs and 6% of all urban jobs);
- 15% in 'education and training' (compared with only 5% of rural district jobs and 8% of urban jobs);
- 8% in 'retail trade' (compared with only 3% of rural district jobs and 11% of urban jobs).

This reflects the role of rural centres in tourism and some service industries and some local services. The proportion of rural centre jobs in manufacturing is marginally higher (at 13%) than manufacturing jobs in any other settlement type. This is likely to relate to secondary processing of primary sector outputs.

Figure 9 provides a breakdown of the industry groups in which residents of rural areas work, using different definitions of rural. As expected, the second graph which shows urban influence reflects the importance of primary industry (particularly agriculture) in remote areas and areas with low urban influence. 'Social services' and 'wholesale/retail, food and accommodation' are important in remote rural areas (though unsurprisingly to a lesser extent than in urban areas), reflecting the sweeping range of tourism.

Table 2: Employment distribution (%) by Industry sector (ANZSIC 2006 level 1) for rural and urban areas by residence and workplace in 2006

Geographical basis	Minor Urban		Rural Centres		Rural Districts		Rural Areas (All rural)		Urban areas (All urban)	
Industry (ANZSIC 2006 Level 1)	Workplace	Residence	Workplace	Residence	Workplace	Residence	Workplace	Residence	Workplace	Residence
Agriculture, Forestry and Fishing	4.1	7.7	13.3	14.2	52.9	34.3	48.9	32.0	3.0	2.9
Mining	0.4	0.6	0.5	0.7	0.9	0.4	0.8	0.4	0.2	0.2
Manufacturing	11.8	14.0	13.1	12.3	11.3	8.7	11.5	9.1	11.6	12.0
Electricity, Gas, Water and Waste Services	0.7	0.8	0.4	0.6	0.3	0.5	0.4	0.5	0.5	0.5
Building and Construction	7.4	10.5	6.1	8.6	5.2	7.4	5.3	7.5	8.4	8.0
Wholesale Trade	3.0	3.3	1.9	3.5	1.6	3.2	1.6	3.3	5.6	5.6
Retail Trade	15.7	12.1	7.7	9.2	2.8	6.8	3.3	7.1	11.1	11.1
Accommodation and Food Services	9.5	8.3	14.1	7.8	4.0	4.1	5.1	4.5	6.1	6.1
Transport, Postal and Warehousing	3.2	4.5	4.5	5.0	1.8	3.1	2.2	3.3	4.5	4.5
Information Media and Telecommunications	1.1	1.1	0.1	1.0	0.2	0.8	0.2	0.8	2.2	2.2
Financial and Insurance Services	2.1	1.9	0.4	1.4	0.7	1.6	0.7	1.6	3.7	3.8
Rental, Hiring and Real Estate Services	3.3	2.8	1.9	2.6	2.7	2.8	2.6	2.8	2.9	2.9
Professional, Scientific and Technical Services	6.0	4.9	2.1	4.6	2.7	4.9	2.6	4.8	8.7	8.8
Administrative and Support Services	2.2	3.1	2.1	3.0	1.8	2.2	1.8	2.3	3.7	3.8
Public Administration and Safety	3.7	3.6	4.6	4.8	1.4	2.3	1.7	2.6	4.7	4.6
Education and Training	10.3	7.1	15.5	7.8	4.7	6.2	5.7	6.4	7.9	7.8
Health Care and Social Assistance	8.8	7.6	7.0	7.2	1.5	6.0	2.1	6.1	9.3	9.0
Arts and Recreation Services	1.6	1.9	1.6	2.0	1.7	1.5	1.7	1.6	1.7	1.8
Other Services	5.1	4.2	3.2	3.8	1.8	3.1	2.0	3.2	4.4	4.3
Total	100	100	100	100	100	100	100	100	100	100

Figure 9: Distribution (%) of industry group by residence of worker 2006
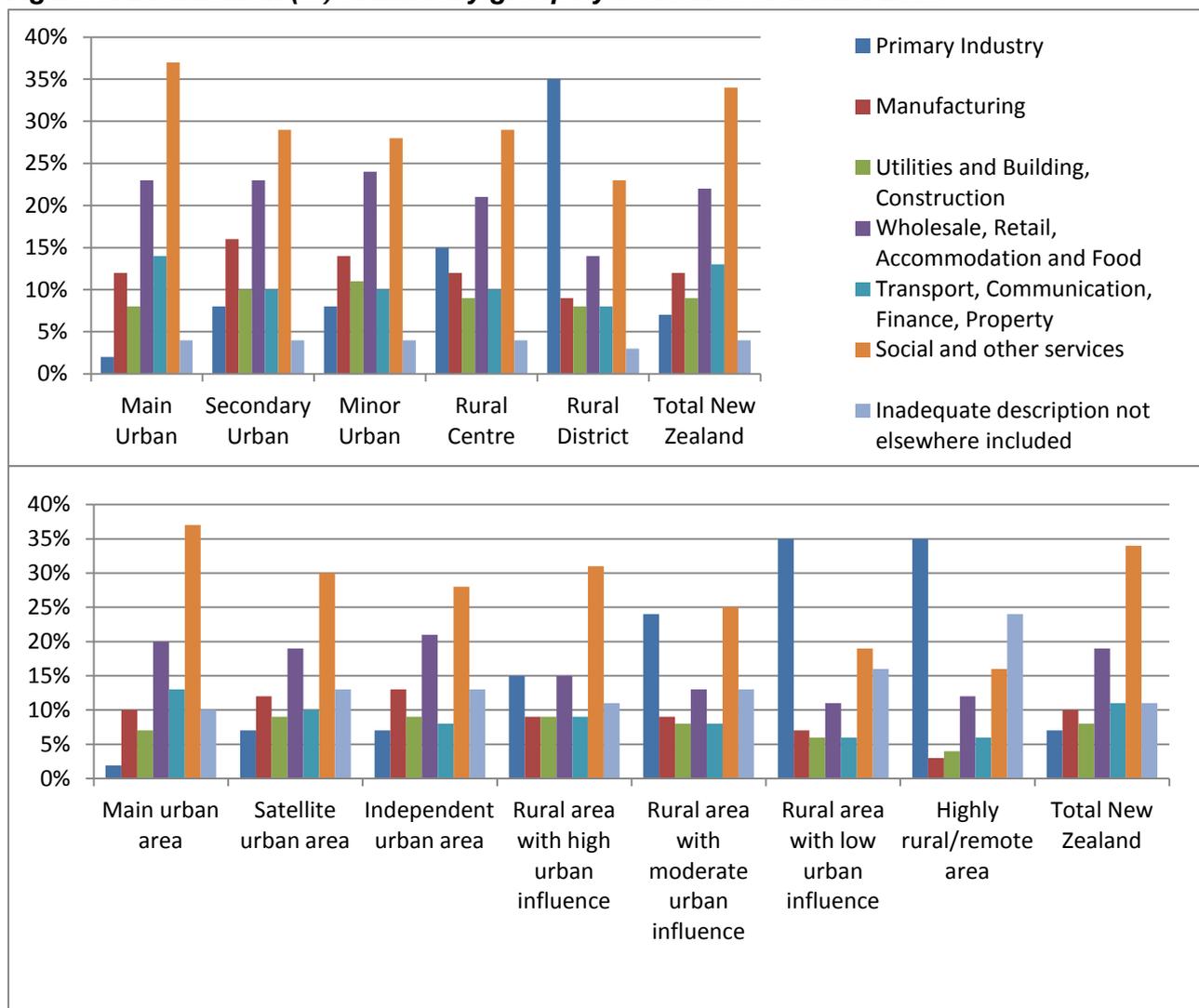
Trends in jobs by industry for rural residents 1981 to 2006

Any analysis of the industry mix of jobs needs to recognise that jobs in rural areas increased by roughly 50% between 1981 and 2006, from 201,000 to 300,000. The rates of change of the employed population of rural areas between different censuses 1981 to 2006 have been uneven and cyclical. Rates of change for rural communities for each gender and overall, follow roughly the same trend as in urban New Zealand through the 1981 to 2006 period, illustrating how connected rural and urban communities are.

The rate of change in the numbers of working women has been consistently higher than that of working men. Employment of rural women has also grown faster than employment of urban women in all but the 2001 to 2006 period. For women, increased participation in work overall has been a major feature of labour market change whereas for men the major compositional shifts in industries represented a larger share of changes in job opportunities.

The industry mix of jobs held by rural residents has steadily shifted from agriculture to other industry sectors at successive censuses over the 25 year period.

Figure 10: Jobs of rural residents by industry 1981 - 2006
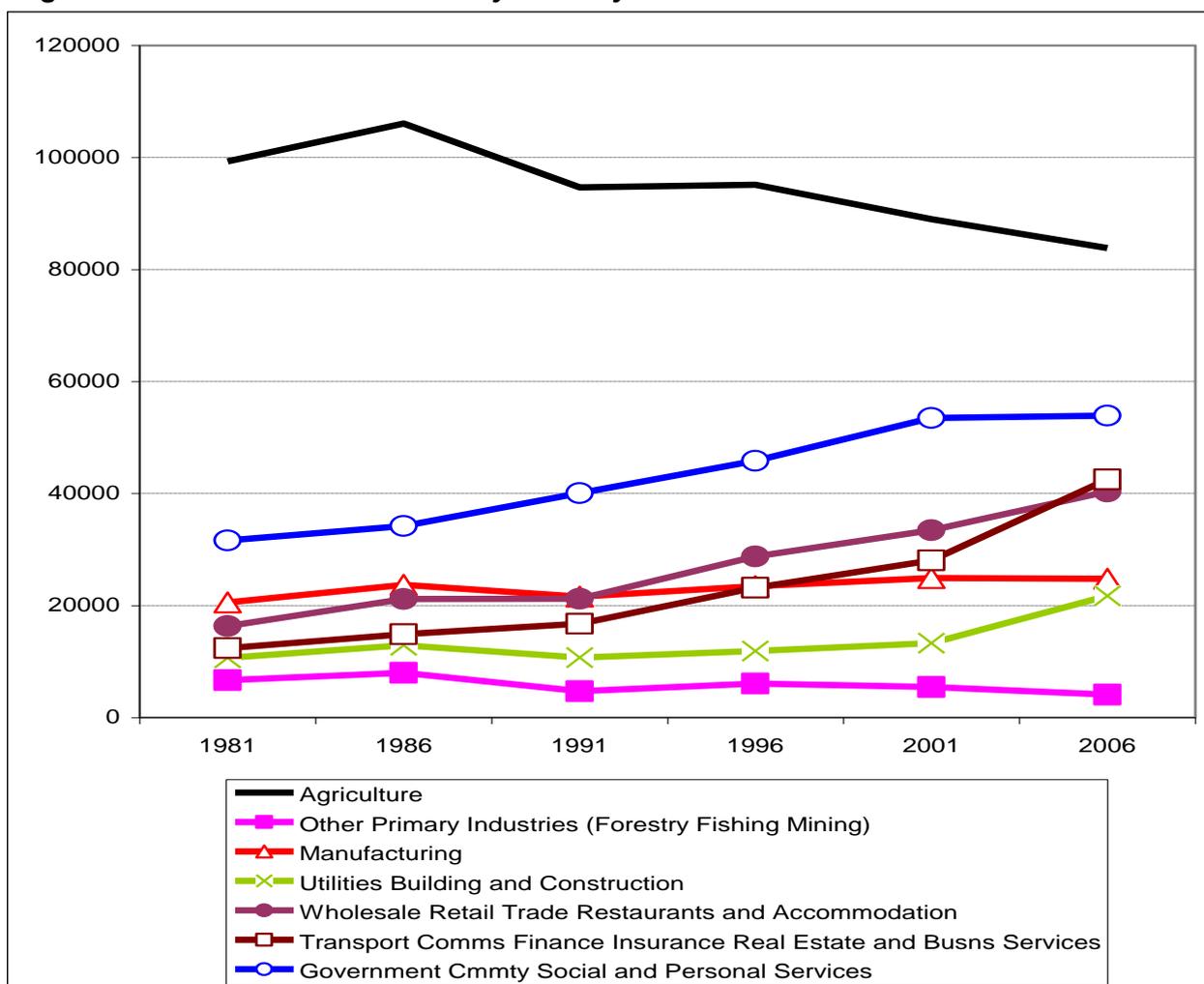
Table 3a: Jobs of rural residents by industry 1981 - 2006 (NZSIC)	1981	1986	1991	1996	2001	2006
Agriculture	99,306	106,089	94,665	95,133	88,989	83,817
Forestry and Logging	3,789	4,377	1,827	3,228	3,075	1,764
Fishing	1,323	1,896	1,530	1,551	1,278	1,224
Mining	1,596	1,944	1,392	1,314	1,110	1,110
Manufacturing	20,595	23,718	21,603	23,481	24,939	24,762
Utilities	2,178	2,349	1,629	1,011	633	1,344
Building and Construction	8,484	10,584	9,066	10,896	12,672	20,382
Wholesale and Retail Trade	11,682	14,451	14,739	19,743	22,677	28,065
Food Services	1,299	2,253	2,844	4,461	5,460	7,443
Accommodation	3,354	4,467	3,618	4,581	5,367	4,839
Transport or Communications	8,196	8,958	7,092	8,370	9,330	11,238
Finance and Insurance	1,833	2,484	2,922	3,282	3,507	11,952
Real Estate and Business Services	2,415	3,924	6,783	11,574	15,276	19,326
Public Administration and Defence	6,849	5,991	7,152	7,389	6,948	7,101
Health Education Community Social and Personal Services	25,173	28,635	33,144	38,625	46,632	46,821
Not Specified or Not Adequately Def.	3,264	2,097	4,581	19,314	17,766	17,490
All Industries	201,336	224,217	214,587	253,953	265,659	288,678

Figure 11: Change in jobs held by women by industry in rural areas 1981-2006
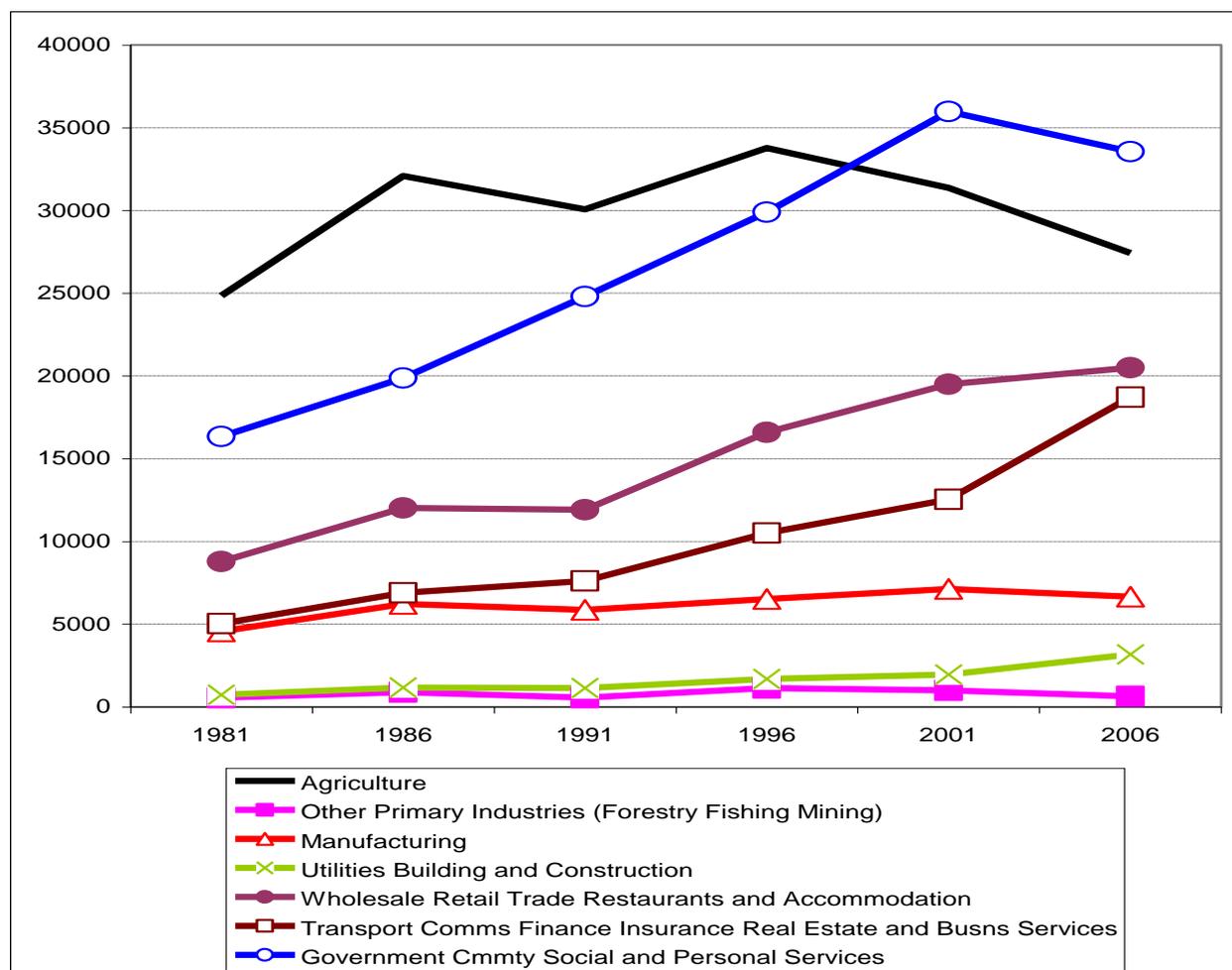
Table 3b: Industry composition (%) of jobs held by residents of rural areas 1981 – 2006*

Industry (NZSIC)	1981	1986	1991	1996	2001	2006
Agriculture	49.3	47.3	44.1	37.5	33.5	29.0
Forestry and Logging	1.9	2.0	0.9	1.3	1.2	0.6
Fishing	0.7	0.8	0.7	0.6	0.5	0.4
Mining	0.8	0.9	0.6	0.5	0.4	0.4
Manufacturing	10.2	10.6	10.1	9.2	9.4	8.6
Utilities	1.1	1.0	0.8	0.4	0.2	0.5
Building and Construction	4.2	4.7	4.2	4.3	4.8	7.1
Wholesale and Retail Trade	5.8	6.4	6.9	7.8	8.5	9.7
Food Services	0.6	1.0	1.3	1.8	2.1	2.6
Accommodation	1.7	2.0	1.7	1.8	2.0	1.7
Transport or Communications	4.1	4.0	3.3	3.3	3.5	3.9
Finance and Insurance	0.9	1.1	1.4	1.3	1.3	4.1
Real Estate and Business Services	1.2	1.8	3.2	4.6	5.8	6.7
Public Administration and Defence	3.4	2.7	3.3	2.9	2.6	2.5
Health Educ Community Social and Personal Services	12.5	12.8	15.4	15.2	17.6	16.2
Not Specified or Not Adequately Defined	1.6	0.9	2.1	7.6	6.7	6.1
Total all Industries	100.0	100.0	100.0	100.0	100.0	100.0

Note: Figures in table 3a and 3b are based on the NZSIC classification for time series consistency, so are not the same as the figures used in Tables 2 and 6b which are based on the ANZSIC classification – see also Appendix A.

The number of rural residents working in agriculture decreased at an average annual rate of 0.7% per annum, from 99,306 in 1981 to 83,817 in 2006 (Figure 10 and Table 3a). This reflected a drop in agricultural employment from 49% of jobs held by rural residents in 1981, to 29% in 2006 (Table 3b).

Over the 25 year period employment in 'wholesale and retail trade' nearly doubled (to 10%), 'real estate and business services' increased from 1% to 7%, and social services (health, educational, community and social and personal services) increased from 12% to 16% (Table 3b). This meant that in 2006, after agriculture the largest source of jobs for rural residents was 'health, education community, social and personal services', followed by 'wholesale and retail trade', 'manufacturing', 'building and construction', and 'real estate and business services' (Table 3b).

Part of the shift into services away from agriculture is due to changes within the agriculture industry itself, and increased opportunities in the service sector. The most dramatic change, however, is the major increase in the participation by rural women (like urban women) in the paid labour market.

While the numbers of rural women in agriculture increased by almost 10,000 between 1981 and 1996, then declined (to a level slightly above that of 1981), participation by rural women in 'community, social and personal services' more than doubled between 1981 and 2006, and there were also significant increases in the participation of rural women in 'wholesale, retail, restaurant and accommodation' and in 'transport, communications, finance, business and real estate' services over the 25 years, particularly from 1991 (Figure 11).

Changes in employment within primary industry

Table 4: Estimated jobs in agriculture, forestry and fishing all New Zealand 1981-2006

Detailed Industry Group (NZSIC)	Estimated number of full or part time jobs (census counts)					
	1981	**1986**	**1991**	**1996**	**2001**	**2006**
Horticulture and Fruit Growing	19,280	27,560	25,340	28,940	26,900	24,220
Grain, Sheep and Beef Cattle or other Livestock Farming	62,520	64,580	58,620	57,400	49,820	48,300
Other Crop Growing	1,260	1,120	780	660	680	940
Dairy Farming	33,980	35,400	31,620	35,280	35,040	33,520
Poultry Farming	1,980	1,880	1,680	1,920	1,620	1,620
Aquaculture	220	640	740	1,020	940	1,040
Forestry and Logging	10,100	11,560	5,800	9,460	9,580	7,960
Marine Fishing	3,340	4,000	3,180	3,260	2,780	1,820
Hunting and Trapping	1,520	980	240	340	340	300
Services to Agriculture	11,980	11,620	10,280	11,840	15,080	15,720
Agriculture Forestry and Fishing Total	**146,180**	**159,340**	**138,280**	**150,120**	**142,780**	**135,440**

Table 4 shows that for New Zealand as a whole the distribution of jobs within primary industry is similar over the 25 year period from 1981 to 2006, but over time job numbers in the sheep-beef and grain sector have declined (and the proportion dropped from 43% of jobs in agriculture, forestry and fishing in 1981, to 36% in 2006). The number of jobs in dairying has fluctuated (although the proportion of jobs in dairying increased from 23% in 1981 to 25% in 2006), forestry has declined, and services to agriculture have increased (from 8% to 12%).

Table 5: Employment % in primary industry sectors rural and minor urban residents 2006

Industry (ANZSIC 2006 Levels 2 or 3)	Minor Urban	Rural Centres	Rural Districts	All Rural	All Urban
Nursery and Floriculture Production	2.7	4.2	2.1	2.2	5.4
Mushroom and Vegetable Growing	4.5	6.5	2.2	2.3	5.8
Fruit and Nut Growing	19.3	16.8	7.7	8.0	13.9
Grain, Sheep and Beef Cattle Farming	13.7	21.1	39.8	39.2	16.7
Other Crop Growing	0.9	0.4	0.6	0.6	0.7
Dairy Farming	10.1	26.9	32.0	31.8	13.2
Poultry Farming	3.3	0.3	0.8	0.8	1.7
Deer Farming	0.7	0.0	1.4	1.4	0.5
Other Livestock Farming	2.7	2.0	3.4	3.3	3.2
Aquaculture	1.6	0.0	0.4	0.4	1.2
Forestry and Logging	6.5	1.4	1.8	1.7	7.1
Fishing	1.6	0.0	0.3	0.4	2.5
Hunting and Trapping	0.3	0.0	0.1	0.1	0.3
Forestry Support Services	3.0	1.9	0.4	0.4	3.4
Agriculture and Fishing Support Services	21.3	14.8	5.6	5.8	19.7
Mining	7.9	3.8	1.6	1.7	4.8
Primary Industry Total	100.0	100.0	100.0	100.0	100.0

In 2006 employment of residents of rural districts in 'grain, sheep and beef cattle farming' made up 40%, the largest 'slice' of all rural primary industry sector jobs in rural districts (Table 5), while dairy farming made up 32% of these jobs. 'Fruit and nut growing' is a distant third, providing only 8% of rural jobs overall but 17% of jobs in rural centres. Jobs in 'agriculture and fishing support services' make up 21% of minor urban and 15% of rural centre jobs, but only 6% of rural district jobs.

Farm trends

Matching the decline in jobs in the sheep/beef and grain sector is the overall decline in the number of farms. Mulet-Marquis and Fairweather (2008) note that the different sources providing data on farm numbers report very different figures and trends over time, but they all seem to indicate an overall trend of decrease in total farm numbers between 1972 and 2002. This appears to be due mainly to a decrease in the numbers of grazing and fattening farms (sheep/beef) and in the number of arable farms (grain).

The distribution of farms by size range over time shows an increase in the proportion of both the smallest and the largest ones, at the expense of the midsized categories. This is particularly the case for dairy farms (Mulet-Marquis and Fairweather 2008:8).

Analysis by Beef + Lamb NZ's Economic Service shows that across New Zealand sheep and beef cattle numbers continue to decline, while dairy cattle increase in number. The numbers of dairy herds have dropped (from over 14,000 in 1998/99 to under 12,000 in 2008/09), but herd sizes are up. While almost half of New Zealand's dairy herds are now in the range of 150-350 cows, and the average herd size is 376 cows, some 400 herds across New Zealand (3%) have over 1,000 cows (DairyNZ 2010).

The area in farmed pasture has dropped by about 20%. While forestry expanded in the '90s, current market returns are pushing the conversion of plantation forests into dairy farms. Water is the biggest limitation on dairy expansion (Beef + Lamb NZ Economic Service 2011).

IV.   REGIONAL SUMMARY – NEW ZEALAND RURAL COMMUNITIES 2006

Demographics

The regions which are most rural are Northland (with almost half its population living in rural areas), followed by Tasman and the West Coast (Figure 12). However, Waikato has the largest share (16%) of New Zealand's rural population with Canterbury (14%) and Northland (13%) close behind. Despite only 4% of the Auckland region's population living in rural areas (Figure 12, left hand axis), Auckland is home to 9% of the rural population (Figure 12, right hand axis). A very low proportion of Nelson (2%) and Wellington (4%) residents live in rural areas and these two regions are home to less than 1% and 3% respectively of New Zealand's rural population.

Figure 12: Rural Population Distribution by Region in 2006
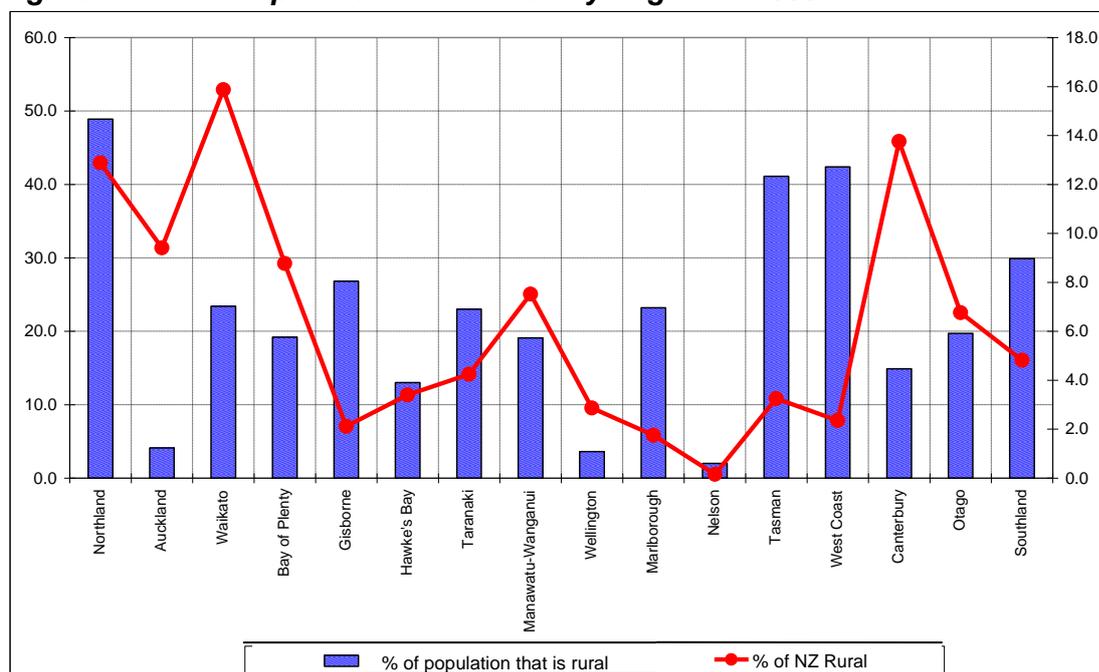
The age structures of rural regional populations all share the general form of excess of adults within a range of 30 years to retirement age, with a second bulge due to children associated with those adults. 20 to 29 year olds are largely absent and those over 70 years are under-represented.   This relates to rural communities being a part of a wider New Zealand population with departure of children on leaving school, returning or replacement with working age adults aged 30 years or over often with children, and outflows to small urban centres into retirement.

Within this general form there are several variations. Gisborne, for example, has a much younger largest adult cohort at aged 45-49 years and a relatively large number of children relative to the adult population, and Marlborough has an older peak age group at 55-59 years and a much lower proportion of children. This in part represents contrasting ethnic composition. Some 59% of Gisborne rural residents are of Māori ethnicity compared with only 8% of Marlborough's rural areas.

Concentration of Māori in rural centres and minor urban areas more than the surrounding rural districts is particularly marked in Bay of Plenty, Waikato, Taranaki and Manawatu-Wanganui.

One possible historical process supporting this split is the high historical engagement of Māori in agricultural seasonal labour and primary processing in extensive sheep and beef farming. Another is the historical alienation of many rural Māori from their land and isolation into pockets in some rural regions with a low proportion of ownership of working farms in many regions.

Employment

Multiple job holding

After allowing for the high number of jobs that are not coded fully to a specific workplace location, of the order of 200,000 jobs were located in rural areas in 2006 as compared with just over 300,000 jobs held by rural residents. By implication around two out of every three rural residents is likely to work in an urban area for their main job.

Figure 13: Multiple job holding rates for rural areas by region in 1981 and 2006
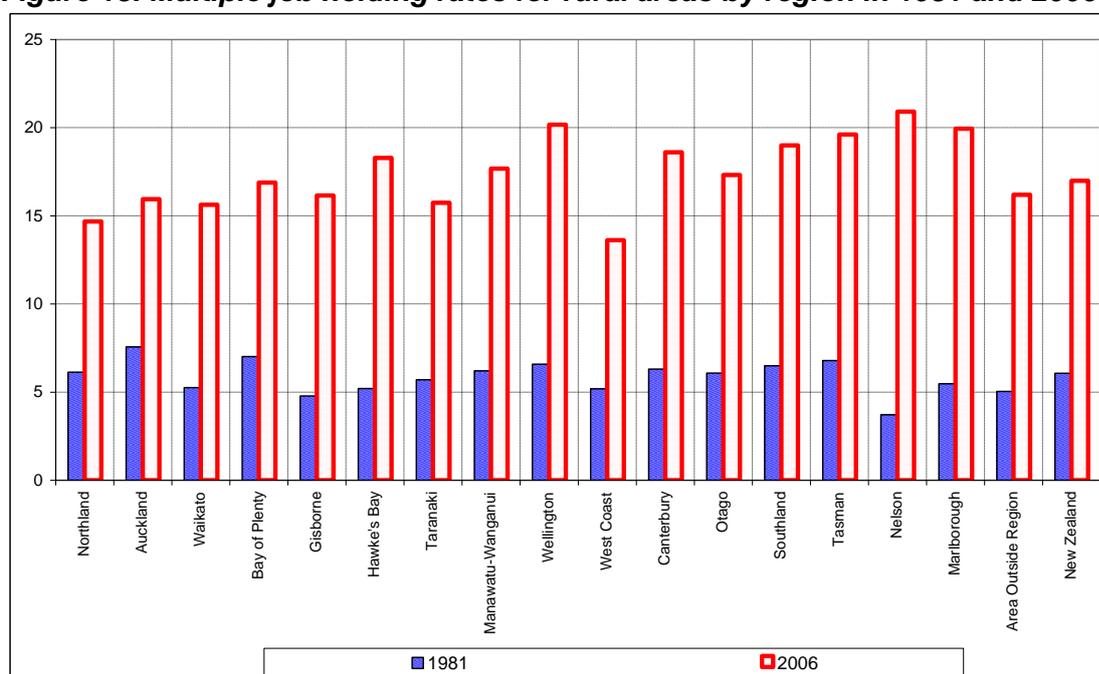
At a regional level, while many rural residents are engaged in major rural industries and associated manufacturing and processing, many other rural residents commute to work all or part of their time in urban areas. Simple statistics on first jobs ignore the manner in which individual rural livelihoods are sustained by drawing on more than one industry. Multiple job holding rates reflect this. Multiple job holding rates by rural residents of most regions increased sharply between 1981 and 2006 (Figure 13).

Rural regional work

While 32% of New Zealand's rural residents worked in 'agriculture, forestry and fishing', and 49% of rural jobs were in agriculture, forestry and fishing, there was considerable variation across the regions. Whereas 66% of jobs in Taranaki and 58% of Southland's jobs were in 'agriculture, forestry and fishing' (Table 6a), unsurprisingly (given Auckland's place as New Zealand's major city) only 31% of Auckland jobs were in this sector and only 14% of Auckland region's residents worked in it. Taranaki and Southland had the greatest proportion of their

Table 6a: New Zealand regions in 2006 – Rural workplace jobs by industry as a percentage of all industries (ANSIC 2006 level1)

Region	Agric Forestry & Fishing	Mining	Manu-facturing	Utilities & Building Constru-ction	Whole-sale Retail Trade	Accom-modation & Food Services	Transport Commun-ication Finance Ins. Real Estate	Profess, Scientific & Technical Services	Public Admin Safety Admin & Support	Educ-ation & Training	Health Care and Social Assis	Other Services	Total Jobs - all Industries
Northland	39.7	0.7	9.2	8.4	6.1	6.4	7.6	3.2	2.2	9.4	3.6	3.5	17,337
Auckland	30.8	0.7	11.3	11.0	7.0	5.0	9.2	6.3	3.0	5.8	2.7	7.3	13,488
Waikato	53.2	0.9	11.7	5.2	4.0	4.6	5.8	2.1	2.9	5.0	0.9	3.7	29,934
Bay of Plenty	48.1	0.4	8.8	7.1	5.5	3.3	5.8	3.4	4.7	6.9	2.5	3.6	12,618
Gisborne	52.3	0.2	11.6	3.3	3.6	2.6	3.9	1.6	4.6	10.3	3.1	3.2	3,861
Hawke's Bay	54.9	0.4	21.5	3.9	2.3	1.9	3.3	1.6	2.1	5.2	1.2	1.7	7,653
Taranaki	66.2	1.9	8.7	3.9	3.1	1.6	4.4	1.3	1.1	5.0	0.5	2.4	8,589
Manawatu-Wanganui	51.1	0.2	9.2	4.2	7.2	3.2	4.1	2.1	7.6	6.4	1.8	3.1	16,197
Wellington	45.5	0.7	11.2	6.9	3.9	5.4	4.6	2.9	6.2	2.8	4.8	5.1	5,874
West Coast	37.5	10.4	13.6	2.4	2.1	17.9	3.6	0.5	3.0	4.3	2.6	1.9	4,686
Canterbury	50.3	0.2	10.5	4.5	5.6	5.7	5.3	2.0	2.1	5.1	2.0	3.7	27,771
Otago	45.6	1.1	9.9	7.3	4.7	6.9	5.8	3.5	2.5	5.4	3.5	3.8	14,430
Southland	57.8	0.7	18.9	2.1	2.3	3.3	6.0	1.4	1.0	3.9	0.9	1.8	12,210
Tasman	46.5	0.2	10.	4.6	5.1	10.2	5.4	3.2	2.8	5.0	2.5	4.5	6,135
Nelson	50.5	0.0	4.5	11.7	0.0	5.4	2.7	9.0	4.5	3.6	3.6	4.5	435
Marlborough	48.1	0.9	13.8	5.6	5.7	7.9	5.8	2.8	1.8	3.9	1.0	2.9	4,533
Chathams	39.1	2.9	5.8	0.0	0.0	5.8	16.0	0.0	4.4	10.1	7.3	8.7	279
New Zealand	48.9	0.8	11.5	5.7	4.9	5.1	5.7	2.6	3.6	5.7	2.1	3.7	186,030

Table 6b: Distribution of jobs (%) held by rural residents of regions (2006)

Region	Agric Forestry & Fishing	Mining	Manu-facturing	Utilities & Building Construc-tion	Whole-sale Retail Trade	Accom-modation & Food Services	Transport Commun-ication Finance Ins. Real Estate	Profess, Scientific & Technical Services	Public Admin Safety Admin & Support	Educ-ation & Training	Health Care and Social Assis	Other Services
Northland	23.1	0.4	9.0	10.4	11.2	5.5	9.0	5.1	5.2	8.0	8.0	5.2
Auckland	13.8	0.3	10.8	12.0	14.2	3.6	12.3	8.3	5.8	6.7	5.8	6.4
Waikato	37.0	0.5	8.5	8.1	9.9	4.4	7.8	4.3	4.2	5.8	4.9	4.7
Bay of Plenty	26.3	0.2	9.8	9.2	11.0	3.8	8.7	5.7	5.6	7.1	7.2	5.4
Gisborne	42.5	0.2	5.4	5.9	7.1	3.5	7.4	2.2	4.2	10.3	7.3	4.1
Hawke's Bay	42.1	0.3	10.6	6.0	9.0	2.5	6.1	3.7	4.3	6.4	5.2	3.8
Taranaki	47.2	0.9	9.1	5.8	7.9	2.8	6.4	3.4	3.0	5.4	5.0	3.2
Manawatu-Wanganui	38.5	0.0	8.0	6.3	10.1	3.3	6.9	3.7	5.3	7.0	6.3	4.6
Wellington	26.6	0.3	6.6	8.8	10.7	4.1	9.5	7.9	7.5	6.5	6.6	5.1
West Coast	24.9	3.7	8.7	7.3	10.8	11.9	7.4	3.1	5.7	5.3	5.8	5.4
Canterbury	32.2	0.1	9.8	6.7	10.6	4.7	8.9	4.6	5.9	5.9	5.9	4.5
Otago	32.9	1.0	8.4	7.9	9.6	5.9	8.5	4.4	4.2	5.9	6.8	4.6
Southland	48.7	0.2	9.4	4.1	7.7	3.4	8.	2.8	2.9	4.8	4.3	3.6
Tasman	30.4	0.3	8.8	7.5	9.6	7.5	8.2	4.9	4.4	5.8	6.9	5.7
Nelson	10.5	0.0	10.5	11.9	10.5	3.3	8.5	9.2	5.9	7.9	15.1	6.6
Marlborough	36.6	0.3	11.5	7.2	7.8	6.9	8.6	4.0	3.6	5.2	5.5	3.0
Chathams	42.1	0.0	5.6	4.7	4.7	5.6	11.2	1.9	4.7	6.5	4.7	8.4
New Zealand	32.0	0.4	9.1	8.0	10.4	4.5	8.5	4.8	4.9	6.4	6.1	4.8

residents working in the 'agriculture, forestry and fishing' sector (47% and 49% respectively). While only 11% of Nelson residents worked in the 'agriculture, forestry and fishing' sector, 50% of the jobs in this region were in 'agriculture, forestry and fishing' (Tables 6a and 6b).

Following agriculture, manufacturing (mainly food processing) is important in Hawke's Bay and Southland (21% and 19% of rural jobs respectively).

Tourism and leisure related industries are major employers in some rural regions. The sector 'accommodation and food services' is the major identifiable component of the diverse industries reliant on this activity. The rural communities of the West Coast at 18% have the highest rates of employment in this sector at local workplaces, more than 3 times the national mean.

In decreasing order, Tasman, Marlborough, Otago and Northland rural areas have higher than average employment at local workplaces in this sector. Rates in Taranaki and Hawke's Bay at 2% each are the lowest, much lower than the national mean. Linked with tourism, as well as being a basic service, an important source of employment for people living in rural areas are the wholesale and retail trades.

Change in agriculture and forestry sector jobs 1981-2006 by region

The number of jobs in 'grain, sheep and beef cattle or other livestock farming' decreased sharply between 1981 and 2006 by 12,700, about 20%. On a national basis it is estimated that there were 49,800 jobs in 'grain, sheep and beef cattle or other livestock farming' in 2006. The highest rates for regions as a whole were in Southland (11%) and Gisborne (8%) compared with a national rate of 2.5% (Table 7).

Table 7: Change in jobs of rural residents in three industry sectors by region 1981- 2006

Region	Sheep, beef, other livestock & grain			Dairying			Forestry		
	Jobs in 1981	Jobs in 2006	% of jobs in 2006	Jobs in 1981	Jobs in 2006	% of jobs in 2006	Jobs in 1981	Jobs in 2006	% of jobs in 2006
Northland	3,780	2,931	4.6	3,738	2,526	3.9	720	621	1.0
Auckland	3,126	2,742	0.4	2,961	1,554	0.2	462	447	0.1
Waikato	6,744	5,514	3.1	11,517	9,960	5.7	2,133	1,146	0.7
Bay of Plenty	2,088	1,842	1.5	3,435	2,691	2.2	2,334	1,260	1.0
Gisborne	2,577	1,545	8.0	75	36	0.2	402	474	2.5
Hawke's Bay	4,572	3,510	4.8	147	360	0.5	438	606	0.8
Taranaki	1,938	1,353	2.6	5,892	4,440	8.6	72	99	0.2
Manawatu-Wanganui	7,704	6,225	5.7	2,436	2,766	2.5	378	492	0.5
Wellington	2,460	2,007	0.9	753	684	0.3	213	438	0.2
West Coast	642	423	2.6	630	1,050	6.5	495	270	1.7
Canterbury	11,511	9,678	3.6	963	3,360	1.2	678	531	0.2
Otago	5,889	4,815	4.8	390	1,317	1.3	534	459	0.5
Southland	6,948	5,247	10.9	294	2,037	4.2	390	195	0.4
Tasman	1,137	873	3.7	483	522	2.2	498	471	2.0
Nelson	78	75	0.3	21	15	0.1	174	189	0.9
Marlborough	1,221	963	4.2	183	183	0.8	162	243	1.1
New Zealand	62,511	49,812	2.5	33,981	33,513	1.7	10,098	7,965	0.4

Jobs in 'dairying' dropped slightly by 470 jobs or 1% between 1981 and 2006. The shifts in number of dairying jobs between regions over 1981 to 2006 have been very large. The number of dairying jobs grew by 590% in Southland, 250% in Canterbury, 240% in Otago and 150% in the Hawke's Bay between 1981 and 2006. On a national basis it is estimated that there were 33,500 jobs in 'dairy farming' in 2006. The highest rates for regions as a whole

were in Taranaki (9%) the West Coast and Waikato (6% each) compared with a NZ as a whole at 2% (Table 7).

Many forestry jobs are held by urban residents who commute to work. The number of jobs in 'forestry and logging' dropped sharply by 2,133 jobs from 10,098 jobs in 1981 to 7,965 in 2006. Despite the loss of jobs Bay or Plenty and the Waikato, these regions remain the most important for forestry. Growth in forestry in Hawke's Bay (predominantly in the north) was from a low base (Table 7).

Regional distribution of jobs in rural workplaces within the agricultural and forestry sectors

When looking at rural workplaces alone and expressing jobs in the 'sheep, beef, grain, and other crops' sector as a percentage of all jobs in 'agriculture, forestry and fishing', the rural region most dependent on jobs in 'sheep, beef, grain, and other crops' was rural Hawke's Bay with 67% of jobs (Table 8).   This was followed by Gisborne (60%), Southland (58%), Manawatu-Wanganui (57%), Otago (56%) and the Chathams (56%). At the other extreme, some rural areas had a very low proportion of local jobs in this activity, notably Nelson (4%), West Coast (12%) and Bay of Plenty (16%).

Again from a workplace perspective the rural regions most dependent on dairying jobs in 2006 were the West Coast (78%), followed by Taranaki (72%) and Waikato (57%) (Table 8). At the other extreme, fewer than 10% of 'agriculture, forestry and fishing' jobs in Gisborne, Marlborough, and Hawke's Bay were in dairying. Nelson and the Chathams had too few jobs in this area to register.

The rural regions most dependent on jobs in forestry were Nelson (22% but of a very small rural area), West Coast and Tasman (6% each), followed by Bay of Plenty (5%).

Table 8: Regional distribution (%) of rural workplace Agriculture, Forestry and Fishing jobs (2006)

Region	Nursery floriculture mushroom and vegetable growing	Fruit and tree nut	Sheep beef grain and other crops	Dairy	Poultry deer other livestock	All agriculture	Forestry and forestry support services	Fishing and other	Agric forestry and fishing as a % of all jobs
Northland	6.3	6.8	38.2	37.2	2.7	91.2	3.3	5.6	39.7
Auckland	22.8	8.2	30.4	20.9	9.6	91.9	2.0	6.1	30.8
Waikato	2.5	1.6	25.7	57.2	6.1	93.1	1.5	5.4	53.2
Bay of Plenty	5.5	30.5	16.4	28.9	4.6	85.9	4.9	9.3	48.1
Gisborne	3.0	22.3	59.8	0.8	2.5	88.4	3.9	7.7	52.3
Hawke's Bay	1.1	13.2	67.3	6.7	3.3	91.6	2.1	6.2	54.9
Taranaki	2.9	0.4	17.3	71.8	3.4	95.8	0.5	3.7	66.2
Manawatu-Wanganui	4.0	0.7	57.2	25.6	4.0	91.5	2.3	6.1	51.1
Wellington	4.8	8.5	51.2	20.9	5.8	91.2	2.2	6.6	45.5
West Coast	1.6	0.0	11.9	77.7	0.5	91.7	6.5	1.8	37.5
Canterbury	5.2	3.4	50.5	22.0	9.3	90.4	1.1	8.6	50.3
Otago	3.1	8.9	56.3	17.7	5.3	91.3	2.0	6.7	45.6
Southland	1.5	0.1	58.4	26.4	6.5	92.9	0.5	6.5	57.8
Tasman	5.6	36.8	25.5	15.7	4.8	88.4	5.8	5.8	46.5
Nelson	0.0	69.4	4.1	0.0	0.0	73.5	22.4	4.1	50.5
Marlborough	3.1	38.8	29.1	7.5	3.9	82.4	3.3	14.3	48.1
Chathams	0.0	0.0	55.6	0.0	0.0	55.6	0.0	44.4	39.1
New Zealand	4.6	8.1	40.5	32.4	5.6	91.2	2.2	6.7	48.9

V.   PROFILE OF THE CASE STUDY COMMUNITIES

To obtain an understanding of the attitudes and perspectives of rural communities on community resilience and climate change, interviews and focus group meetings[10] were undertaken with residents and workers from case study communities from two regions: one in the North Island and the other in the South Island. The specific communities used for case study profiling represent a range of characteristics of New Zealand's rural communities.

*Figure 14a: Distribution of population by settlement type, case study areas, NZ (2006)*
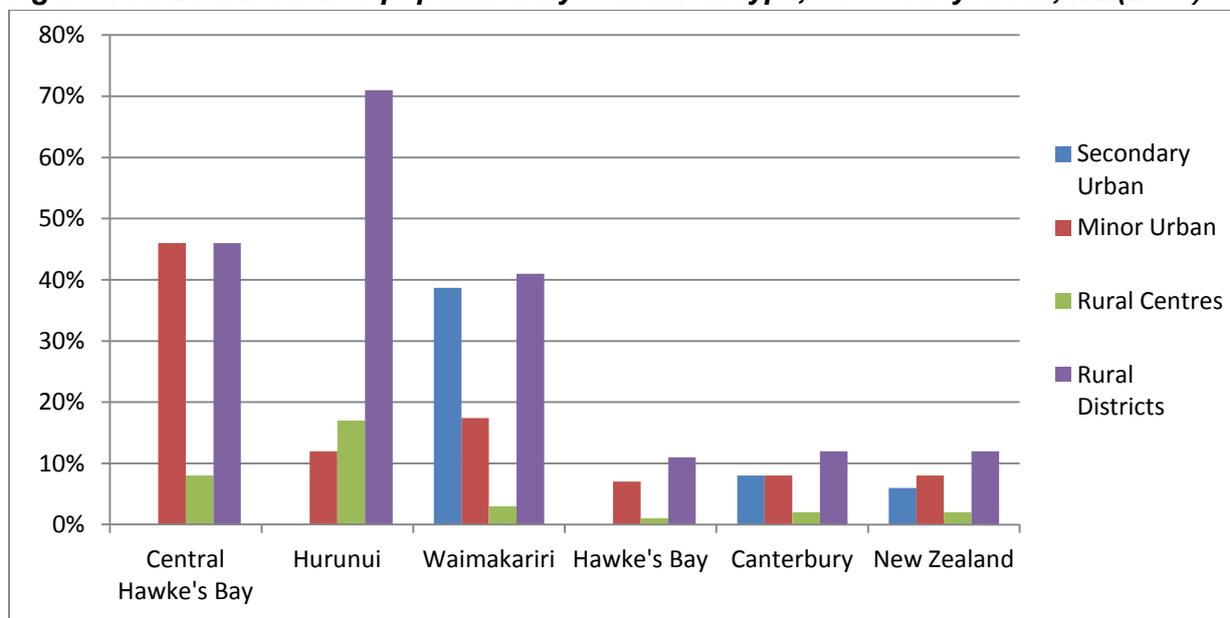
Figure 14b: Settlement by urban influence, case study areas, NZ (2006)
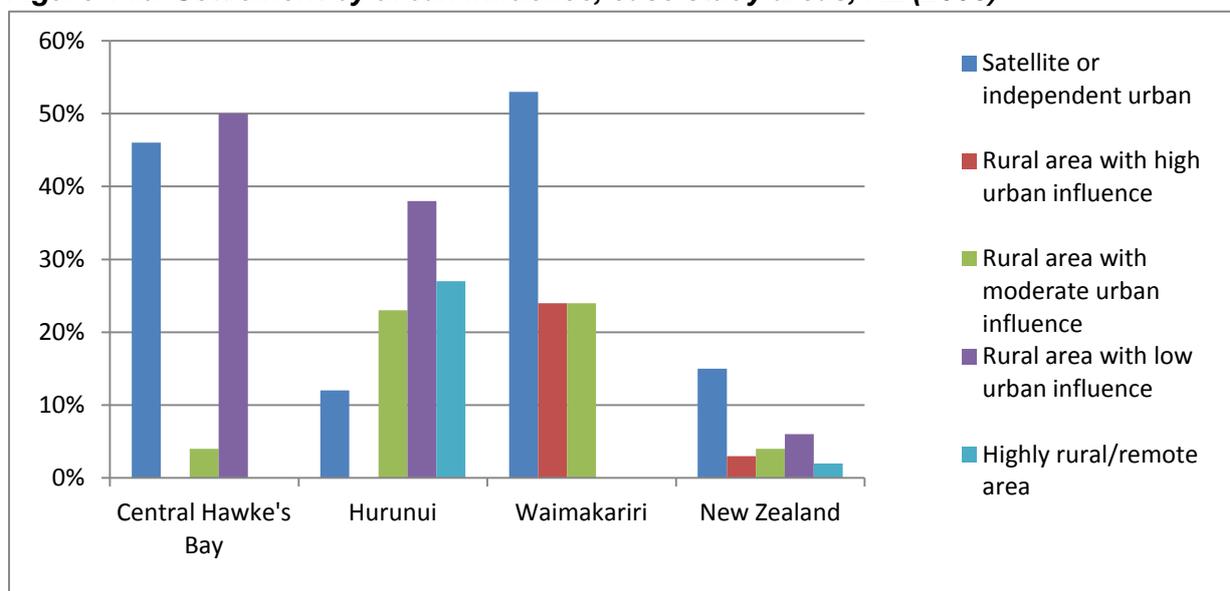
(Note: main urban areas are excluded from the New Zealand graph in Figures14a & 14b, and the region graphs in 14a)

Three territorial authorities were selected with the choice being made predominantly on the basis of their degree of urban influence: Central Hawkes Bay (CHB) District Council on the

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[10] See main report Chapter 4

east coast of the North Island, and in North Canterbury two adjacent authorities, Hurunui District Council and Waimakariri District Council, on the east coast of the South Island.

Locating the study areas on the dry east coast regions of New Zealand ensured that all three case study areas were subject to similar climatic experiences: all three areas have always been subject to drought, intense rain storms and to periodic flooding; and as Figure 18 (below) shows, all three areas have a similar distribution of farm types.

As can be seen from Figures 14a and 14b, the three areas reflect different degrees of rurality and urban influence across a continuum from highly rural/remote, low urban influence (Hurunui) at one end of the continuum to, at the other, rural with high urban influence in close proximity to one of New Zealand's main urban centres and with several secondary urban centres (Waimakariri).

CHB falls in between the two North Canterbury study areas in terms of urban influence. Some 54% of the people in this North Island territorial authority live in the district's rural areas, while the remaining 46% of the population live in two minor urban areas 8 km apart in the centre. While Figure 14b identifies CHB as predominantly rural with low urban influence, it is within commuting distance of the cities of Napier and Hastings[11].

In 2006, 88% of Hurunui's resident population was defined by Statistics New Zealand as rural (with much of the area highly rural/remote or with low urban influence).

In contrast only 34% of Waimakariri District's resident population is rural. In addition to having two secondary urban centres of its own, Waimakariri is separated from Christchurch city by the Waimakariri River and forms part of the Christchurch commuter belt (predominantly connecting via one bridge on State Highway One, south of Kaiapoi).

Another defining difference between the case study areas is the much higher proportion of Māori living in rural CHB (18%) compared with the two rural case study districts of rural Hurunui (6% Māori) and rural Waimakariri (5% Māori). Māori as a proportion of the rural CHB population is only slightly higher than rural New Zealand as a whole (16%) but as a proportion of rural North Canterbury (6%) is much lower.

Socioeconomic profile

A further difference between the areas is their socio-economic profiles. Based on the data compiled for the 2006 Deprivation Index by White *et al* (2008), Figure 15 shows the proportion of population in each territorial authority area in each decile. Decile 1 is the highest socioeconomic grouping and decile 10 the most deprived[12].

Of the three case study areas CHB has the largest proportion of population with a low socio-economic status: 30% of its population is in the lowest three deciles compared to Hurunui's 7% and Waimakariri's 9%. The North Canterbury case study areas had over a third of their populations in the top two deciles.

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[11] The drive between Waipukurau and Hastings takes 30-45 minutes.
[12] For an explanation of the NZDep2006 Index of Deprivation see Appendix C.

Figure 15: Deprivation Index profiles of the three case study areas 2006
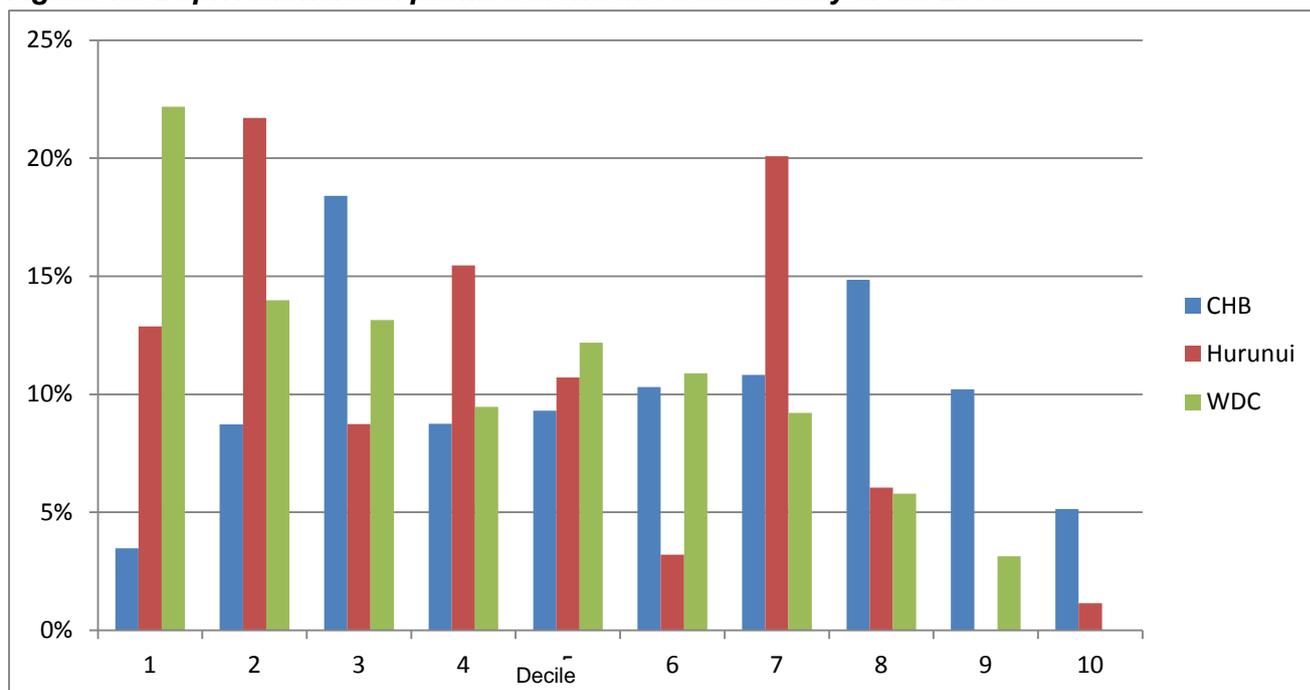
Local government

Table 9 and Figures 16a, b, and c reflect the different challenges faced by the three councils in terms of population size, area, rates and other income, expenditure and staff numbers.

Table 9: Key statistics for the three case study territorial authorities

	CHB	Hurunui	Waimakariri	NZ
No. council employees 2009	40	116	165	
Land area	$3,328km^2$	$8,660km^2$	$2,219km^2$	
Usually resident population 2006	12,957	10,476	42,834	
People per km^2 2006	3.9	1.2	19.3	9.7
Median income 2006	$23,500	$23,000	$24,000	$24,400
Pop growth 2001-2006	0.2%	1.2%	3.2%	1.6%
Public equity per person 2009	$49.14	$24.72	$20.47	$21.1
Operating revenue per person 2009	$1.68	$2.80	$1.00	$1.50
Operating expenditure p.p. 2009	$1.79	$3.05	$1.02	$1.60
Capital expenditure p.p. 2009	$0.59	$0.61	$0.96	$0.80
Rates revenue p.p. 2009	$1.05	$1.01	$0.63	$0.90

Figures 16a, b, and c show that, like most other district councils, rates revenue makes up the bulk of local government income for the three case study areas. While CHB has a population which is above the median for rural councils[13], and high public equity, it has relatively few staff. This restricts its ability to carry out any but the most basic services. Since 2009 the council has focused on holding rates, and is saving money through staff redundancies[14].

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[13] The median population for the 26 rural district councils was 9,810 people in 2009. Half of the rural councils had fewer than 50 staff. Of these all were below the median in terms of population size for a rural district council with the exception of CHB and Rangitikei.
[14] To this end, two positions have been disestablished: the Accreditation Officer and the Communications and Youth Coordinator (interview with the CHB Mayor, 31 May 2011).

Figure 16a: CHB District Council Operating Revenue 2009 (figures in $000s)
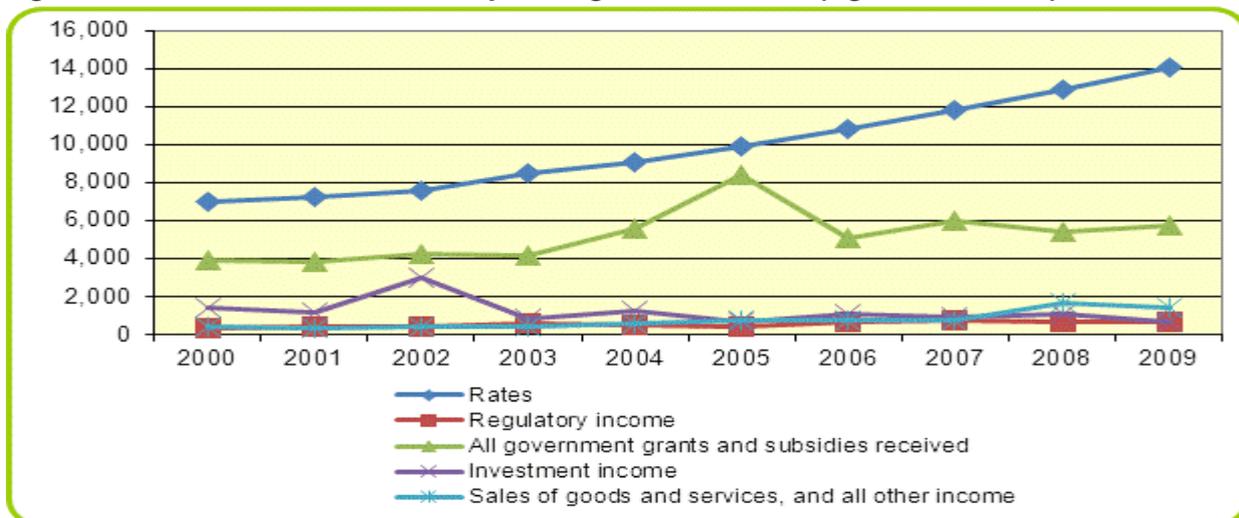
(*Source: DIA www.localcouncils.govt.nz Local Authority Census, Statistics New Zealand*)

Figure 16b: Hurunui District Council Operating Revenue 2009 (figures in $000s)
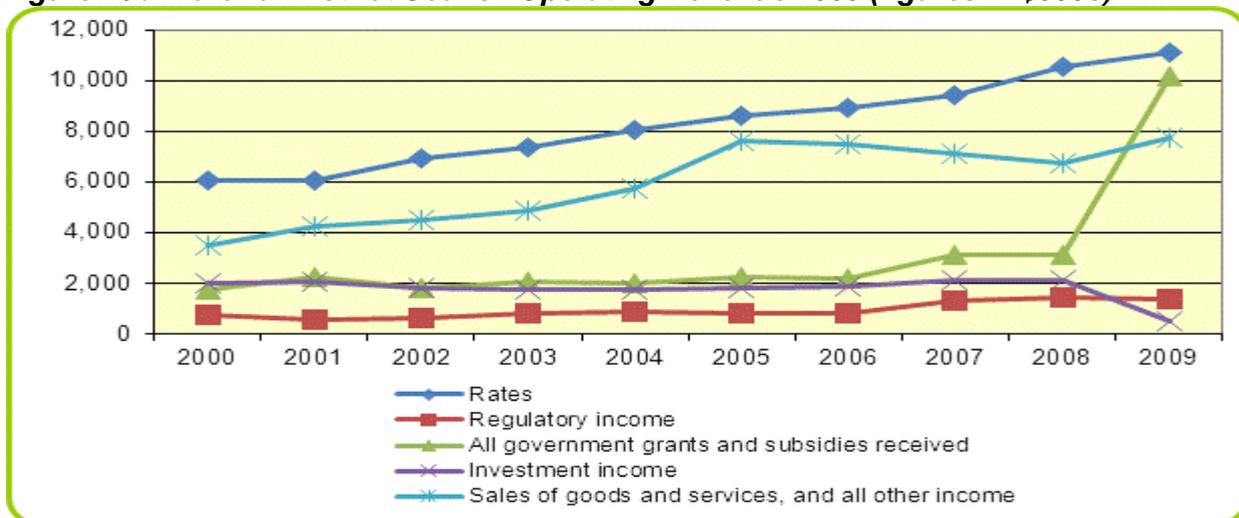

(*Source: DIA www.localcouncils.govt.nz Local Authority Census, Statistics New Zealand*)

Figure 16c: Waimakariri District Council Operating Revenue 2009 (figures in $000s)
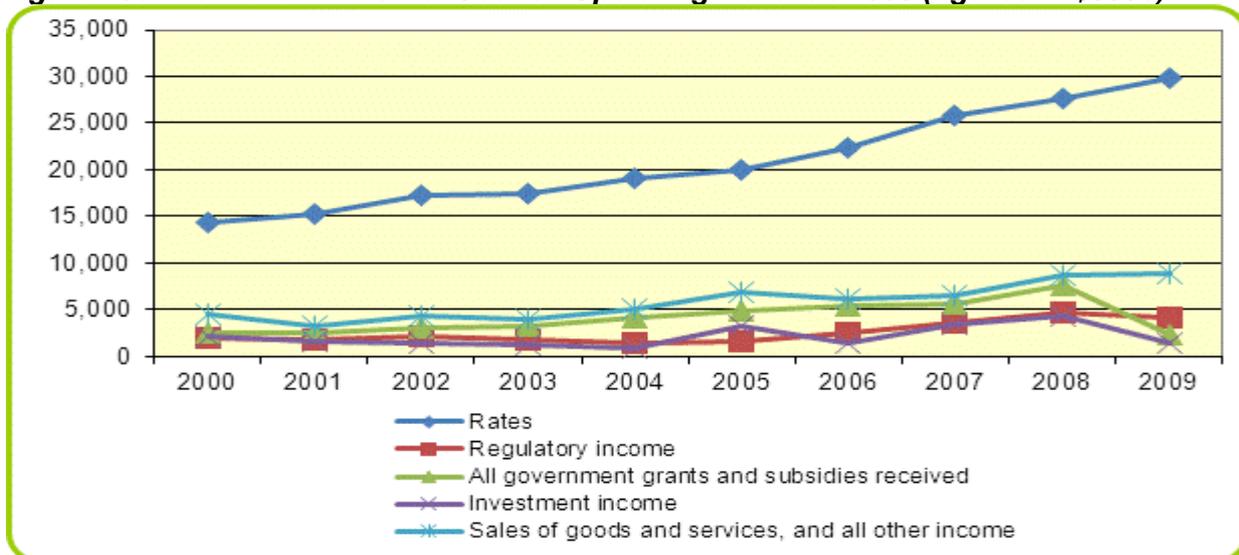

(*Source: DIA www.localcouncils.govt.nz Local Authority Census, Statistics New Zealand*)

Farm trends

Changes in farm numbers identified earlier for New Zealand are reflected in the case study areas (Figure 17). Boundary changes of district council areas, plus the cessation and then intermittent collection of Agriculture Statistics means that the data shown in Figure 17 may not be accurate. It does, however, provide an indication of trends. Growth in Waimakariri is due to the growth in 'small' or 'lifestyle' farms.

Figure 17: **Farm numbers case study areas selected years 1987-2007**
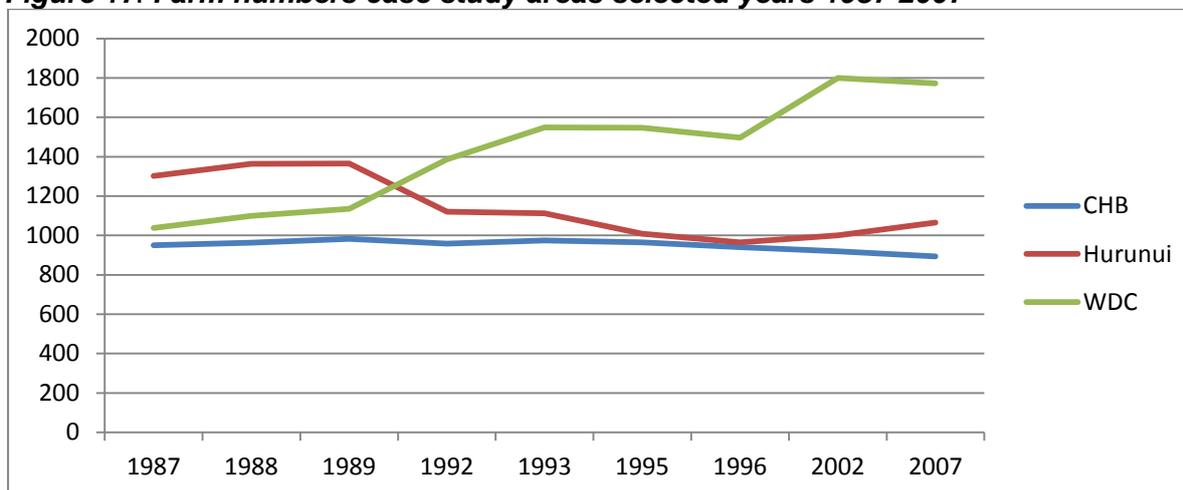
(*Source: Statistics NZ, Agriculture Statistics*)

As Figure 18 shows, in all three districts sheep/beef production is predominant with little change between 2002 and 2007, except at the margins in Waimakariri, probably in the lifestyle farming sector (see below for more detail in the reviews of .each case study area).

Figure 18: Distribution of types of farm, case study areas and New Zealand in 2002 and 2007
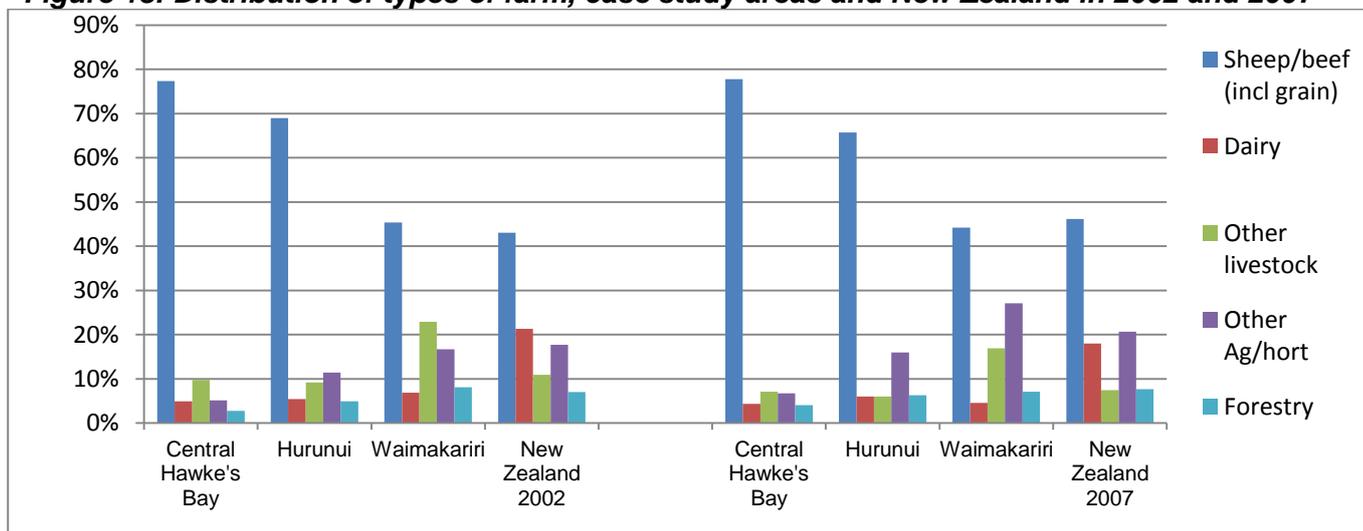
(*Source: Statistics NZ, Agriculture Statistics*)

While dairy farming is not the predominant farm type in the case study areas, it makes a significant impact where it occurs. Hurunui district has the highest average herd size in New Zealand with herds averaging 848 cows (DairyNZ 2010: 16). Hurunui also has the highest average production per herd in New Zealand with 326,768 kilograms of milksolids. CHB, with

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an average of 218,771 kilograms of milksolids, has the highest milksolids production per herd in the North Island. Table 10 shows the key dairy statistics for the three study areas.

Table 10: NZ Dairy Statistics 2009/10 for the case study areas

	Total Herds	Number of owner operators	Number of share-milkers	Average herd size	Ave no. cows per ha	Ave kg milksolids per cow	Ave kg milksolids per herd
CHB	39	29	10	688	2.94	318	218,771
Hurunui	64	47	17	8 48	3.27	304	326,768
WDC	84	60	24	535	3.29	385	204,332
NZ	11,691	7,534	4,125	376	2.81	327	123,043

(*Source: DairyNZ 2010*)

Employment

Multiple job holding rates and the rates of self-employment are a feature that sharply distinguishes rural and urban communities (Table 11). In 2006, multiple job holding rates in urban New Zealand were 8% compared with 17% for rural New Zealand. Amongst the case study rural districts multiple job holding rates were highest for rural Waimakariri at 21% compared to 17% for rural CHB reflecting probably the larger urban second job commuters amongst Waimakariri rural lifestyle householders.

Rural self employment rates (grouping employers and those self employed without employees) are generally almost double the rates of urban areas (Table 11). Self-employment rates for rural centres were generally intermediate between that for rural districts and urban settlements of their respective areas. Rural centres with substantial manufacturing employment such as Takapau and Otane have much lower rates of self-employment.

Analysis of industry distribution of some selected industries between the case study areas shows some interesting differences in the functional roles of the various settlement types. Primary industry is least important in Waimakariri district highlighting the peri-urban lifestyle residential nature of this district. Manufacturing is especially important in the rural and minor urban centres of Central Hawke's Bay, notably in Takapau rural centre.

Some of the more outstanding differences between areas are in the proportion employed in "food services and accommodation", a sector associated with tourism. This has high local significance in Hurunui, relatively more so than for the other case study districts. In 2006, 34% of Hamner Springs, 24% of Cheviot and 13% of Culverden rural centres working residents were employed in this sector in 2006 compared to only 4.5 % of employed New Zealand rural residents overall. Common to all three case study areas is the importance of occupations in the service sectors.

The employment rates by age of the three case study areas are very similar but generally slightly higher than for rural New Zealand as a whole. Participation in work by the age groups 65-69 years has roughly doubled between 1981 and 2006, accompanying population aging. Participation in work by 65 to 69 year olds is much higher in rural districts than in urban or rural centres. Rural districts have a similar employment rate of 60 to 64 year old residents as main urban areas but much higher than rural centres – as rural centres tend to be favoured as retirement destinations for rural farming households.

Table 11: Selected summary statistics for residents of case study rural areas in 2006

Locality	Multiple Job Holding Rate (%) ages 15 yrs or older	Residents aged 25- 64yrs in 2006			Jobs by Industry as % of employed residents in 2006			
		% Work-ing	% of workers self employ-ed	Median personal income ($)	% Primary industry	% Manu-fact-uring	% Food service and accom-modat-ion	% Govt cmmty soc and personl serv-ices
Minor Urban Waipawa	8.6	80.2	17.2	24,131	14.0	18.7	4.7	23.4
Minor Urban Waipukurau	7.5	80.1	17.2	25,674	10.4	22.9	3.1	24.5
Rural Centre Takapau	9.6	78.2	14.4	24,054	13.3	46.7	4.0	16.0
Rural Centre Otane	7.6	71.6	17.3	22,832	18.8	22.5	2.5	26.3
Rural Districts CHB	17.8	83.4	33.0	30,333	49.5	8.5	1.3	16.0
Minor Urban Area Amberley	7.4	76.8	19.4	24,981	14.9	12.0	6.9	23.4
Rural Centre Hanmer Springs	15.2	74.5	41.8	28,862	5.5	2.4	33.9	22.8
Rural Centre Culverden	15.9	86.3	32.3	27,703	29.4	0	13.2	29.4
Rural Centre Cheviot	8.9	n.a.	n.a.	22,827	18.5	7.4	24.1	25.9
Rural Districts Hurunui	20.4	82.1	40.4	29,117	47.8	6.7	5.2	15.9
Secondary Urban Rangiora	7.1	78.4	17.4	27,269	5.2	14.8	4.6	24.8
Minor Urban Woodend	7.1	80.1	17.3	30,187	3.0	15.2	4.8	23.4
Minor Urban Oxford	12.1	70.8	21.4	24,543	14.0	8.8	4.4	30.3
Rural Centre Sefton	17.6	83.0	26.7	30,180	17.0	14.2	5.7	18.9
Rural Centre Waikuku	6.2	78.3	21.5	28,571	7.0	14.1	3.9	24.2
Rural Centre Cust	17.1	85.5	26.5	31,057	19.1	10.3	2.9	22.1
Rural Districts Waimakariri	21.9	83.3	32.8	34,616	19.0	11.7	2.7	22.3
Central Hawke's Bay Rural	16.7	82.2	30.8	29,356	45.2	11.7	1.6	16.7
Hurunui Rural	18.4	80.3	41.2	28,061	42.4	7.0	6.4	17.6
Waimakariri Rural	20.8	86.6	48.2	34,007	18.4	11.9	2.9	22.3
Hawke's Bay Rural	18.3	79.3	32.0	30,228	42.4	10.6	2.5	17.6
Canterbury Rural	18.6	82.8	34.4	31,497	32.4	9.8	4.7	20.3
New Zealand Rural	17.0	77.6	36.2	30,818	32.4	9.1	4.5	19.9

Aggregate total jobs mask what are two contrasting stories of employment by industry by men and women over the last 25 years in the study areas. Employment of rural male residents in primary industries has dropped consistently over time in CHB, Hurunui and Waimakariri while employment of women in this broad sector generally increased up until 1996 before levelling off or decreasing. No other industry has contributed significantly to the reduction of employment of Hurunui and CHB males in primary sector industries, but a range of industries have increased employment of rural male residents of Waimakariri District. Employment of rural resident women in all three study areas has increased sharply in "government social and personal services", a sector that saw high growth and was already a major employer of rural women in 1981, although both rural CHB and Hurunui saw a decrease in the employment of rural women in this sector between 2001 and 2006.

Central Hawke's Bay

Central Hawke's Bay (CHB) Territorial Authority is situated on the east coast of the North Island. It is bound by the Ruahine Ranges to the west and the Pacific Ocean in the east.

Map 2: Central Hawke's Bay

(*Source: CHB District Council Long Term Council Community Plan 2009-19)*

Demographics

There are two minor urban areas, Waipukurau and Waipawa with 46% of the district's population (see Tables 12a and 12b below). In addition there are two rural centres Otane and Takapau (with a further 8% of the population), plus a number of smaller townships including Tikokino, Porangahau and Ongaonga, and several beach settlements. In 2006 the population of the Elsthorpe-Flemington area unit was 3,039, Tikokino areas unit was 2,718 and Porangahau had 240 people.

The population of CHB has remained fairly consistent over time. Numbers peaked in 1986, and then fluctuated at just under the 1986 level (Table 12a). Similarly, the proportions of people living in the area have remained fairly constant over the last two decades (Table 12b).

Table 12a: Central Hawke's Bay usually resident population 1981-2006

Type	Settlement	Community	1981	1986	1991	1996	2001	2006
Urban	Minor Urban	Waipawa	1,797	1,917	1,845	1,917	1,872	1,926
		Waipukurau	3,771	4,116	3,969	4,002	3,909	4,005
Urban Subtotal			5,568	6,033	5,814	5,919	5,781	5,931
Rural	Rural Centres	Takapau	474	564	600	579	582	513
		Otane	369	453	537	513	543	516
	Rural Districts		6,417	6,144	5,874	6,024	5,919	5,997
Rural Subtotal			7,260	7,161	7,011	7,116	7,044	7,026
Total CHB territorial authority			12,828	13,194	12,825	13,035	12,825	12,957

Table 12b: Central Hawke's Bay % distribution usually resident population 1981-06

Type	Settlement	Community	1981	1986	1991	1996	2001	2006
Urban	Minor Urban	Waipawa	14.0	14.5	14.4	14.7	14.6	14.9
		Waipukurau	29.4	31.2	30.9	30.7	30.5	30.9
Urban Subtotal			43.4	45.7	45.3	45.4	45.1	45.8
Rural	Rural Centres	Takapau	3.7	4.3	4.7	4.4	4.5	4.0
		Otane	2.9	3.4	4.2	3.9	4.2	4.0
	Rural Districts		50.0	46.6	45.8	46.2	46.2	46.3
Rural Subtotal			56.6	54.3	54.7	54.6	54.9	54.2
Total CHB territorial authority			100.0	100.0	100.0	100.0	100.0	100.0

Figure 19a: CHB Rural Area % population composition by age and sex 1981
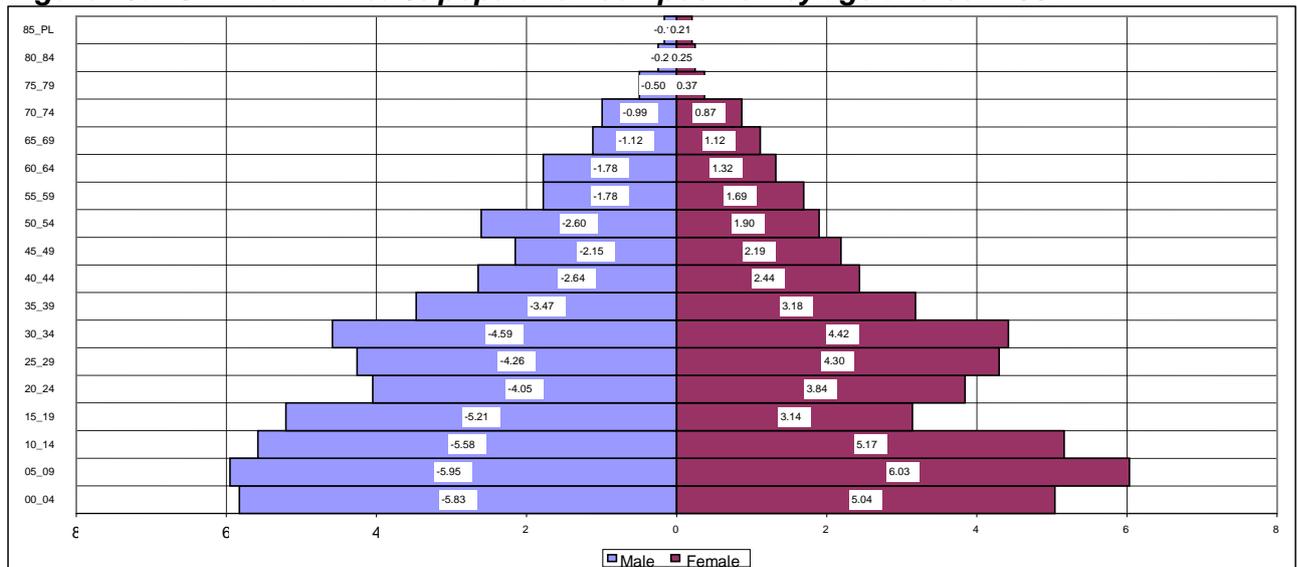

Figure 19b: CHB Rural Area % population composition by age and sex 2006
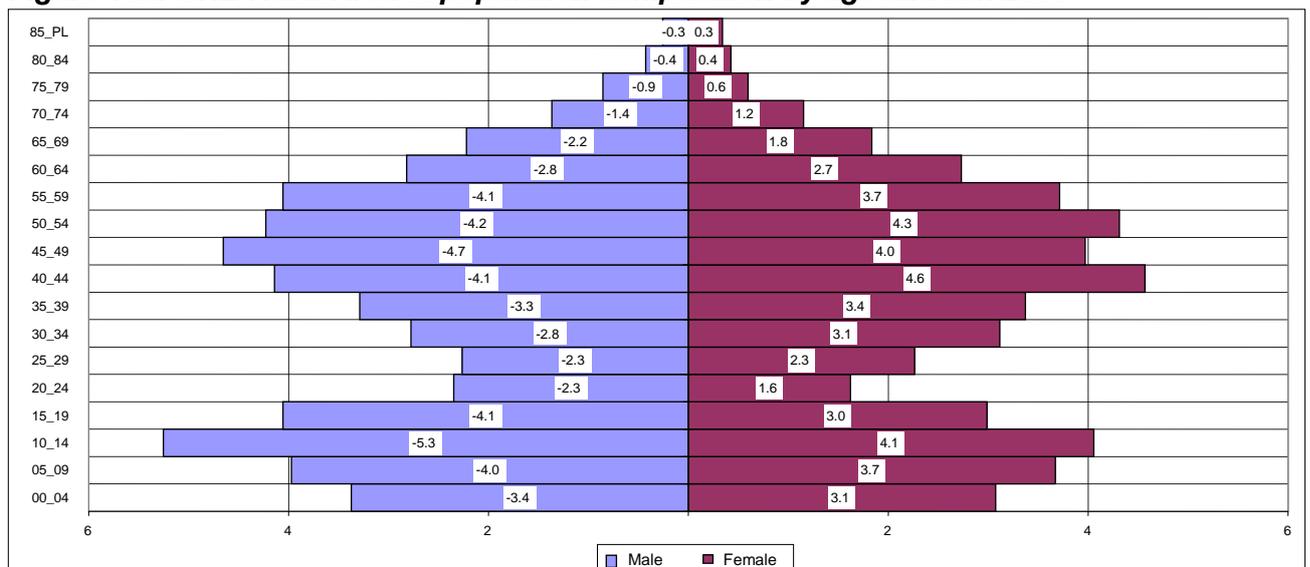
CHB follows the hollowed out pattern of New Zealand's rural age structure which occurred between 1981 and 2006 (Figures 19a and b). In rural CHB, there was a major increase in the

rate of net outmigration of those 15 to 24 years between 1981-86 and 1986-91 and again between 1986-91 and 1991-96.

The outmigration which has occurred over the 25 year period in CHB is particularly significant given the much larger proportion of children 0-9 years in 1981 compared with the proportion that age in 2006.

In 2006, 75% of CHB's residents were NZ European, 21% were Māori, 2% were Pacific peoples and 1% Asian. Takapau has the highest concentration of Māori at 42% of the population, followed by Otane (36%). One-quarter of Waipawa and Waipukurau's residents are Māori, whereas the proportion of Māori living in CHB's rural district (15%) is the same as for New Zealand.

Settlement

CHB's Te Taiwhenua ō Tamatea is one of six Taiwhenua that make up Te Rūnanganui o Ngāti Kahungunu. The Ngāti Kahungunu iwi authority established these Taiwhenua in the early eighties to allow for a fairer distribution of resources and wider representation (Jahnke 2003:16). Each Taiwhenua is a legal entity and operates separately in quite distinct and localised ways. Each has an elected Board of Trustees whose members are drawn from local individual marae or cluster of marae. Two representatives from each Taiwhenua serve on the Ngāti Kahungunu Iwi Inc. Board. Te Taiwhenua ō Tamatea has nine marae:

- Mataweka (in Waipawa) consisting of Ngāi Te Whatuiapiti, Toroiwaho, Rangitane and Te Hauapu.
- Pourērere consisting of Ngāi Te Oatua.
- Pukehou consisting of Ngāti Pukututu, Ngāi Te Rangitekahutia, Ngāi Te Hurihangaiterangi, Ngāi Te Whatuiapiti.
- Rakautatahi (Takapau Plains) consisting of Ngāti Kikirioterangi, Toroiwaho, Rangikahutia, Rangitotohu, Ngāi Tahu o Kahungunu, Rangitane.
- Rango A Tahu (Takapau) consisting of Te Aitanga o Whata, Rangitane, Ngāi Tahu ki Takapau, Ngāi Toroiwaho, Ngāi Te Kikiri o Te Rangi, Ngāti Kahungunu.
- Rongomaraeroa (Porangahau) consisting of Ngāti Kere, Pihere, Tamatea Hinepare o Kahungunu, Ngāti Manuhiri o Rangitane
- Tapairu (Waipawa) consisting of Ngāti Marau o Kahungunu
- Te Whatuiapiti (Otane) consisting of Ngāti Whatuiapiti tuturu o Kahungunu
- Waipukurau consisting of Nga Hau E Wha

Most of Te Taiwhenua ō Tamatea lands were lost as a consequence of the Crown's purchase of around 279,000 acres in Waipukurau in 1851, followed by further contested sales in the district in 1854 and 1858. Prices paid for land were generally low and in many cases not all rightful owners were consulted before sales were made, and some deals were made in secret. Discontent with this situation led in the 1870s to an ultimately unsuccessful repudiation movement to reject all sales and leases. Much CHB land was on-sold or leased by the Crown to settlers who established stations to graze sheep and sometimes cattle. From 1862 settlers were able to buy land directly from Maori (Pollock 2010).

Waipawa was established in 1860 (and Waipukurau shortly after) from subdivisions created by pastoralists and land speculators. From the 1870s the owners of vast pastoral stations developed into a local version of the English landed gentry, and once established, the wealth generated resulted in a privileged lifestyle (Pollock 2010). Many built grand homesteads and

some station owners founded townships on their land (e.g. H. H. Bridge founded Ongaonga in 1872, and Sydney Johnston founded Takapau in 1876). The advent of refrigeration from 1882, and the move to voluntary and state instigated subdivision from 1893, led to the 'busting up' of the great estates across New Zealand and a shift from extensive to intensive farming (Brooking 1981:237-238). Despite this, the balls, house parties and hunt meets held by sheep station owners were regular events on the social calendar well into the 20th century. Stations passed down within families over generations (Pollock 2010).

Shifting social conventions, and the removal of subsidies and other forms of agricultural support in the 1980s, changed this world. Farming alone could no longer maintain a privileged lifestyle. According to Pollock (2010) children are now less inclined to continue farming, and the changes in matrimonial property laws have seen more sales of properties following divorce. Some of the more imposing homesteads, such as John Ormond's Wallingford (built 1853) and Sydney Johnston's Oruawharo (built 1879) have been converted into luxury lodges or events centres (Pollock 2010).

Labour market and economy

Figures 20a and 20b show the dominance of the primary sector for both males and females in rural CHB, despite the fall in the numbers of males employed in this sector over the past 25 years (and the more recent decline in female employment in this sector).

The core of the CHB region's economy is sheep and beef farming (78% of the 891 farms in 2007 were in this sector). In addition to its tiny number but significantly large sized dairy farms, the district grows pip and stone fruit, vegetables, flowers and grain crops. Venture Hawke's Bay's website is effusive over the nine or so vineyards and 15 orchards:

> *The limestone hills and ancient riverbeds are ideal grape growing conditions and there are a number of established vineyards throughout the Central Hawkes Bay district. The region shows much promise for the cooler climate white varieties...[which] ripen later than in the more maritime climate of northern Hawkes Bay. ... Central Hawkes Bay is a large contributor to the world food chain. Seven of the Mr Apple NZ 14 Hawkes Bay orchards are located here, with the 104 hectare orchard in Tikokino producing over 350,000 cartons every season from six varieties. Annually 1.8 million cartons of the apples are packed for New Zealand markets and for export to European and UK markets* (Venture Hawkes Bay 2011).

Dairying expanded in CHB between 1981 and 2006, but has levelled off since then.

In addition to its orchards Mr Apple NZ Ltd, a subsidiary of Scales Corporation Ltd, owns a packhouse in Waipawa. Following the closure of Ovation NZ Ltd's[15] processing plant in Waipukurau, the only remaining major meat processor in the district is Silver Ferns Farms Ltd in Takapau.

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[15] Advertised on the Ovation™ website as 100% free range grass fed lamb. Ovation™ is the new name of Advance Foods of NZ Ltd a wholly owned Subsidiary of Bernard Mathews Plc UK selling frozen rolled lamb roasts to the UK market. Shifting of the meat boning part of the operation to Fielding was announced on 17 June 2011 axing 180 permanent and 120 seasonal jobs from the CHB district. Storage and logistics operation was to remain in Waipukurau. The closure was due to the reduction in stock numbers and changes in processing, including a shift from frozen to chilled products.

**Figure 20a: Number of Jobs by Industry – Male residents of rural CHB**

- Primary Industries (Agriculture Forestry Fishing Mining)
- Manufacturing
- Wholesale or Retail Trade
- Food Services and Accommodation
- Government Cmmty Social and Personal Services
- Finance Insurance Real Estate and Busns Services
- Utilities Construction Transport or Comms
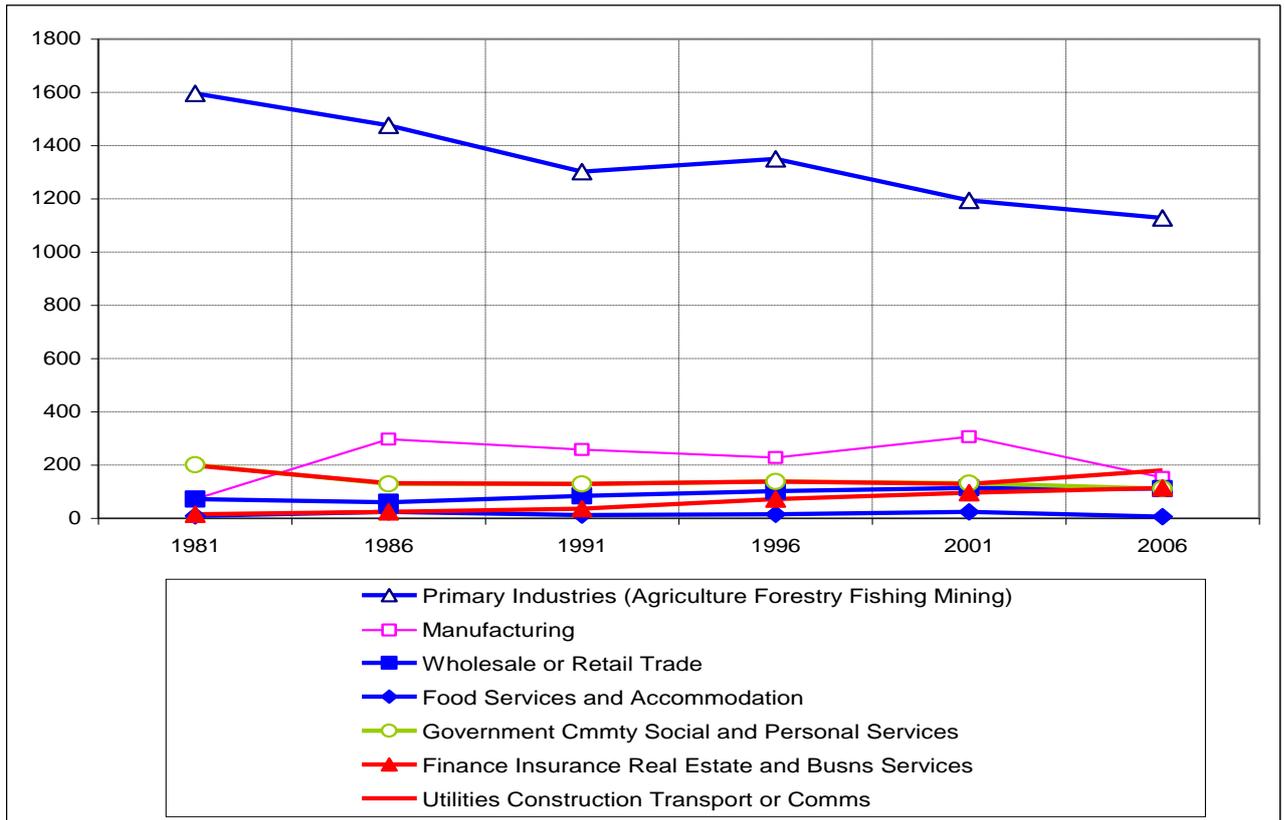
Figure 20b: Number of Jobs by Industry – Female residents of rural CHB

- Primary Industries (Agriculture Forestry Fishing Mining)
- Manufacturing
- Wholesale or Retail Trade
- Food Services and Accommodation
- Government Cmmty Social and Personal Services
- Finance Insurance Real Estate and Busns Services
- Utilities Construction Transport or Comms
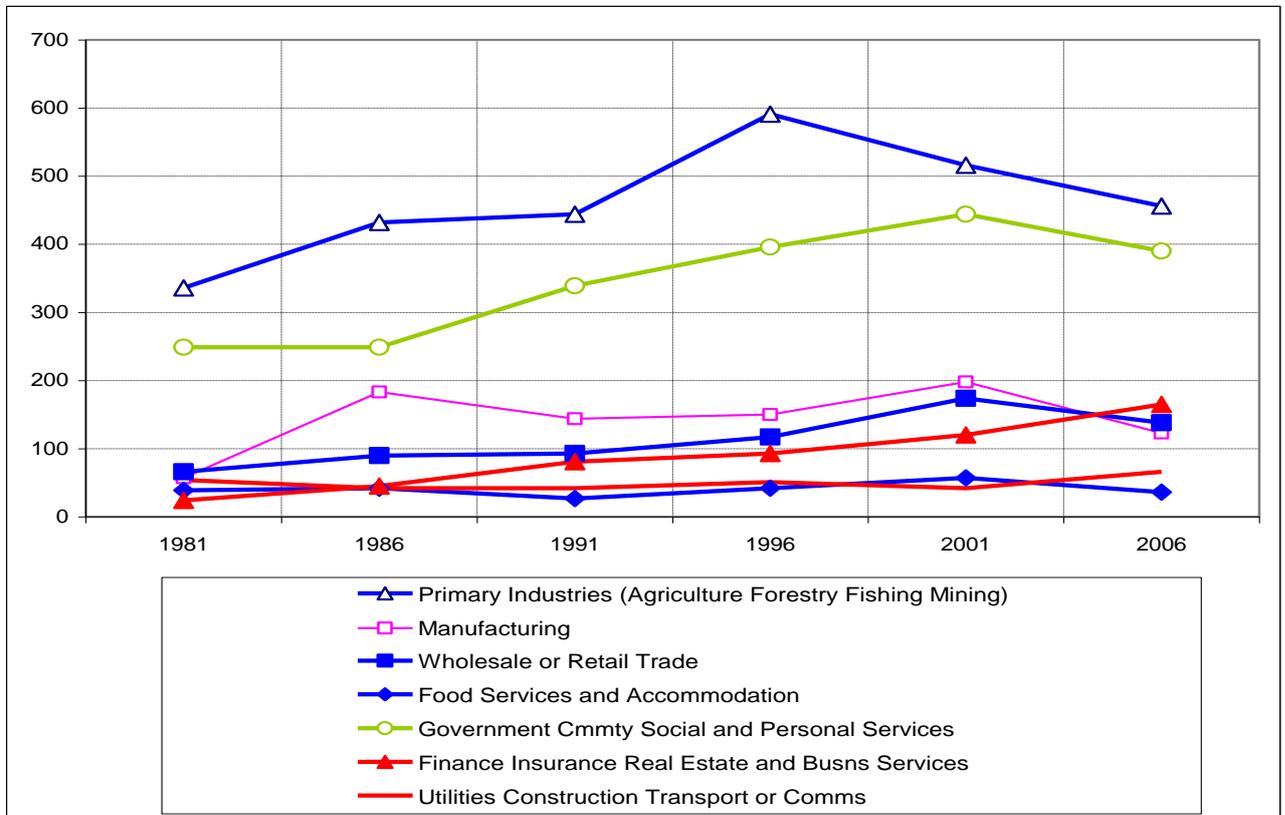
'Government, social and personal services' is an important sector for CHB's rural women (Figure 20b) despite the decline since 2001. Increased employment in other service sectors is likely to be due to an increase in the numbers or women commuting to Hastings and Napier.

There is little commercial forestry in the CHB district other than part of the Gwavas forest which is Crown forest licensed land[16] over which Pan Pac currently has the cutting rights, and a small forest to the south over which Ernslaw One Ltd[17] has cutting rights. The mountain forests of the Ruahine Ranges are part of a Conservation Forest Park, and the patches of podocarp-broadleaf remnant forests on the plains and coastal ranges now tend to be protected or in demarcated reserves. There is some farm forestry on the hill country (blocks are less than 1,000 ha) where owners have diversified into exotics. With the maturing of the older of these farm forests there has been an increase in logging.

Climate Change

According to research summarised by AgITO (2010), Hawke's Bay is expected to warm by 1^oC by 2050 and by 2^oC towards the end of the century. Temperature increases may be highest in summer and autumn with less warming in spring. Annual rainfall is likely to decrease overall (by between 2 and 6% by 2050, MAF 2010c), and may be dominated by 10-15% less rain in winter and spring. Summers may become up to 10% wetter, although this is not certain.

The impact of these changes is expected to be (MAF 2010c:1, AgITO 2010:16):

- a longer growing season and reduced frequency of frost
- more frequent hot dry summer conditions, more frequent heat waves
- lower rainfall, increased evaporation over the growing period, increased drought frequency and severity
- decreased runoff into rivers and thus reduced river flows on average (although uncertainty over rainfall changes in the western ranges means uncertainty about runoff changes)
- increased frequency and intensity of high rainfall events depending on changes in to weather patterns, together with drier average conditions which could lead to increased erosion and flooding
- more persistent westerly winds
- increased risk of low lying coastal areas being inundated from sea-level rise or more prone to salt water intrusion.

For CHB farmers, climate change means (after perhaps an initial burst in pasture yields) reduction in pasture productivity, particularly in drier parts of the region, increased soil erosion and flood risk on hill country, and changes in pasture composition. Current pasture species aren't well suited to drought conditions, and the inability to cultivate the land doesn't provide a lot of scope for pasture replacement (Kenny 2001:9). There could be problems with animal health (including increased heat stress), pests and diseases (including invasion of subtropical species) and increased risk of fire (Kenny and Porteous 2010:4). For the community, issues include water shortages, and a need for infrastructure for flood protection, erosion control, irrigation, water reticulation, culverts, bridges, and drainage.

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[16] The rental proceeds from these forests are available to Māori for Treaty Settlement purposes. The Gwavas forest straddles the Hastings district boundary.
[17] Ernslaw One Ltd is controlled by members of the Tiong family of Malaysia (MAF 2008b:6).

Hurunui

Hurunui, located in North Canterbury, stretches from Lewis Pass at the northern most point of the Southern Alps to the Pacific Ocean (less than two hours away by road).

Map 3: Hurunui

(Source: Hurunui District Council Long Term Council Community Plan 2009-2019)

Demographics

Hurunui's population was 10,470 people in 2006 (a 6% increase since 2001), of whom 594 were Māori. While Hurunui's population has grown overall, this is mostly due to the expansion of Amberley (the administrative centre) and Leithfield district (both on State Highway One close to the southern bridge access point and within commuting distance of Christchurch). Growth in the Amuri basin to the north east of the Hurunui district is due to the development of dairy farming, and Hanmer Springs is developing as a thriving tourist destination. The population of remaining areas has either declined or fluctuated (Tables 13a and 13b).

Table 13a: Hurunui District usually resident population 1981-2006

Community Type		Area Unit	1981	1986	1991	1996	2001	2006
Urban	Minor Urban	Amberley	886	904	945	1,093	1,190	1,305
Rural	Rural Centres	Hanmer Springs	643	661	542	607	691	729
		Culverden	480	444	426	399	393	420
		Cheviot	420	432	456	444	393	390
	Rural Districts	Leithfield	1,010	1,190	1,437	1,820	2,164	2,382
		Hurunui	2,625	2,592	2,613	2,508	2,565	2,583
		Parnassus	1,068	981	1,014	966	900	879
		Waiau	242	243	231	244	248	249
		Amuri	1320	1319	1252	1324	1341	1533
Rural Total			7808	7862	7971	8312	8695	9165
Hurunui Territorial Authority			**8,694**	**8,766**	**8,916**	**9,405**	**9,885**	**10,470**

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Table 13b: Hurunui District % distribution usually resident population by locality 1981-06

Community Type	Area Unit		1981	1986	1991	1996	2001	2006
Urban	Minor Urban	Amberley	10%	10%	11%	12%	12%	12%
Rural	Rural Centres	Hanmer Springs	7%	8%	6%	6%	7%	7%
		Culverden	6%	5%	5%	4%	4%	4%
		Cheviot	5%	5%	5%	5%	4%	4%
	Rural Districts	Leithfield	12%	14%	16%	19%	22%	23%
		Hurunui	30%	30%	29%	27%	26%	25%
		Parnassus	12%	11%	11%	10%	9%	8%
		Waiau	3%	3%	3%	3%	3%	2%
		Amuri	15%	15%	14%	14%	14%	15%
Rural Total			90%	90%	89%	88%	88%	88%
Hurunui District			100%	100%	100%	100%	100%	100%

Figure 21a: Hurunui Rural Area % population composition by age and sex 1981
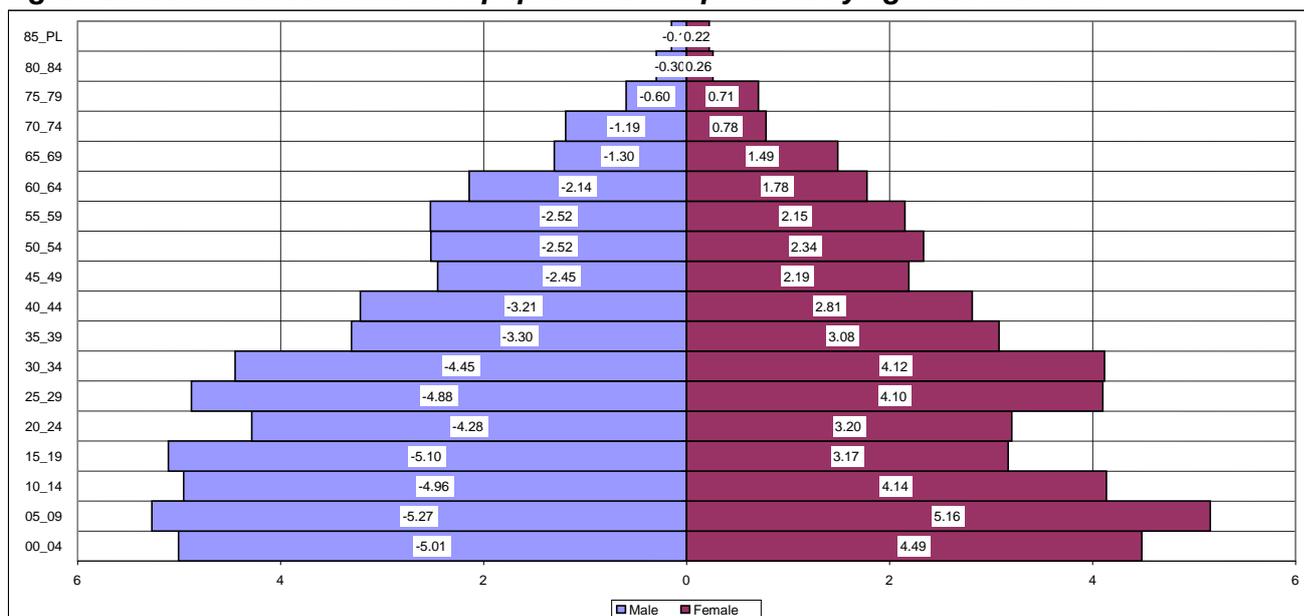

Figure 21b: Hurunui Rural Area % population composition by age and sex 2006
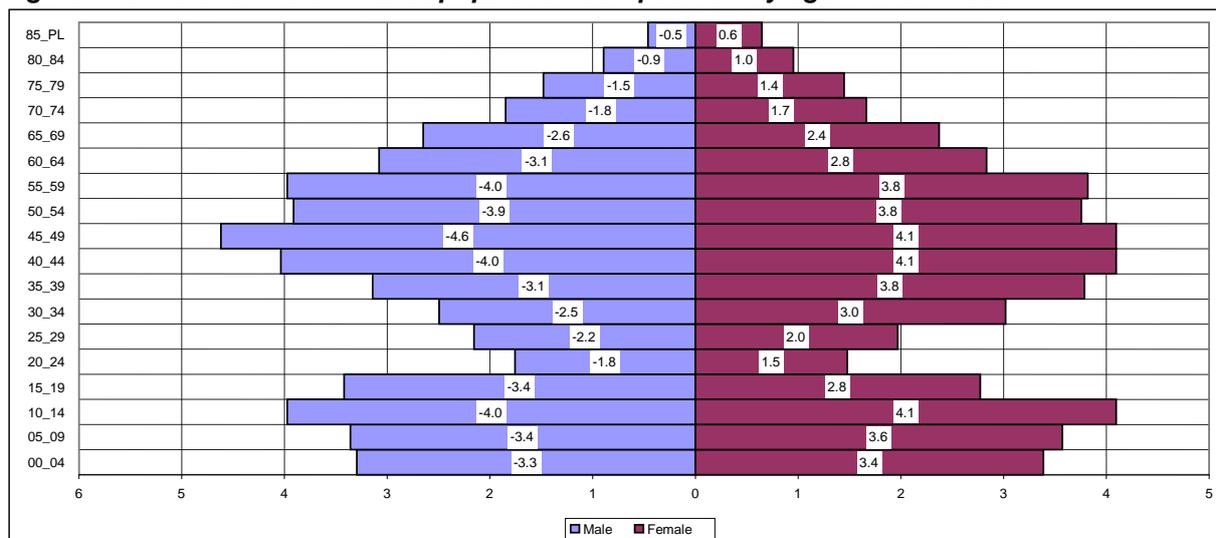
Like the other case study areas Hurunui experienced the 'hollowing out' of its age structure between 1981 and 2006 (Figure 21b). Like Waimakariri, Hurunui has a lower proportion of 20-24 year olds, but its ratio of 25-29 year olds matches rural New Zealand as a whole. Hurunui

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had a stronger gain of people aged 25 to 44 years compared to Waimakariri in 2006. In this respect it is similar to Central Hawke's Bay. Rural Hurunui also has a much higher proportion of people aged 65 years or over and a lower proportion aged 5 to 9 years than the other case study areas.

While one-quarter of the population of Waiau was Māori in 2006, Hurunui's rural centres and rural districts, with 8% and 5% Maori respectively, are more typical of the low Māori populations of the South Island.

Settlement

Te Rūnanga o Ngāi Tahu is recognised as the iwi authority for the Hurunui district and there are two rūnanga with status as tāngata whenua. They are the takiwa of Te Rūnanga o Kaikōura (Ngāti Kurī) which centres on Takahanga and extends from Te Parinui o Whiti (White Bluffs) in the north, south to the Hurunui River and inland to the Main Divide, and the takiwa of Te Ngāi Tūāhuriri Rūnanga which centres on Rūnanga Tuahiwi (see below for Waimakariri, pp80-81), and extends from the Hurunui River in the north to the Hakatere (Ashburton) river in the south. The Waitangi Tribunal decision (Wai 0027 discussed below, p81), records that mishandling by government agents of North Canterbury land purchases resulted in European occupation of the entire area from the 1850s, and failure to grant Māori land reserves (Waitangi Tribunal 1991).

Farming

Pastoral farming was established by the early colonial settlers and remains as the dominant land use in the Hurunui district today. As in CHB, fortunes were created for the few by high wool prices, low labour costs and low land values. "The huge homesteads of the Amuri 'wool barons' stand in mute testimony to an era of a major disparity in social status and income" (Davison 2006:79).

Also as in CHB, larger landholdings were subdivided from the 1890s and an era of more intensive sheep farming began, assisted by the development of new breeds such as James Little's Corriedale, a dual purpose meat and wool sheep suited to drier country (Gardiner 1981:80). For about 80 years, farms of 120 hectares were large enough to provide a good living. Post Second World War mechanisation and aerial fertiliser topdressing meant these farms easily supported a farm family and farm worker.

The decline in wool prices in the early 1970s, together with the loss of UK markets and the first 'oil shocks' marginalised these small scale dryland sheep properties. The smaller holdings which have come up for sale have been purchased by neighbours to expand their farms, and farm families have turned to supplementary activities to boost incomes, including tourism related ventures such as 'farm stays', holiday and camping parks, walking trails, and gardens for public viewing. Numbers of permanent full-time farm workers also dropped, sometimes replaced by family members, but from the eighties members of farm families have increasingly taken off-farm work.

Although the basic pattern of farming remained constant throughout the twentieth century, the availability of water through the new rural reticulated water supply schemes and changes in farm management practices led to dramatic increases in production (Lovell-Smith 2000:68-69).

**Figure 22a: Number of Jobs by Industry – Male residents rural Hurunui**

Legend:
- Primary Industries (Agriculture Forestry Fishing Mining)
- Manufacturing
- Wholesale or Retail Trade
- Food Services and Accommodation
- Government Cmmty Social and Personal Services
- Finance Insurance Real Estate and Busns Services
- Utilities Construction Transport or Comms
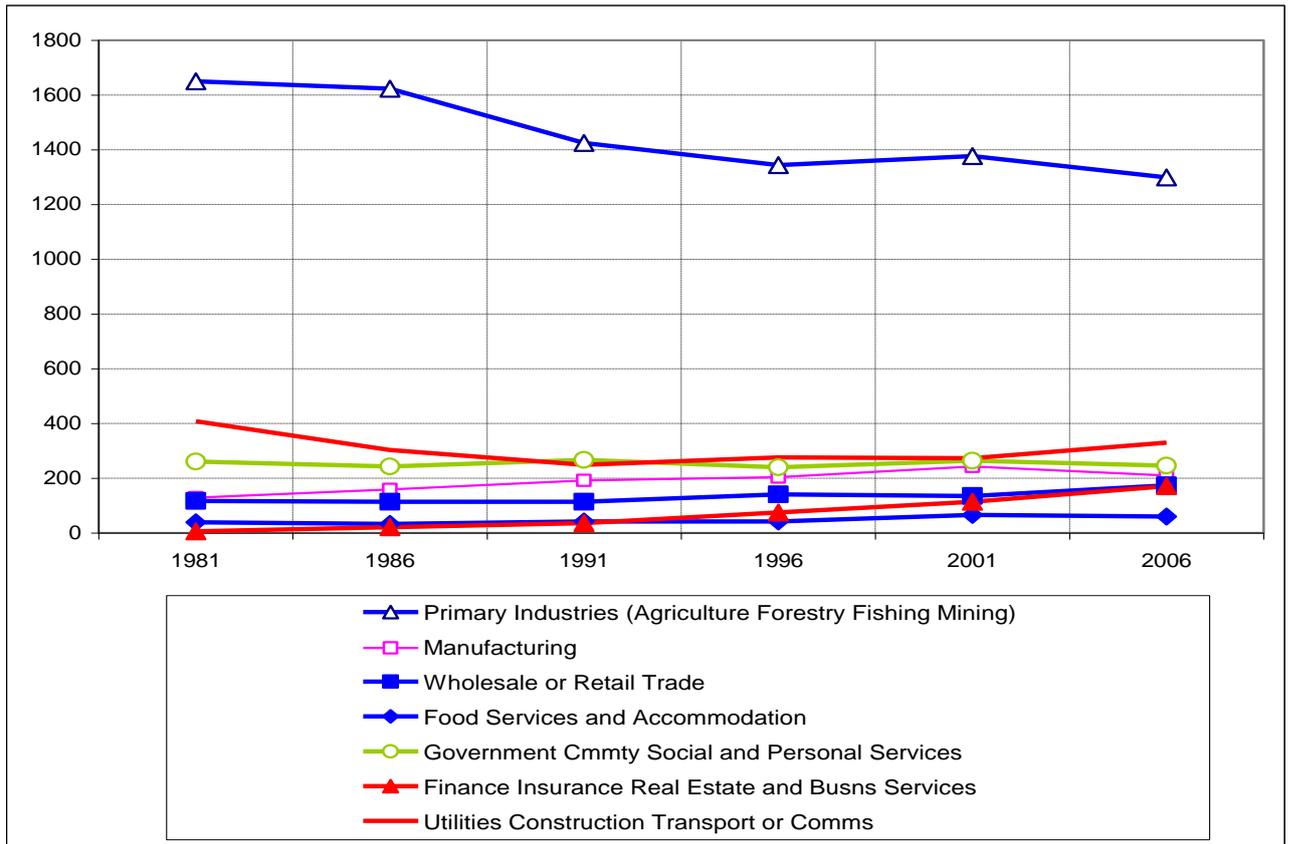
Figure 22b: Number of Jobs by Industry – Female residents rural Hurunui

Legend:
- Primary Industries (Agriculture Forestry Fishing Mining)
- Manufacturing
- Wholesale or Retail Trade
- Food Services and Accommodation
- Government Cmmty Social and Personal Services
- Finance Insurance Real Estate and Busns Services
- Utilities Construction Transport or Comms
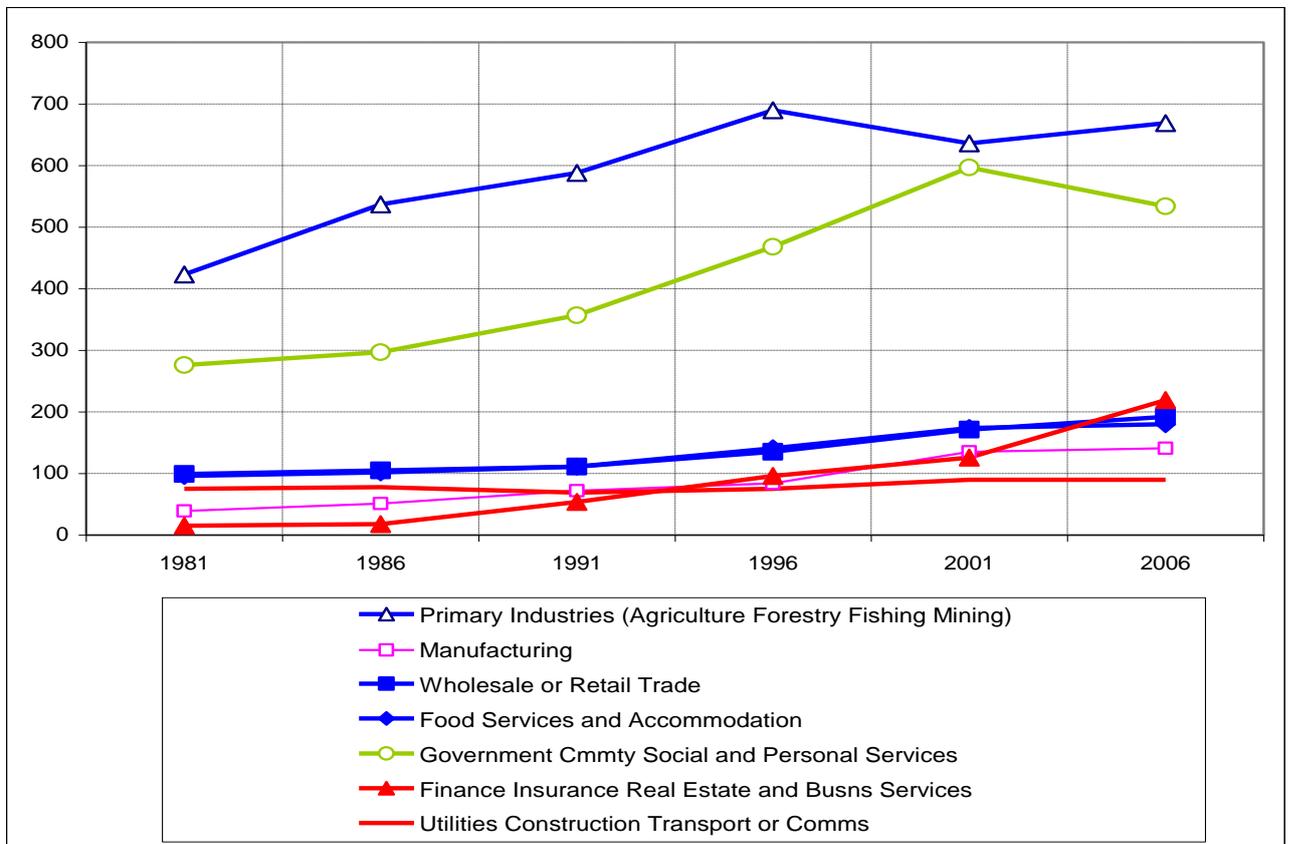
Reliable water allowed subdivision of farms into smaller paddocks and the development of new grazing patterns. Water from the irrigation scheme transformed properties enabling intensive sheep and bull beef units to compete for land with dairy production (dairy conversions tripled the number of dairy farms from nine in 1990 to 36 in 1992) while other properties expanded into providing dairy support[18]. Like other farming districts, farm businesses in the Hurunui came under financial pressure in the mid-1980s through to the end of the 1990s with the removal of subsidies and drought affecting dry-land farmers.

By 2007 Statistics New Zealand's Agricultural Production Census identified that the Hurunui area had 1,065 farms mostly sheep and beef cattle farms (65%), plus 63 dairy farms and 63 vineyards (see Figure 17 above). Olives, hazelnuts, asparagus and field crops (barley, wheat, peas for seed) were also grown. About 74% of North Canterbury's plantation forests (mainly radiata pine and Douglas-fir) are in Hurunui district. Most are owned by Matariki Forestry Group[19] under forestry rights with Ngāi Tahu (MAF 2007). There is one timber mill.

Labour market and economy

Figures 22a and 22b show that Hurunui's employment structure is very similar to that of CHB, with primary industry dominating. Viticulture (in the Waipara district), and tourism (centred particularly on Hanmer Springs and the Mt Lyford Ski Field) are expanding. Better roads and better cars are enabling people living in the Hurunui to drive long distances to go shopping or attend movies and the theatre in Rangiora or Christchurch[20]. Reflecting on a common rural trend, Davison records that many goods and services are now sourced from outside the district (including the bank and local government services) with many tradespeople travelling to Amuri from Amberley, Rangiora, or Christchurch.

Increasing numbers of commuters are also settling within Hurunui. Lovell-Smith documents that the area of land used as lifestyle blocks in the Hurunui district increased by 110% between 1994 and 1996. As a consequence of all the changes, by "2000 the Hurunui district presented a mosaic of economic activity quite different from the preponderance of pastoral farming of the 1950s. It had become a district of much greater diversity, with each township, and in some cases each farm, very different from its neighbours" (Lovell-Smith 2000:209). Davison also writes of new commercial enterprises emerging in Culverden and new houses being built in Culverden, Rotherham and Waiau. "The transport operators are busy, builders very busy, [and there is now] a café and revamped Culverden Store among other small businesses" (Davison 2006:82).

Climate Change

According to NIWA calculations, there is an expectation that annual rainfall on the coastal part of Hurunui will fall by 6-8% in the next 50 years (MAF 2010d). Surface temperatures are expected to rise (by 1.5-2°C in summer and 2-3°C in winter by 2080 (O'Donnell 2007:17). The Hurunui whose catchment reaches back into the Main Divide could maintain or have even increased flows because of projected rainfall increases in the mountains (O'Donnell 2007:18). Sea levels are expected to rise with the likelihood of coastal flooding.

[18] These are farms which supply grazing and supplementary feed to the milking platforms.

[19] Matariki is a New Zealand incorporated, unlimited liability, joint venture company. Shareholders include Rayonier, AMP, Deutsche Bank's REEF Infrastructure Fund, Phaunos Timber Fund, and Matariki Forests Australia.

[20] Culverden is 98km from the centre of Christchurch - just under 1½ hours drive, while Amberley is 47km – a ¾ hour drive from Christchurch.

Waimakariri

Waimakariri territorial authority is situated between Hurunui territorial authority and Christchurch city. It is separated from Christchurch by the Waimakariri River, and extends from Pegasus Bay in the east to the Puketeraki range in the west. Much of the area has fertile flat land or highly productive rolling downlands. Land to the east of Rangiora is reclaimed swamp subject to poor drainage and occasional flooding. The north-west part of the district is hill and high country with some forestry (Map 5).

Map 4: Waimakariri
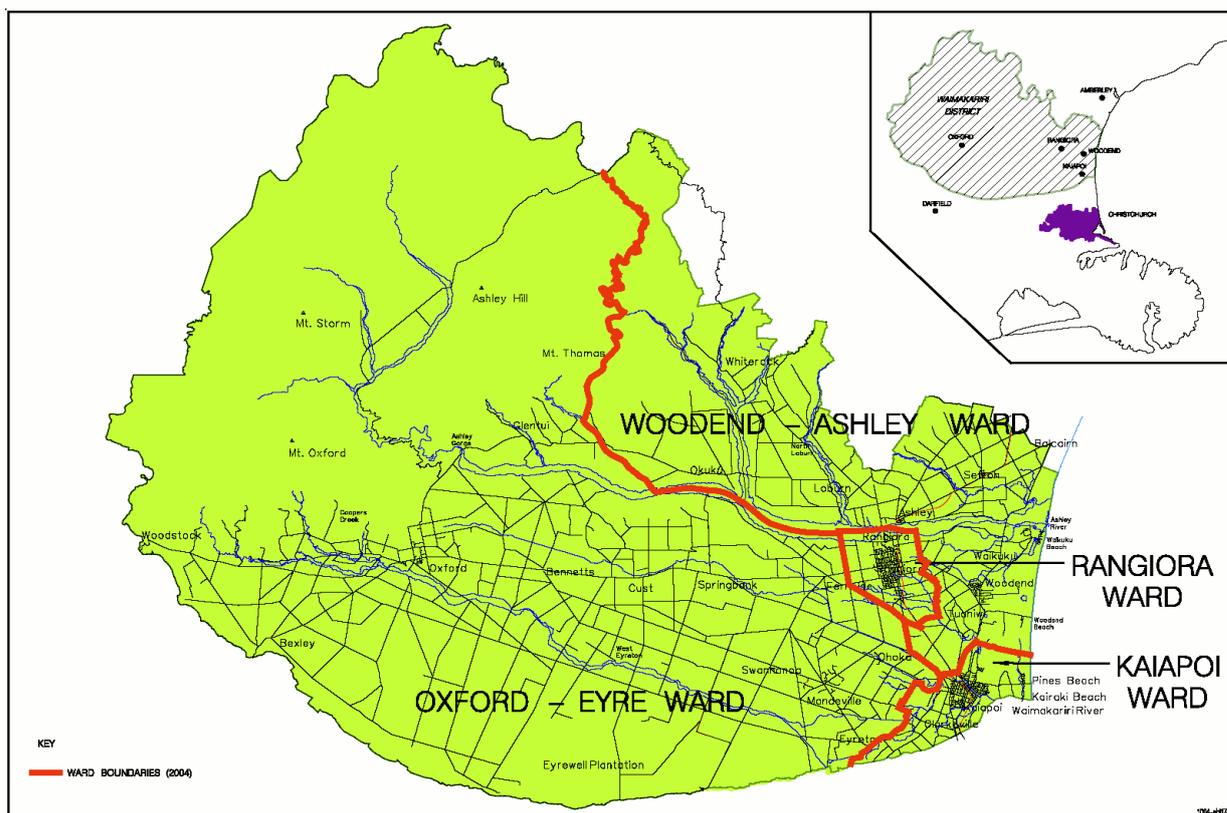
(Source: Waimakariri Long Term Council Community Plan 2009-2019)

Demographics

The largest urban areas in the district are Kaiapoi (on the edge of Christchurch and considered part of its urban labour market) and Rangiora (½ hour from Christchurch) (Table 14a).

Table 14a records the steady growth experienced in all parts of this area over the past 25 years, while Table 14b shows that this growth is most marked in the rural districts (in small holdings and rural residential developments).

Waimakariri has an even smaller proportion of people aged 20-29 years than not only the other case study areas, but also compared to rural New Zealand and other regions. Also in contrast to the others, rural Waimakariri has a much larger proportion of its population aged 35-44 years, due to a very high rate of net intercensal migration gain of couples aged 30-44 with children under 15 years. Of significance is the much smaller base of 0-19 year olds in 2006, compared with 1981 (Figure 23b).

Table 14a: Waimakariri Usually Resident Population 1981 - 2006

Community Type		Area Unit	1981	1986	1991	1996	2001	2006
Urban	Secondary Urban	Kaiapoi	7,386	7,827	8,400	9,681	10,941	12,144
		Rangiora	7,608	8,316	8,772	9,861	10,797	11,865
	Minor Urban	Woodend	990	1,212	1,239	1,563	2,241	2,616
		Oxford	963	1,125	1,356	1,476	1,581	1,716
Urban Total			16,947	18,480	19,767	22,581	25,560	28,341
Rural	Rural Centres	Sefton	414	405	438	489	501	582
		Waikuku	321	390	540	690	738	783
		Cust	348	429	456	363	396	429
	Rural District		5,697	5,910	6,678	8,226	9,711	12,705
Rural Total			6,780	7,134	8,112	9,768	11,346	14,499
Waimakariri Territorial Authority			23,727	25,614	27,879	32,349	36,906	42,840

Table 14b: Waimakariri % distribution of usually resident population by locality 1981-06

Community Type		Area Unit	1981	1986	1991	1996	2001	2006
Urban	Secondary Urban	Kaiapoi	31%	31%	30%	30%	30%	28%
		Rangiora	32%	32%	31%	30%	29%	28%
	Minor Urban	Woodend	4%	5%	4%	5%	6%	6%
		Oxford	4%	4%	5%	5%	4%	4%
Urban Total			71%	72%	71%	70%	69%	66%
Rural	Rural Centres	Sefton	2%	2%	2%	2%	1%	1%
		Waikuku	1%	2%	2%	2%	2%	2%
		Cust	1%	2%	2%	1%	1%	1%
	Rural District		24%	23%	24%	25%	26%	30%
Rural Total			29%	28%	29%	30%	31%	34%
Waimakariri Territorial Authority			100%	100%	100%	100%	100%	100%

Map 5:

Canterbury Water Management Zones: Waimakariri Zone
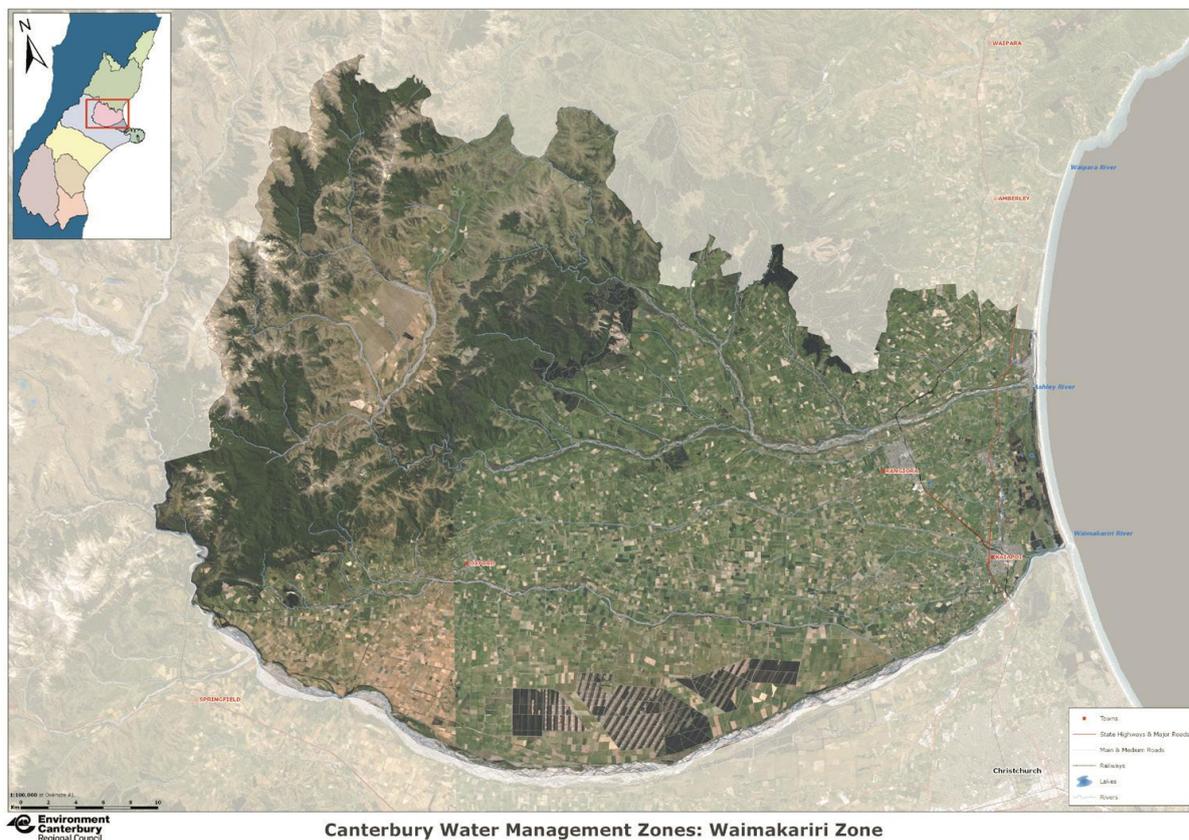
Over a third of the population of the Waimakariri District (37%) has come from in-migration (particularly to Rangiora). Many Kaiapoi and Oxford residents are from Christchurch (WDC 2008a:14) (even before the earthquakes).

**Figure 23a: Waimakariri Rural Area % population composition by age and sex 1981**
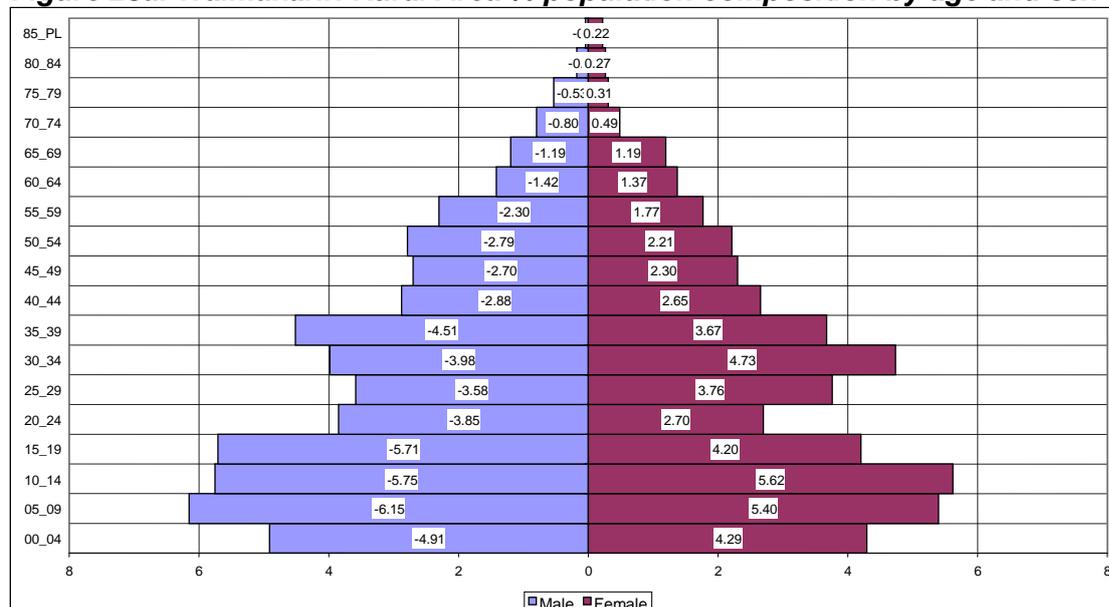
Figure 23b: Waimakariri Rural Area % population composition by age and sex 2006
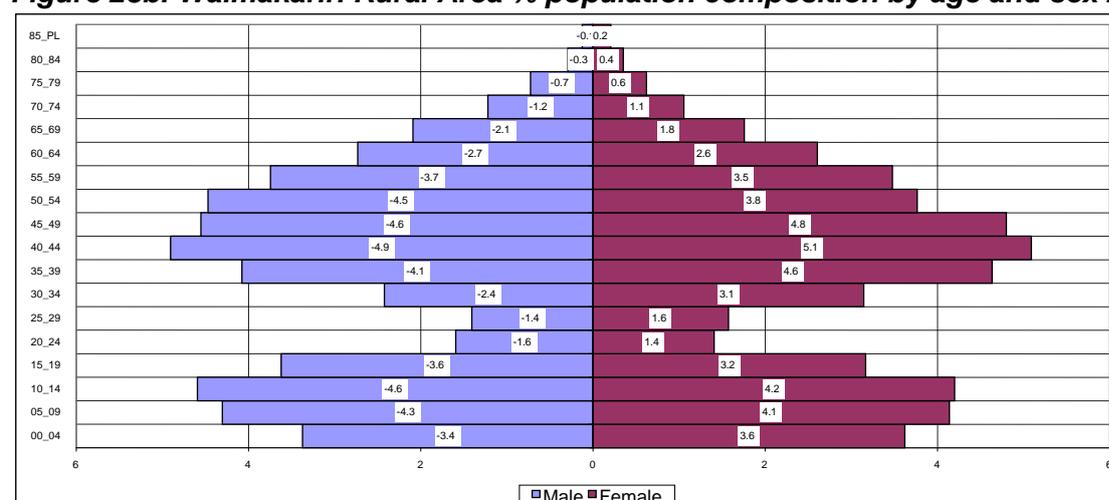
Settlement

Te Rūnanga o Ngāi Tahu is recognised as the iwi authority and Te Ngāi Tūāhuriri (descendents of Tahu Pōtiki) as manawhenua of Waimakariri. The takiwā of Te Ngāi Tūāhuriri Rūnanga centres on Tuahiwi[21] (located between Rangiora and Kaiapoi) to the north of the Kaiapoi Pā (Taurakautahi) and extends from the Hurunui to the Hakatere (Ashburton) river, sharing an interest with the Arowhenua Rūnanga northwards to Rakaia, and inland to the Main Divide. The Kaiapoi Pā was established by Ngāi Tahu (formerly from the east coast of the North Island, from their base in the Kaikōura district). It became the major capital, trading centre and point from which further penetration of the South Island occurred. The area is a genealogical centre for all Ngāi Tahu whānui (Tau 2005).

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[21] Excavations for Pegasus township identified hundreds of artefacts 500-600 years old. The area was evidently a significant pounamu working site over a long period of time, and attracted several waves of migrants.

Ngāi Tahu had contact with European whalers and sealers from around 1795 and built a thriving industry supplying the whaling ships with pigs, potatoes and wheat (Te Rūnanga o Ngāi Tahu 1996). Kaiapoi Pā was destroyed by Te Rauparaha (chief of Ngāti Toa) in 1832 causing many Ngāi Tūāhuriri to flee south (Tau 2005). In 1848 Governor Grey recognised Ngāi Tahu rights to land at least up to the Hurunui River, however the later inclusion of Ngāi Tahu land in the Wairau purchase from Ngāti Toa was irreconcilable with Ngāi Tahu's rangatiratanga over this land (Waitangi Tribunal 1991). The decision of the Government to fix the northern boundary of its land purchase at Kaiapoi Pā effectively dispossessed Ngāi Tahu of their territory in Kaikōura and North Canterbury as it recognised Ngāti Toa mana over land north of the Pā. Not only did this have the consequence of acknowledging Ngāti Toa's rights to land well within Ngāi Tahu territory, it allowed much of the area to be made over to the Canterbury Association and the whole block of over a million acres became the exclusive preserve of European runholders.

It took Ngāi Tahu eight years to gain acknowledgement by the Crown. Wai 0027 records that they were paid £500 in 1857 but were not granted the promised reserves of 10% of the land as by then the block was already completely occupied by Europeans (Waitangi Tribunal 1991). "Robbed of the opportunity to participate in the land-based economy alongside the settlers, Ngāi Tahu became an impoverished and virtually landless tribe" (Te Rūnanga o Ngāi Tahu 1996). From their first court case in 1868, it took Ngāi Tahu 130 years to finally obtain an apology from the Crown and an Act of Settlement providing redress (Tau 2005).

Labour market and economy

During the early years of European settlement Kaiapoi developed as a river port, Rangiora was the area's main market town, and Oxford's development was based on timber milling. European settlement concentrated on the fertile soils of the plains. Agriculture and pastoral production predominated initially, with horticulture and forestry gaining in importance towards the end of the 20th century.

Despite the importance of primary industry, by 2006 only 18% of Waimakariri's labour force was involved in this sector. The district has few other major industries and most processing is associated with the primary sector.

In 2007, 44% of Waimakariri's 1,770 farms were engaged in sheep and/or beef production, while 18% of properties were engaged in nurseries, flowers, vegetables, fruit, or olives. A further quarter of Waimakariri farms were engaged in 'other' livestock (e.g. angora goats), or grain production. Only 5% were involved in dairying, and the district had 15 properties in grapes.

Most of the commercial forests in Waimakariri are owned by Matariki Forestry Group. Ecan owns some radiata pine forests for stopbank protection purposes on particularly the Waimakariri (but also Ashley) rivers (these are used for production and recreation). The region has a modest range of wood processing industries, dominated in size by Carter Holt Harvey's medium density fibreboard (MDF) plant at Sefton, near Rangiora – the first such facility in the Southern Hemisphere. Others wood processing plants include: McAlpines Sawmilling (Rangiora), Sutherland Timber (Kaiapoi), AIS Sawmill and Bennett's Sawmill (Oxford).

**Figure 24a: Number of Jobs by Industry – Male residents of rural Waimakariri**

Legend:
- Primary Industries (Agriculture Forestry Fishing Mining)
- Manufacturing
- Wholesale or Retail Trade
- Food Services and Accommodation
- Government Cmmty Social and Personal Services
- Finance Insurance Real Estate and Busns Services
- Utilities Construction Transport or Comms
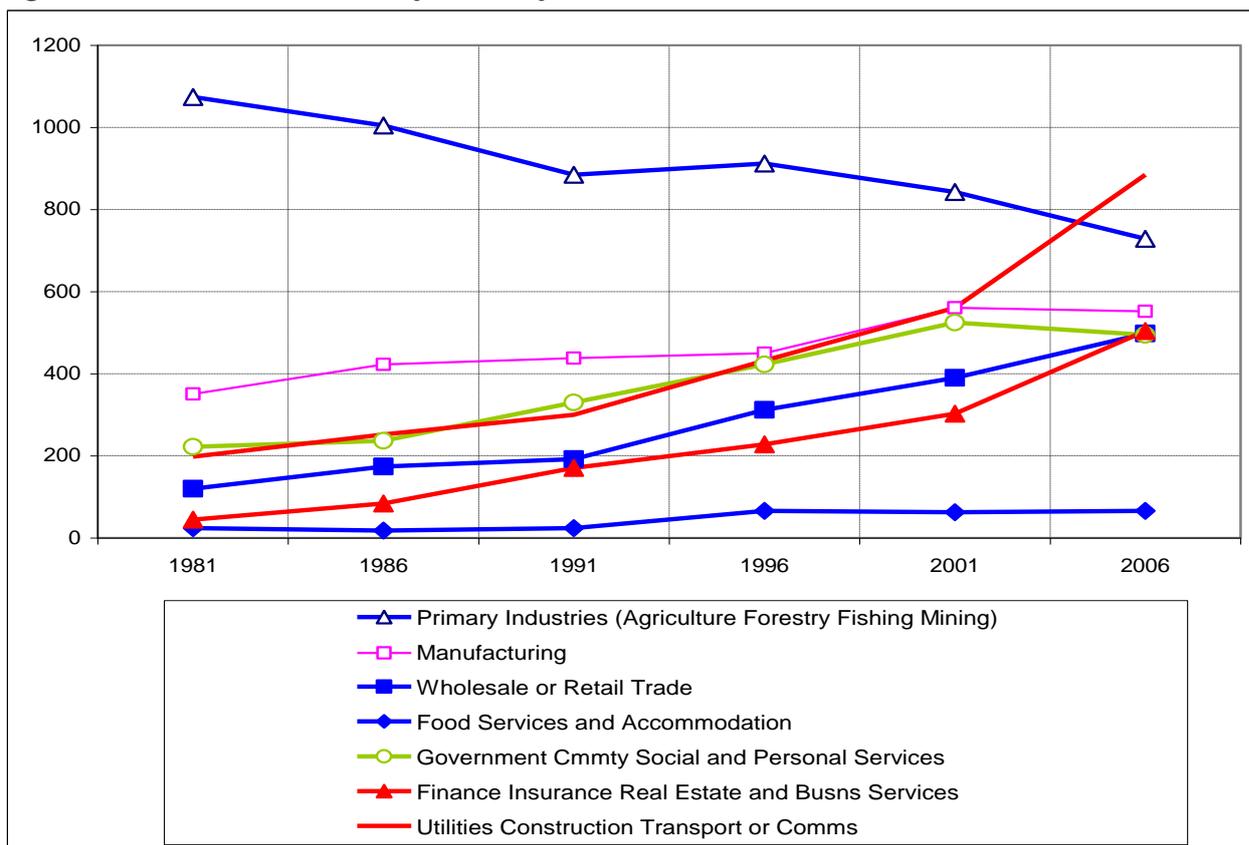
Figure 24b: Number of Jobs by Industry – Female residents of rural Waimakariri

Legend:
- Primary Industries (Agriculture Forestry Fishing Mining)
- Manufacturing
- Wholesale or Retail Trade
- Food Services and Accommodation
- Government Cmmty Social and Personal Services
- Finance Insurance Real Estate and Busns Services
- Utilities Construction Transport or Comms
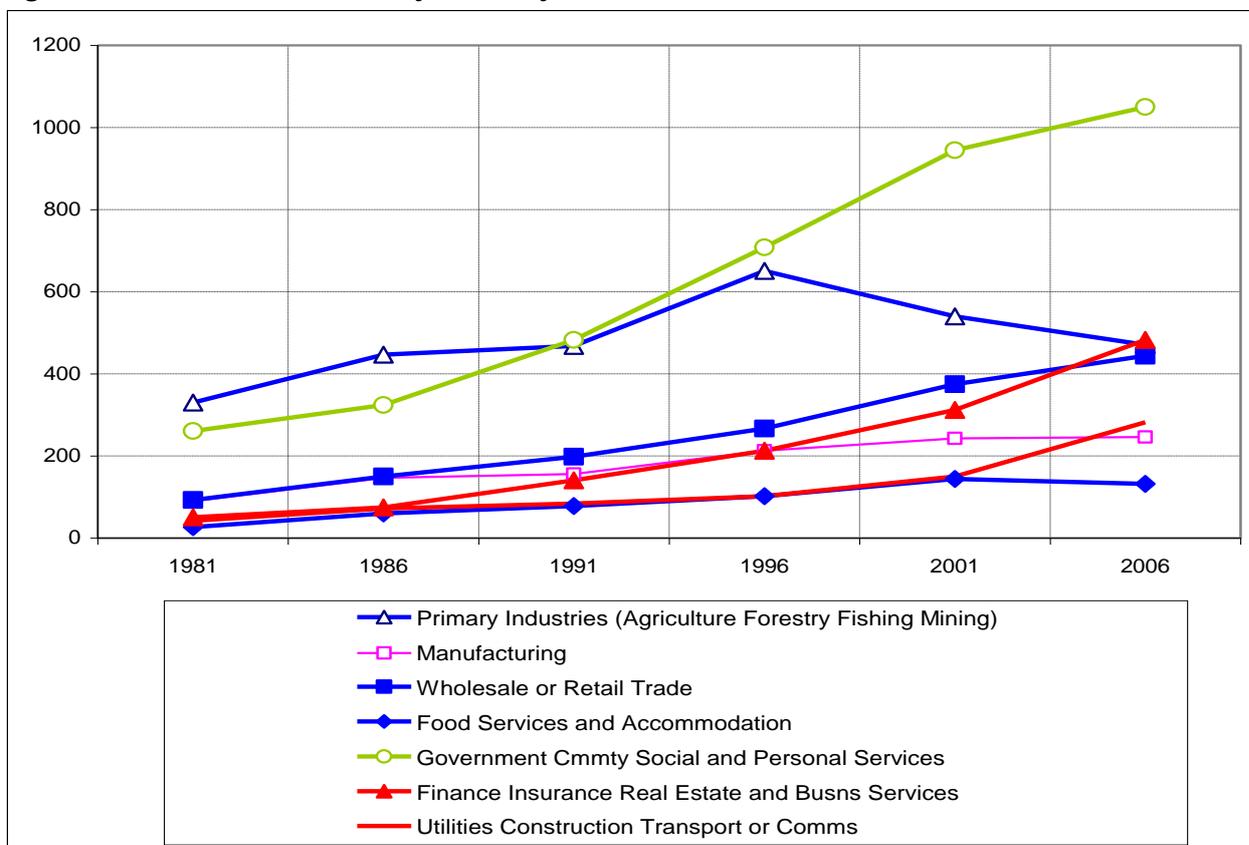
Small business growth has been significant in recent years and an increasing number of people work in wholesale/retail trades, the hospitality industry, education, health and community services.

The increasing importance of work in urban centres for Waimakariri's rural population is reflected in Figures 24a and 24b which show a very different pattern to the other case study areas.

By 2006 utilities/construction/transport and communications had become the main source of employment for men (Figure 24a), while government/community/social and personal services was by far the most important work area for women (Figure 24b).

Rural Waimakariri had a much higher proportion of workers aged 35 to 49 years balanced in part by a lower proportion aged 20 to 29 years and aged 65 years or over than the other rural districts or rural New Zealand as a whole. The working population of rural Waimakariri District has been expanding due to high rates of net migration gain of those aged 35 to 54 years keeping the peak age group close to 40-44 years. This contrasts with rural Central Hawke's Bay and Hurunui Districts which are both noticeably and steadily aging over time.

Community

According to the Council the Waimakariri district retains its rural/small town character despite rapid growth and despite shifts in the kinds of activities undertaken. For example, the sale yards in Oxford have closed, and high quality cafés and restaurants, bookshop, and art gallery, have emerged. Oxford is now very much within the Christchurch commuter belt, exemplified by the Sunday farmers' market which attracts people from Christchurch and provides business for the restaurant trade.

The area has an extensive range of community and recreational organisations, and a relatively high proportion of the people living in the district are involved with one or more of these (WDC 2008a:8). The percentage of people reporting involvement with voluntary work at a Marae or with a community organisation was highest for the Oxford/Eyre wards (WDC 2008a:32).

Small holding and rural residential property holders

Despite the small percentage of people involved in the primary industries in general in Waimakariri, there has been a substantial increase in the number of people living in the district's rural areas. Many new small-holdings (which range from 2 ha to 8 ha) have been created. Some of these are used for fulltime or part-time horticultural enterprises, including vegetable and flower growing, fruit and nut trees and olives. In one instance co-operation between adjacent small-holders enabled a vegetable growing enterprise to be developed. Other properties were used for grazing sheep, often for neighbours, and for grazing horses (mostly for recreational purposes), and woodlots (WDC 2007a).

Other small-holdings were occupied by people who have no current involvement in agriculture (WDC 2007a:52, 2008:7). WDC's research on this group of residents (WDC 2007a) found that 28% of small-holders ran a home-based commercial enterprise that did not involve land-based production. These included engineering/manufacturing businesses and servicing businesses and consultancies. Research on households living on rural residential properties (plots of 0.5 ha to 2 ha) had a similar profile to the smallholders (WDC 2007b, see Tables 15a, b, and c).

Table 15a Place of work of the main job of those in the paid workforce				
Place of work	Small-holders		Rural residential	
	No.	%	No.	%
Christchurch	347	52	280	57
Waimakariri District incl at home	240	36	140	28
Mobile worker	42	6	36	7
Elsewhere	3	-	9	2
No information	39	6	29	6
TOTAL	671	100	494	100

(*Source: Waimakariri District Council*)

Table 15b Length of time on present property	Small-holders	Rural residential
Fewer than 2 years	19%	15%
2-4 years	29%	30%
5-9 years	21%	26%
10-19 years	13%	20%
20+ years	16%	8%
Not specified	2%	1%

(*Source: Waimakariri District Council*)

Table 15c Location prior to present property	Small-holders	Rural residential
Another address within Waimakariri District	36%	32%
From Christchurch city	42%	34%
Rest of New Zealand	12%	17%
overseas	4%	6%
Not specified	6%	11%

(*Source: Waimakariri District Council*)

Despite a high percentage of the households having moved onto their smallholding from Christchurch City, 80 percent of the smallholder households had at least one adult who had spent 5 years or more of his/her childhood either living on a farm, in a rural village/township or at a property on the periphery of an urban area with a rural outlook. This suggests that there is a higher level of familiarity with rural life by this group of people than is often assumed.

Climate Change

NIWA predicts that annual mean rainfall may decline in the Waimakariri district by 2 to 4% over the next 30 years (MAF 2010d). Surface temperatures are expected to rise (by 1.5-2°C in summer and 2-3°C in winter by 2080 (O'Donnell 2007:17). The Waimakariri River whose catchment reaches back into the Main Divide, could maintain or have even increased flows, because of projected rainfall increases (O'Donnell 2007:18). Climate change projections indicate reductions in average summer flows in the Ashley/Rakahuri River (which already has low flows) and this, coupled with an increase in the frequency of extremes such as droughts and floods, is expected to increase demand for irrigation The combination of these effects may place more pressure on the river's ecology (Ecan 2011b:5). As with Hurunui district, sea levels are expected to rise with the likelihood of coastal flooding. Gale force winds are expected to increase, with more winds over 130 km expected, so that there is a strong likelihood of mature trees coming down.

VI.   LITERATURE REVIEW – RURAL COMMUNITY RESILIENCE

Resilience

> *Being resilient is… more than just the ability to bounce back after experiencing a single adverse event such as fire, flood, sudden economic downturn (perhaps as a result of withdrawal of a significant source of local employment) or prolonged years of drought. It is also about anticipating change and having policies and programs in place that make positive rather than negative outcomes achievable* (McIntosh *et al* 2008:4).

The concept of resilience (derived from the Latin *resilio* to spring back) evolved from the disciplines of psychology and psychiatry in the 1940s and, within these disciplines, is mainly accredited to Norman Garmezy, Emmy Werner and Ruth Smith (Manyena 2006:433). According to Manyena the term resilience has been used extensively in more recent years in the fields of physics and ecology (the latter particularly following from C.S. Holling's 1973 article). In these contexts, resilience has been variously defined as the capacity of complex systems to exhibit stability or persistence in the face of change, to adapt creatively to externally induced shocks, or to exhibit self-organisation (Perz *et al* 2010), or "*the ability of an ecosystem to maintain itself when shocked by natural or human disturbance*" (Saunders *et al* 2011:3) .

In an important contribution to understanding of resilience, Walker and Salt (2006) observe that at the heart of resilience thinking is the notion that 'things change'. In an integrated system nothing occurs in isolation from other sub-sets of the system. Impacts of change cannot be predicted by understanding the individual mechanics of the component parts of the system, or the outcome of any pair of interactions. Just focusing on one aspect of the system can make the total system more vulnerable to shocks and disturbances (Walker and Salt 2006:9 and see also Schouten *et al* 2009:3-4). To be resilient requires an approach which is integrated, and which simultaneously takes account of the social, cultural, economic and environmental dimensions of the entire system. From this perspective:

> *Resilience is the capacity of a system to adsorb disturbance; to undergo change and still retain essentially the same function, structure and feedbacks. In other words, it's the capacity to undergo some change without crossing a threshold to a different system regime - a system with a different identity. A resilient social-ecological system in a 'desirable' state (such as a productive agricultural region or industrial region) has a greater capacity to continue providing us with goods and services that support our quality of life while being subjected to a variety of shocks* (Walker and Salt 2006:32).

Applying this approach to farm sustainability, Darnhofer *et al* (2010:187) note that underlining resilience thinking is an understanding of the world as a complex adaptive system. Unpredictable change results from the many decisions made by the many stakeholders operating in the system. Darnhofer *et al* provide an example of this in Australia's Goulburn-Broken Valley where in a 150 year time span there were four periods of major change totalling 20-25 years (about 15% of the time). The authors remind us that not only is change unpredictable, but there are qualitatively different types of change. Persistent stress (such as from on-going drought or economic recession) is distinguishable from transient shocks, although stress can be an enduring pressure offering some predictability. Shocks are sudden disruptions that may lead to system changes. They can be localised (landslip or snow storm) or of national and international significance. Darnhofer *et al* use the example of the early '70s

oil shocks which, coupled with loss of markets as Britain entered the European Union, contributed to the neo-liberal reforms of New Zealand agriculture in 1984.

In addition, the transition period of recovery from shock will be variable depending on the nature of the shock to the system. While changes from one pastoral use to another may take several seasons before labour, contracting and household arrangements settle down, for a transition involving forestry the period may extend across generations before a sustained harvest is achieved and associated processing developed. Long term transitions (including climate change) have a greater element of uncertainty for communities. It is likely to be difficult for individuals and households to envisage the new 'near-equilibrium' system.

Darnhofer *et al*'s point is that achieving resilience requires moving away from 'a system-near-equilibrium' on which, for example, conventional farm management is based (that is, one of predictability and stability), to adaptations which allow successful navigation of change. The latter requires exploring new options, being open to learning, and traversing the tensions between efficiency and adaptability (Darnhofer *et al* 2010:192-195). The authors' research suggests that in the context of resilient farm businesses, understanding the social domain is critical. The farmer's perceptions, preferences and risk aversions dictate "*how a farmer perceives and conceptualises the potentials and limits of his or her farm, the risks emanating from economic, social or ecological changes, and the options that he or she can employ to face them…as well as...family needs and satisfaction*" (Darnhofer *et al* 2010:193).

The concept of resilience also appears in economics, health and sociology literature, but according to Schouten *et al* (2009) "*the application of resilience to the uncertainties and rapid changes of rural areas has been minimal*". This may be why an FAO study laments that "*The rural sector's lack of resilience to climatic accidents seems to be one of the main reasons for the transformation of climatic accidents into environmental, economic and social disasters for local communities*" (Bockel *et al* 2009). Schouten *et al (*2009:7) also mention social sources of resilience, such as social capital, in the context of rural populations' adaptation to change.

Social capital

Economists and others have deconstructed the concept of 'capital' to delineate the ways that capital contributes to the capacity of a community to respond to endemic long-term pressures or random shocks, and supports the well-being, multi-functionality and resilience of systems and communities. In addition to financial capital (markets, credit systems, etc), natural capital (soil, water, natural vegetation, animal labour power), environmental capital (which includes non-renewal extractive resources, amenity values, and the ability of the environment to 'process' waste) and produced capital (the money, machinery and infrastructure which help economies and societies to function) are other forms of capital (Saunders *et al* 2011; McIntosh et al 2008). These include:

- cultural capital "*the set of values, history, traditions and behaviours that link a specific group of people together… particularly important where a minority cultures exists alongside a dominant culture, e.g., Welsh in the United Kingdom; Québécois in Canada and Māori in New Zealand*" (Saunders *et al* 2011:2)
- human capital (incorporating the knowledge, skills, competencies and attributes of individuals that facilitate personal social and economic well-being)
- institutional capital (which relates to the public and private sector and also not-for-profit organisations and institutions)
- social capital or the connectedness between citizens.

The term 'social capital' was popularised by Harvard academic Robert Putnam, who uses it to refer to networks of repeated social interaction which build trust and enable people to work together to achieve common goals and shared objectives (Robinson 1997). Social capital differs from human capital because it concerns the way people interact and relate (Saunders *et al* 2011:5). When people decide to participate and contribute to the social character and culture of a community through building personal intimacy, emotional depth and social cohesion, they build social capital. While initially social capital referred to the ability of people to capitalise on social networks, Bankoff (2007:328) notes that the concept has been extended to recognise that social capital is built through "*trust that a contribution freely given will be reciprocated in due measure at an appropriate time*". Institutionalised group relations uphold and reinforce this belief.

Putnam also distinguished between bonding and bridging forms of social capital. Bonding social capital allows individuals from within groups (particularly kin groups) to work together by sharing similar values, whereas bridging social capital enables cohesive relationships to form between different groups with different values (see Sinner *et al* 2005:8). Bridging social capital is of particular importance for bringing people together in rural communities where there are diverse groupings of people, diverse values, outlooks and goals. The networks which people develop are useful for economic purposes such as finding employment, or obtaining resources in an emergency[22]. A third set of relationships is encapsulated in the notion of 'linking capital' which refers to connections with people in power (in political or financially influential positions) (Woolcock 2001).

Social connections and interaction (whereby people with diverse knowledge and experience come together, build trust, exchange information and ideas, and contribute resources) facilitate well-being and co-operation for mutual benefit or, in other words, social capital – the building blocks of communities.

> *Social capital is the social resource that is embodied in the relations between people. It resides in and stems from the contact, communication, sharing, co-operation and trust that are inherent in ongoing relationships...Social capital is a collective resource rather than one accruing to an individual. However, the circumstances surrounding an individual or household may result in their having access to greater or lesser stocks of the community's social capital* (Statistics New Zealand 2002:3).

New Zealand's economic and social policy reforms from the mid eighties were seen to have resulted in a loss of social capital and social cohesion (Ashton and Thorns 2007:213). The speed of change and the severity of restructuring which accompanied the cuts in subsidies to farmers and rural industries, the opening up the economy to increased competition, and the liberalisation of the exchange rate, created concern about the strength and resilience of local communities. While Ashton and Thorns' analysis is primarily about urban community in the context of information-communication technology, their work poses questions such as "*what constitutes community?*", "*are face-to-face relationships in local place still significant and meaningful?*", and "*what happens if the strength of local social ties lesson or fail?*". Where social capital is weak, and where people are not connected with each other, Ashton and Thorns suggest that the lack of knowledge about those that live around us can increase our

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[22] On one of her speaking tours through New Zealand in 2006, Organisational Consultant Margaret Wheatley spoke of some of the lessons which came out of Hurricane Katrina. "You cannot start to build networks with people at 2am in the morning. When you need resources you have to know the people that can get them for you well in advance".

sense of insecurity and fear of the 'others' within the neighbourhood. They quote from Dr Papaarangi Reid:

> *Increasingly, we are being encouraged to find solutions at an individual level… In the name of progress, we are being encouraged to 'look-after ourselves' and lose what used to be our national asset, our ability to care for our neighbours and our fellow citizen (Reid 1998:13, quoted in Ashton and Thorns 2007:217).*

Ashton and Thorns' argument is that community rather than individual solutions are critical for generating well-being, enabling people to connect with each other and participate effectively in society, promoting change from the bottom up. They say community is not something that can be taken for granted – it has to be resilient in the face of change. Where social capital is strong, people have a clear sense of themselves as a social entity, a clear view of their aspirations and needs and how these can be achieved. This is a community that gives, receives and cares – and it only happens when people are connected and know and care about what is going on.

Social capital is seen as having explanatory power specifically in the area of collective action for environmental management and building resilience within a social context. To show that "social capital is central to the lived experience of coping with risk" Adger (2003) points to examples such as the community's response to Hurricane Andrew, and the "networks of reciprocity and exchange that are the hallmark of pastoral economies" (Adger 2003: 389). Using examples from Trinidad and Tobago and Vietnam, Adger illustrates the importance of social capital in the context of adaptation to climate risks. He notes that bridging (networking) capital (within civil society) can be an important substitute for the state's involvement in the provision of public goods, state structures and institutions (although the state is also seen to have a role in promoting social capital). Other commentators also highlight the role of networking and social capital as a contributor to community resilience. For example, Bankoff's (2007) research in the Philippines (in an area steeped in poverty, shaken by up to five earthquakes daily and subject to adverse events including 20 or more typhoons annually), points to rural communities' philosophy of mutual reliance, their capacity to organise as a group, develop structures, and find resources to cope.

Margaret Wheatley's commentary on Hurricane Katrina reflects the importance of networks for building resilience. "*Networks begin with the circulation of information. This is how members find each other, learn from each other and develop strategies and actions…once the network has momentum, its passion and individual creativity propel it forward*" (Wheatley 2006). She adds that people do not need to be told what to do in an emergency, and they particularly do not need to be told by outsiders who often lack knowledge about the locality and do not comprehend the nature of the situation or magnitude of the disaster.

Smith *et al's* (2011) commentary on recent adverse events in New Zealand concludes that the critical factor in a community's resilience to these events is its stock of social capital: *Social capital, developed through both informal and formal networks, is fundamental if communities are to establish collective ways of dealing with the challenges of extreme climatic events using new approaches to the resources on which they depend* (Smith *et al* 2011:4). Similarly In the context of responses to fire, Warren and Wilson (2011) note that where stocks of social capital are maintained and enhanced and people are networked, communities have a greater capacity to act for mutual benefit and the common good.

The literature shows that social capital comes from mutual trust and reciprocity, supportive institutions and networks that enable people to adapt to a changed reality and these are the cornerstones of resilience. Communities with these attributes also tend to have access to the skills and resources needed to take advantage of opportunities in the face of change.

Social resilience

Increasingly resilience thinking is being applied to discussions about social change and the capacity (or lack of capacity) of communities to withstand or adapt to external shocks. For example, Adger (2000) applies ecological resilience in a resource management context to social resilience. He argues that social resilience is defined as the ability of communities to withstand external shocks to their social infrastructure, and this is significant

> *for resource-dependent communities where they are subject to external stresses and shocks, both in the form of environmental variability (such as agricultural pests or the impacts of climatic extremes), as well as in the form of social, economic and political upheaval (associated with the variability of world markets for primary commodities, or with rapid changes in property laws or state interventions)* (Adger 2000:361).

In a later article Adger (2003:388) argues that adaptation to shocks involves "the interdependence of agents through their relationships with each other, with the institutions in which they reside, and with the resource base on which they depend". In this context bonding and bridging social capital are shown as the basis by which resource-dependent communities act collectively to adapt in the face of climate change risks. Adger concludes that "the nature of adaptive capacity is such that it has culture and place-specific characteristics that can be identified only through culture and place-specific research" (Adger 2003:400)

Ross *et al* (2010) have undertaken a comprehensive international literature review of social resilience which identifies work on: individual and community resilience in rural areas (Hegney et al 2007); community resiliency and health (Kulig et al 2005); resilience in disasters (Manyena 2006, Maguire & Hagan 2007, Norris *et al* 2008); cultural resilience, and resilience to environmental risks. In synthesising definitions of resilience from these studies (Ross *et al* 2010:20) suggest resilience:

- is like a 'bouncing ball' in the face of adversity (Hegney *et al* 2007)
- is the capacity of social groups and communities to recover from or respond positively to crises (Maguire and Hagan 2007)
- is the ability of a community to deal with adversity and in doing so to reach a high level of functioning (Kulig *et al* 2005)
- emerges from four primary sets of adaptive capacities that include economic development, social capital, information and communication, and community competence (Norris *et al* 2008).

Ross *et al* explain social resilience as a process by which individuals, communities and societies adapt, transform, and potentially become stronger when faced with environmental, social, economic or political challenges. Their analysis acknowledges the complex interplay between social, cultural, spiritual, economic and environmental systems, and recognises the synergistic relationship between people and the environments in which they live and derive livelihoods (Ross *et al* 2010:2).

From case studies and 75 interviews undertaken in far North Queensland, Ross *et al* identified six key indicators of social resilience for use in social reporting and management. These were:

- people-place connections - recognition of human-environment interdependencies and connections, including sense of 'place' stewardship, and sustainable resource use patterns
- knowledge, skills and learning - individual and group capacity to respond to local needs and issues
- community networks - processes and activities that build and support people and groups in a place
- engaged governance - collaborative processes for regional decision making (including partnerships, planning, supportive and creative institutions).
- diverse and innovative economy - regional economies comprise a broad range of industry and services, and support new and exciting opportunities
- community infrastructure - appropriate services and facilities to support identified community needs.

Sense of connection with, and custodianship over, the natural and built environments were seen as important for social resilience (Ross *et al* 2010:131), as is the maintenance of strong indigenous culture, while a lack of social infrastructure such as health or education facilities detracts from social resilience (Ross et al 2010:17).

Other researchers have focused on social resilience and health mainly in the context of the characteristics of resilient individuals. For example, the Resilience Research Centre based at Dalhousie University, Canada employs methodologically diverse approaches to understanding how children, youth and families cope with different kinds of adversity (Resilience Research Centre 2010). Some of the findings from this work are applicable to community resilience. The Resilience Research Centre's principal investigator Michael Ungar notes that resilience is a social process which achieves social outcomes around self-defined well-being. He believes that understanding resilience requires knowledge about social conditions, access to social justice, formal and informal networks and resources, cultural factors and community contexts (Ungar 2006).

From health and adolescent studies literature (cited in Hegney *et al* 2007) factors found to be influential in the development of resilience have been divided into intrapersonal and environmental factors. Intrapersonal factors include cognitive factors (intelligence, optimism, creativity, humour and a belief in one's self) and competencies (coping strategies, social skills, above average memory and educational abilities). Environmental factors include perceived social support. The authors also emphasise the importance of recognising the dynamic, interactive nature of resilience and the interplay between an individual and his or her broader environment.

Māori and resilience

> *Ēhara taku toa I te toa takitahi*   My strength is not the strength of one
> *Engari taku toa he toa takitini*   My strength is the strength of many
>   (quoted in Adams 2008:234).

Linda Smith[23] (1999) and Tangihaere[24] and Twiname (2011) suggest indigenous knowledge is often not respected or is overlooked, and that Māori ways of knowing have been denied.

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[23] Professor Linda Tuhiwai Te Rina Smith is affiliated with Ngāti Awa and Ngāti Porou

Despite this, the authors demonstrate that Māori have shown particular resilience in refusing to allow such ignoring of Māori perspectives to undermine their mana, leadership, values, concepts and ways of thinking, feeling and behaving. Tangihaere and Twiname (2011) report a growing willingness among non-Māori to understand the Māori worldview, and that successful outcomes can be achieved by the application of cultural knowledge. To this end, Simon Lambert's[25] (2008) analysis of what he calls 'innovation diffusion' under two distinct, but not mutually exclusive, knowledge management systems – one modern, the other traditional - provides useful insight into the building of resilient Māori communities.

Defining resilient communities as *being able to absorb disturbance before altering their own structure, being able to recover quickly after a disturbance, being able to self-organise and increase their capacity for learning and adaptation*, Lambert makes telling points about institutional resilience where institutions have a role of mediating "*between an often unpredictable biophysical environment and the divergent needs and desires of socio-political constituents*" (Lambert 2008:3). He draws attention to 'social memory' which captures the experience of past changes from previous disturbances through community debate and decision-making processes that enable appropriate strategies for coping with on-going change. Farming that is 'information intensive' rather than 'physical-input' intensive is seen as important for increased and on-going resilience (Lambert 2008:4). Central to his thesis is the notion of 'cultural resilience' which has enabled Māori society to deal with vulnerabilities created through the alienation of around 90% of their lands. In Lambert's view, aspects of their culture which contribute to Māori resilience include:

> *kaitiakitanga* – responsibility for the environment
> *kotahitanga* - a respect for the individual in combination with consensual decision-making
> *manaakitanga* – the obligations of hospitality
> *taonga tuku iho* – esteem for tangible and intangible assets passed down
> *whānaungatanga* – acknowledgment of the bonds of kinship (Lambert 2008:7).

Lambert builds on Mason Durie's[26] (2005) metaphor of tidal patterns (uneven progress) and the qualities of durability and resilience inherent in Maori culture which have ensured the endurance and survival of Māori as a people. Durie's analysis reflects on Māori capacity for adaptation and the turning of adversity into accomplishment. In the context of sustainably managing significant areas of land returned under Treaty of Waitangi compensation settlements, Lambert notes the value to Māori of holding onto "*so-called 'traditional' Māori cultural practices that include inclusive decision-making and the communal ownership and distribution of benefits*" (Lambert 2008:10).

To this end, Adams' (2008) analysis of an indigenous approach to community empowerment and action draws attention to the importance social connectedness plays in Māori communities:

> *For Māori, a strong sense of social connectedness permeates all aspects of living; all relationships are treasured for their own intrinsic value and their value is reinforced repeatedly through a variety of common cultural practices* (Adams 2008:237).

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[24] Tracey Mihinoa Tangihaere is affiliated with Ngāti Maniapoto and Ngāti Porou
[25] Dr Simon Lambert is affiliated with Ngāti Ruapani and Tūhoe
[26] Professor Sir Mason Durie is affiliated with Rangitāne, Ngāti Kauwhata and Ngāti Raukawa

Adams notes one such customary practice is the process of formal introductions: individuals identify the mountains and river catchments of the lands they come from, as well as the families to which they belong. Resilience depends on social connectedness and *whānaungatanga*, involving ties beyond family (hapū) and tribe, into the social world as a whole. Such social connectedness is a feature of the general literature on resilience, although the geographic links are rarely acknowledged in non-Māori literature.

Lambert argues that to be considered 'successful', innovations adopted by Māori communities must maintain or increase the resilience of Māori communities. The experience of marginalisation has not diminished the reliance of Māori on new technology, or the need to innovate towards sustainable development of Māori resources. On the other hand, "*dependency theory shows that while inequality afflicts all societies, there is a pattern to indigenous peoples being routinely marginalised from the innovations that their resilience requires*" (Lambert 2008:32). An insight from Lambert's research is that while contemporary development theory asserts that innovation struggles against 'cultural traditions' which constrain change, Māori have never rejected innovation. Instead "*adoption of non-Māori inventions has accelerated with contemporary Māori development from the realisation that sustainable development, including cultural resilience, requires new ways of 'doing things'*" (Lambert 2008:204). By applying the phenomenon of resilience to culture, Lambert shows that a resilient system is not one of stability or where change is resisted, but instead change is accommodated or absorbed in ways that do not fundamentally alter system structure. In other words, "*radical innovations were absorbed by Māori society without a loss of the cultural logics that demarcated Māori from others*" (Lambert 2008:209).

A number of other studies address more directly the response of Māori communities to climate change. Some of these are outlined below.

A study conducted from 1998 to 2002, by Landcare Research NZ Ltd with Ngāti Porou in Waiapu (East Coast–Gisborne), identified that the enormity of the problem of sustainable land management[27] often prevents communities from knowing where to start in the work of land restoration and conservation, and what the role of different individuals and agencies should be (Harmsworth and Warmenhoven, 2003). Communities often lack sound information on which to base decisions, so that the authors concluded that greater collaboration is needed between agencies, iwi and hapū, and local and central government. This was not seen as an easy step given that "*the community has become very wary through years of Government intervention and failure to consult and listen*" (Harmsworth and Warmenhoven, 2003:8). According to the authors, climate change was seen by Ngāti Porou at that time as yet another, albeit important, variable to consider alongside other social, economic and environmental considerations.

King *et al'*s (2010) more recent analysis of Māori adaption to climate change notes that the most vulnerable Māori communities will be those that are:

> *exposed to not only existing climatic variability and hazards, but those that have limited access to economic resources, low levels of technology, poor information and skills, remote and substandard infrastructure, unstable or weak institutions and governance*

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[27] This analysis identified that deforestation and colonial land development over the last 100 years have had a major impact on cultural values and Māori well-being through spiritual loss, degradation and reduction in the area of natural resources, decreased access to traditional resources, increased flooding risk, loss and deterioration of culturally significant flora and fauna habitats, loss and modification of cultural sites, and the continuing decline in the mauri (life force or health) of the river and the quality of its resources through the deposition of enormous quantities of sediment (Harmsworth and Warmenhoven, 2003).

structures, and inequitable empowerment and representation in local, regional and central government planning (King *et al* 2010:101).

The authors observe that 13 hui conducted by the Ministry for the Environment in 2007 had covered many issues and identified climate change is an "*important and urgent issue for Māori*" (King *et al* 2010:103), but noted that little research had been conducted on the issue.

Not only are the environmental impacts of climate change diverse, complex and unevenly distributed, but the response of Māori to the impacts are and will be equally diverse. Māori society is not homogenous – different groups have different skills, knowledge and roles, are situated in different places and within different environmental contexts and have access to different resources and capital. Māori are subject to the same constraints as non-Māori in that resource activities are determined by regulatory and legal regimes, land use and land ownership regulations, quotas and global markets. "*Consequently, the responses of different Māori to these external influences are likely to be quite variable given differing perceptions and sensitivities, both of which are a function of the particular attributes and social capital of individuals, whānau, hapū, iwi and business institutions*" (King *et al* 2010:103). They comment further:

> *some Māori groups may be better able to respond to the pressures presented by climate variability and change because of strong partnerships, diversity, and the belief that life on earth is more about people. Building resilience through strong social networks is becoming increasingly important in natural hazards management and research* (King *et al* 2010:108).

The conclusion reached by King *et al* is that vulnerabilities to the risks of climate change can be reduced by adaptation and strengthening capacities at all levels to assess, plan and respond to climate change challenges, and that considerable advantage is likely to be gained by those who consider and plan early for future impacts of climate change. King's conclusion could be said to apply to all communities. In addition, traditional Māori social and cultural structures and values seem to provide an inbuilt base which supports community resilience.

Social connectedness, inclusive consensual approaches to decision-making, a holistic approach to issue resolution, and a concern for our fellow citizens, are not only ideals of Māori culture and wellbeing, but appear repeatedly in both Māori and noon-Māori literature as key components of community resilience.

Community resilience

> *Community resilience is the ability and capacity to deal with and adapt to changing conditions and continue to develop…governments, private industries and organisations, formal and informal structures and individuals all have a role to play in the process* (McIntosh *et al* 2008:4).

> *Being resilient in the context of climate change contains the idea of maintaining and even improving quality of life (*Paton 2005).

An Australian literature review on resilience in rural communities recognises that the concept of resilience is a relative newcomer to the literature on the socio-economic wellbeing of rural communities (McIntosh *et al* 2008:37). The review begins by acknowledging that not all rural communities are able to respond effectively to the challenges of climate change and other stresses. In searching for answers on why this may be so, this literature review covers issues

such as adaptive capacity, collaboration, social enterprise, community capacity building, community efficacy, community sustainability, levels of resilience, social capital, alliance building, and rural community vitality, viability and health (McIntosh *et al* 2008:6). The authors note that:

> *Considerable international and national research and debate has focussed on what are regarded as the common characteristics of resilient rural communities. There is general recognition that resilience is not a fixed quantity within communities in that it can grow or decline over time; as it is strengthened, the capacity to intentionally mobilise people and resources to respond to, and influence social and economic change is enhanced…. resilience emerges 'bottom up' through the independent activities of many elements, resulting in more robust and adaptable systems than those designed 'top down'* (McIntosh *et al* 2008:6).

A comprehensive research project undertaken by Hegney *et al* (2008) over a three and a half year period in the town and region of Stanthorpe, Queensland, provides useful insights into rural community resilience. Six groups of residents (including one group identified in the first phase of the project as resilient, and another based on occupation which included farming families) were asked to describe the factors which they believed contributed to individual and community resilience. Eleven resilience concepts were derived from their responses and these became the basis for a toolkit on building resilience in Queensland's rural communities.

Based on Kaplan (1999), the authors defined resilience as "the capacity of an individual or community to cope with stress, overcome adversity or adapt positively to change". The ability to 'bounce back' from negative experiences may reflect the innate qualities of individuals or be the result of learning and experience. Regardless of the origin of resilience, Hegney *et al's* research provides evidence suggesting reliance can be developed and enhanced to promote greater wellbeing, and that enhancing a person's level of resilience may be a more effective way of preventing problems and improving wellbeing than trying to modify individual risk factors.

The facets of resilience identified in the Stanthorpe study are:
- social networks and support
- positive outlook
- learning
- early experience
- environment and lifestyle
- infrastructure and support services
- sense of purpose
- diverse and innovative economy
- embracing differences
- beliefs
- leadership

The way in which each of these factors contributes to resilience is described in turn by Hegney *et al* (2008):

- Social networks are seen as a critical resilience factor for both individuals and communities by bringing people a sense of belonging, identity and social support. Participating in community through for example interest groups or voluntary work can

cement individuals' psychological attachment to a group of people within the community and this in turn has an influential role in many aspects of community functioning, including information seeking and sharing, and group performance. The downside of this is that not being part of a social grouping may deny benefits to newcomers or subgroups.

- Having a positive outlook enabled individuals and groups to see adversity as a challenge to be overcome rather than an insurmountable problem. It was cited as an essential component of resilience, as was perseverance. The will to "just keeping going" can overcome obstacles and increase achievement. Optimism accompanied by humour also improved psychological health and contributed to resilience.

- Learning (whether through formal education or drawing lessons from experience and from mistakes) was seen as enabling individuals to view their lives more broadly, develop new interests and generate purpose, hope, self-esteem, self-efficacy, and personal growth, all important components of resilience.

- Early childhood experience was seen as influencing resilience by shaping attitudes and values (including work ethics and attachment to the land), as well as being a handicap where dysfunctional experiences prevailed.

- The aesthetics of environment and lifestyle generated resilience by fostering feelings of wellbeing and community pride, as well as building character among those faced with weather extremes.

- Infrastructure (water supplies, health services, schools, telecommunications, recreational services etc), and support services (food, housing, employment help for special needs, etc) enable people to carry out their daily activities and are important for quality of life. The absence of such services was seen as impacting negatively on community resilience.

- Having a sense of purpose was seen to enhance community resilience by creating common objectives and encouraging people to work together for the 'greater good of the community'.

- A diverse and innovative economy was seen as providing communities with a range of employment and business opportunities, so that they did not stand or fall on the basis of the market fortunes of just one industry (or in agriculture, just one product). Innovation was seen as revitalising business and making it more resilient.

- Embracing differences (whether through age, gender, culture, socio-economic background, values and beliefs), builds resilience by giving communities access to different ways of thinking, new perspectives and access to different knowledge bases.

- Belief systems were seen to enhance personal and community resilience by providing people with an additional sense of meaning purpose in their lives (Hegney et al 2008:40).

- Finally, leadership - the process of influencing people's activities to facilitate achieving goals - was seen to build resilience (Hegney et al 2008:44). At its best local political leadership was seen as enhancing community well being and resilience by promoting effective performance and goal achievement, but at its worst was a constraining influence, degrading quality of life. Good leadership was seen as having integrity, being decisive and

competent, and having vision. Leadership could come from many quarters including family members, and organisations.

These eleven concepts emerge to a greater or lesser extent in other literature on community resilience, particularly the growing literature on community resilience in the face of disaster and adverse events accompanying climate change.

Learning about community resilience from dealing with disasters

The idea of involving whole communities in emergency management and planning has begun to gain traction as various emergency authorities, such as civil defence and fire services, have shifted their thinking from a focus on working with individuals and families to explore how to build community resilience (Brown, 2007). Resilience in this context is seen as the ability of individuals, communities and institutions to adapt to the consequences of a disaster when normal routines are disrupted and cannot be maintained in the affected area (Twigg 2007, Hegney *et al* 2008). Community resilience particularly in the context of climate change is, however, more than emergency preparation and recovery. Being resilient contains the idea of maintaining and even improving quality of life (Black and Hughes 2001, Paton 2005).

Over the past ten years there has been a growing interest in community responses to disasters, most particularly the capacity of affected communities to recover with little or no external assistance (Manyena 2006:433). Manyena's review of community resilience is primarily based on input from eminent researchers and practitioners working on vulnerability and risk in the context of disaster and development work. He suggests that understanding of resilience has moved from examining adaptive capacity (the amount of disturbance a system can withstand before losing its capacity to bounce back), to also recognising political and socio-economic conditions. Thus, assessing factors such as information, communications, sharing of knowledge, emergency preparedness, political stability, and economic health is an equally important part of the analysis.

Manyena asserts that in addition to activities such as community capacity building, mitigation and emergency preparedness planning (which impact on response and recovery operations), resilience building requires broad-scale community involvement. In this context command and control styles are ineffective, if not counterproductive (Manyena 2006, and see also Wheatley 2006).

By recognising the role of human actors working both as individuals and collectively to take "*responsibility for action, having a disaster plan, building capabilities to implement the plan, purchasing insurance and sharing information on recovery priorities*" individuals and communities can enhance their resilience (Manyena 2006:439).

A feature of Manyena's review is his analysis of literature on vulnerability. This shows that a lack of wealth is not the critical factor in exposing communities to the effects of disaster. In addition to natural hazards and anthropogenic pressures Manyena's literature search identified a complex range of political and social factors that need to be considered to understand community vulnerabilities. His conclusion, however, was that while these factors highlight vulnerability they do not necessarily tell us anything about a community's resilience.

In asking whether disaster resilience is a process or an outcome, Manyena's review concludes that disaster resilience is more than "*the intrinsic capacity of a system or community which is predisposed to a shock or stress to adapt and survive by changing its non-essential attributes*

and rebuilding itself" (Manyena 2006: 446). He finds that people want more than just attaining the minimum standards of coping. People want to be able to go beyond reducing their vulnerability to disasters. They are looking to build local knowledge and for an augmentation of their existing capacity. Manyena argues that this requires "*identification of the essential and non-essential elements of communities and building on affirmative action rather than endless risk assessments and reactions to negatives*" (Manyena 2006: 446).

Irrespective of how resilience is achieved, different groups within communities will have a greater or lesser degree of resilience to a disaster. Maguire and Hagan (2007:17) cite an observation from Oxfam that *disasters, however 'natural', are profoundly discriminatory. Wherever they hit, pre-existing structures and social conditions determine that some members of the community will be less affected while others will pay a higher price.*

Maguire and Hagan suggest that by understanding the impacts of disasters on particular groups it may be possible to identify where future breakdowns in social resilience may occur, and design preventative initiatives. They identify factors that seem to predict higher levels of resilience by comparing communities that have responded differently to similar disasters. Their list includes:

- trust
- leadership
- collective efficacy
- social capital
- social cohesion and sense of community
- community involvement
- existing norms/attitudes/values
- communication and information
- resource dependency.

Maguire and Hagan's predictive factors of resilience also appear in the findings of other researchers, including the Stanthorpe study (noted above). Notably missing from Maguire and Hagan's list are aspects of environment and innovation – both of which are significant factors in the Stanhope and Māori literature, and the aspects of social memory and cultural resilience identified in Māori literature.

Further extensive research has been carried out internationally and particularly across Pacific rim countries by Douglas Paton and others to identify the key generic attributes of community resilience. From this work community resilience is defined as (Colussi *et al* 2000, Twigg 2007, Daly *et al* 2009):

- the capacity to absorb stress or destructive forces through resistance or adaptation

- the capacity to manage, or maintain certain basic functions and structures, during disastrous events

- the capacity to recover or 'bounce back' after a disaster or adverse event, and

- the capacity to take intentional action to enhance the personal and collective capacity of citizens and institutions to respond to and influence change.

Paton's research into disaster response and preparedness suggests that action to build resilient communities occurs on three levels: personal, community and institutional (Paton 2005, 2007; GNS Science 2011). These are discussed in turn:

<u>Personal</u>

Paton's research identifies that at the personal level people know the small things they can do to make a difference for themselves, their families and their neighbours (GNS Science 2011:3). They can identify the hazards and natural disasters they may be exposed to within their community, what changes are in the offing, and what opportunities may arise from recognising these changes. They will discuss these hazards and changes with others and identify what action can be taken to prepare for, mitigate, or take advantage of these changes (MCDEM 2010:10).

Actions taken may include developing a strategy or plan of action, working out what steps can be taken, what challenges are likely to arise, and how these might be handled. People have an expectation that what they do will make a difference and that making these preparations is not difficult.

Psychological barriers at this level include people having expectations that what they do won't make a difference, that disasters either won't happen or are so destructive there is no point bothering to do anything, or people lack the confidence that they have the skills to problem solve in any aspect of their life, or that problems will resolve themselves/go away without their taking action (Bennett and Murphy 1997, Paton 2007:27-29).

<u>Community</u>

At the community level, Paton's research shows that by being actively engaged in community affairs people can contribute to achieving community goals (Paton 2007). Where people are actively involved in community affairs and projects the community is more likely to develop problem solving skills (which will contribute to resilience building). Examples of this kind of activity include people working with others to improve community life; establishing or participating in local activities and events; contributing to good causes either with financial donations, in kind or with their time; attending public meetings on a community issue; and being involved in volunteer activities that benefit the community (Paton 2007:31).

Also at the community level people work together to resolve issues. In doing this they are willing to express their opinions in public in front of a group even when they know that what they say may be unpopular. At community meetings people may take the lead, or they may actively support another's lead (Paton 2007:32-33). Discussions at the community level focus on what residents are most interested in, and while there may be considerable debate this is conducted in a respectful way (Paton 2007:33, Atkinson *et al* 2009). The quality of an individual and the knowledge she or he is known to have when putting ideas forward influences the uptake of ideas and the community's perception of the issue. How the community see problems and responds to these problems will impact on what is done about them (Paton 2007:32-33).

<u>Institutional</u>

Paton found that the characteristics and behaviour of the communities and wider society in which people live has an impact on resilience. Where there is trust and respect, where communities are supported by institutions and agencies, and these institutions encourage community-led initiatives, there is resilience (GNS Science 2011:3)

As Twigg (2007:6) points out, communities do not exist in isolation. Their resilience is also influenced by capacities outside the community including emergency management services, social and administrative services, public infrastructure, and regional, national and international links.

In a resilient community people feel empowered to influence what happens in their community. People feel that voting in local elections influences and helps solve problems in their community, and that there are positive consequences of participating in community activities. As they see this can affect their own lives they take an active part in keeping their community going (Paton 2007:34). They care about the appearance of their community, they have strong opinions about the way things are done by elected representatives, and expect elected representatives to carefully consider the opinions of people in the community and use that information to influence what goes on in the community (Paton 2007:34).

Resilience comes from people having trust in community leaders and organisations. This includes trusting the local council to respond to meet the needs of residents and do what is right for the people they represent. People also need to have confidence that their news media will report fairly, and that the law will protect and maintain order in their community (Paton 2007:35).

While the descriptions in these levels align with other literature findings, it is worth noting that the Ross *et al* findings and Māori writers in general place most emphasis on factors of people-place connections, on inbuilt structures for social connectedness, and embracing diversity and innovation.

Domains of community resilience

From analysing these features of societal functioning and behaviour Paton has developed eight domains of community resilience (Paton 2005, 2007):

1.   critical awareness
2.   action coping
3.   outcome expectance
4.   self-efficacy or self-confidence
5.   community participation
6.   articulating problems/solutions and demonstrating leadership
7.   empowerment
8.   trust

Paton's eight domains incorporate the key facets of resilience identified elsewhere in the literature, including the findings from the Stanthorpe study and Ross *et al*'s (2010) study of social resilience. These domains are already used in New Zealand as part of work to measure progress in building community resilience within a civil defence and emergency management context (MCDEM 2010, GNS Science 2011). They are also used in the present study to assist in the analysis of community feedback about the resilience of New Zealand's rural communities within the context of climate change. It is, therefore, worth looking at Paton's discussion on the eight domains in more detail.

1. **Critical awareness**: When people think about identifying and being aware of hazards and the potential for adverse events then they tend to be motivated enough to do something about these, particularly if they discuss the issues with other people (McIvor and Paton

2007, Paton 2003, 2007, Paton *et al* 2005, 2006). People often respond to new risk information by engaging in disaster related 'conversations'. These are used to resolve any ambiguity introduced by the information. The public often relies on social networks rather than official agencies as a stimulant to engaging in preparedness behaviour (Finnis, 2004)

2. **Action coping**: This involves people focusing on the issues that confront them and finding solutions to deal with these issues. This might mean taking action to make plans, or in the aftermath of a disaster working with others and taking action to deal with or mitigate the effects of a disaster/adverse event (Paton *et al* 2003). Working in this way generates 'community spirit' and means that people are ready to 'swing into action to clean-up' after an event.

3. **Outcome expectance**: Having an increased belief that your own actions will enable you to deal with issues results in also having a belief in the benefits of taking action and preparing for disasters. It gives an expectation that by taking action to prepare for disasters there will be positive outcomes. Such beliefs reduce expectations of negative outcomes and increase people's belief that what they personally can do will make a difference (Bennett and Murphy 1997, Paton 2006). Having expectations of positive outcomes assists people take action and return to normality (or a new normality) relatively quickly, and may even improve quality of life.

   Where people don't believe they can make a difference it is often because they think the event is uncontrollable, or they are fatalistic in their approach. People need to be shown that they are in charge and that their mitigation efforts are effective (McClure et al 1999, Paton 2006).

   To build resilience, both negative and positive expectations about outcomes need to be addressed by separate intervention strategies. If only expectations of positive outcomes are looked at, people may see the benefits of preparing for an event, but won't actually bother. These people need to be shown that the distribution of loss from an event is not evenly spread, and how the choices people make can impact on the extent of their loss.

4. **Self-efficacy** is the assessment an individual makes about what they are capable of achieving in a given situation. It is the confidence they have in their ability to problem-solve successfully, make preparations, and cope. Several researchers have found a correlation between self-efficacy and involvement in community activities (e.g., membership of community clubs, local action groups), which suggests that those who have higher levels of self-efficacy developed it from dealing with everyday community issues and have learned the ability to respond more effectively to unexpected adversity (Bennett and Murphy 1997, Bishop et al 2000, Lindell and Whitney 2000, Paton et al 2001, Finnis 2004).

   The personal involvement in, and responsibility for, decisions regarding personal safety, which come from being part of a community group are characteristics that increase a person's capacity to respond effectively to hazard effects. People with high self-efficacy, therefore, feel that they have the ability to prevent damage and be self-sufficient in the event of a hazard through their own efforts and preparation.

   Finnis (2004) also reported that when people are anxious about a hazard they can be less likely to prepare because acknowledging the existence of a threat (such as attending to risk communication) triggers anxiety. To reduce anxiety, messages are ignored. These

people will probably not do things to prepare for an event because to do so triggers anxiety.

5. **Community participation**: When people are actively involved in community affairs and projects they make a contribution to defining and achieving community goals. Participation involves volunteering time and/or resources to community activities, serving on local committees, the marae, or taking public office. Community participation can influence self-confidence, action coping, community competence, empowerment, trust and intention to prepare for disasters. Additionally, the more active the participation, and the more it is geared towards defining and resolving issues and problems, the more likely that collective problem solving skills can be developed (Paton 2007). People gain confidence by developing and carrying out a community plan (Blackett and Hume 2006).

6. **Articulating problems/solutions and demonstrating leadership**: People need to be able to define and communicate the issues they are dealing with. Conveying attitudes and feelings in words is a social process, and not always easy. The process links aspects such as trust, community participation, and empowerment as well as critical awareness. It assists in developing the community's ability to resolve common issues collectively.

   Good leadership is necessary to ensure that people within the community can contribute their ideas and concerns, are involved in a way which is comfortable to them, and retain ownership of plans and solutions (Burley et al 2007, Mitchell et al 2010). Involving all parts of the community assists in generating community ownership and self reliance. Those assisting from outside need to listen to the locals and ensuring Māori participation is crucial to make certain that traditional knowledge and practices necessary for building resilient communities, are drawn on.

7. **Empowerment**: When individuals know they are listened to, and that their concerns and needs influence what goes on their community, they are truly empowered. Part of the resilience process is developing individuals' ability to influence what happens in their community (Paton, 2007). Empowerment influences critical awareness, opinion about outcomes, self-confidence, sense of community, ability to plan ahead and utilise available resources in working to recover from an emergency. To be empowered, people need to be able to draw on their own inner capabilities and resources, as well as working with others and across a range of institutions.

8. **Trust**: This aspect of resilience influences the effectiveness of interpersonal relationships and group processes. Trust reduces uncertainty for people faced with unusual events (Paton 2008). By building the level of trust people have in different organisations their resilience is also strengthened. Levels of trust depend on previous experiences (such as experiences people have dealing with institutions), structural factors (information provided, levels of community participation) and psychological factors (such as coping style and personality).

These eight domains contribute to framing the analysis of information provided by the selected case study rural communities (see main report).

<u>Comment</u>: RESILIENCE FACTORS – NEW ZEALAND'S RURAL COMMUNITIES

The last decade of the twentieth century was a time of significant change for New Zealand's rural communities as well as for the land-use base in general in New Zealand. In the course of

the current research, feedback from the case study community focus groups also cites the significance of the 15-year period post-1984, and the profound effect many rural people still feel from these changes. Looking back a decade later at the community examples may offer information about common contributive factors to the weakening of a community's resilience:

- lack of economic diversity (e.g. dependence on one or two key industries or firms)
- poor social connectedness between communities (e.g. population influx to an area without accompanying social connectedness)
- difficulties adjusting to changes in labour needs and structures (increased worker mobility, more casual employment, more transient population, fewer people available for key volunteer work)
- a population size too small to sustain necessary infrastructures.
- loss of leadership (e.g. business closures and demographic changes that lead to a loss of people with experience in governance and management skills)
- shift in location of community decision-making and loss of local 'ownership' (of ideas and actions) without processes being put in place to maintain dialogue and connections.

Although the above points are framed as negatives, it is interesting that their positive converses so closely line up with the positive resilience factors identified in the literature review. The points also appear particularly to support Manyena's (2006) view of the significance of wider political and socio-economic factors in affecting levels of resilience.

It is important, however, not to assume the validity of the positive converse of each of these as a resilience factor especially in the context of community response to adverse events and/or climate change.

While a community may survive and endure, resilience also requires positivity, sense of purpose, and taking deliberate action to adapt, move on and even improve the quality of life following adversity[28]. The literature review (especially Paton's domains) suggests that personal community and personal values and beliefs are significant contributors to resilience, and of course these can exist and have effect regardless of, or in spite of externally imposed political and economic change. In addition, the community capacity for social and economic innovation and diversity (the common positive indicators of 'survival' noted in the above community examples, and also cited in the literature as resilience factors) may come to the fore as a *result* of negative effects of change.

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[28] For example, towns such as Murupara have suffered population and economic decline but may still be considered to be 'resilient' in terms of Paton's domains through its strong iwi structure and values.

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ANNEX A: GLOSSARY AND ABBREVIATIONS

AgITO	Agriculture Industry Training Organisation
ANZSIC	Australian and New Zealand Standard Industrial Classification, first published in 1993 (replacing NZSIC), revised in 1996
CDEM	Civil Defence and Emergency Management
CHB	Central Hawke's Bay
DIA	Department of Internal Affairs
DC	District Council
Ecan	Environment Canterbury (Canterbury Regional Council)
ha	hectare
Hapū	subgroup of the main tribe, extended family group with a common ancestor
HBRC	Hawke's Bay Regional Council
HDC	Hurunui District Council
Hui	a meeting or gathering together of people
IPCC	Intergovernmental Panel on Climate Change
Iwi	tribal group
Kaitiakitanga	traditional guardianship – the active protection and responsibility for natural and physical resources by tangata whenua
Kaiawhina	local Māori social service community and educational workers
LGNZ	Local Government New Zealand
LTCCP	Long Term Council Community Plan
Mana	status or prestige, influence or power to enable purposeful achievement (such as enhancement of wellbeing)
Marae	traditional meeting place, village assembly ground
MAF	Ministry of Agriculture and Fisheries (to 1995), Ministry of Agriculture (1995–1998), Ministry of Agriculture and Forestry (1998-)
NIWA	National Institute of Water and Atmospheric Research
NZSIC	New Zealand Standard Industrial Classification – first published in 1970, revised in 1975 and 1987 and replaced in 1993 by ANZSIC
Pā	fortified village
primary industry	agriculture, forestry, fishing, and mining
Rangatiratanga	chieftainship/sovereignty, self-determination
RMA	Resource Management Act 1991
Rūnanga	an assembly, tribal council
Taiwhenua	land, district, permanent abode
Takiwa	district, space
Tangata whenua	people who belong to a particular place/people of the marae
Tino rangatiratanga	the right of Māori to define for themselves how things should be
Turangawaewae	'place to stand' – the situational identity, through genealogy or association, that provides a home base on the marae and enables a person to say 'I belong'

WDC	Waimakariri District Council
Whānau	family
Whānui	descendants

ANNEX B: DEFINITIONS

Job Ratio An indicator of the concentration of localised jobs in a geographical area. In simple terms, it is the number of jobs located at workplaces in an area divided by the number of employed residents of an area. Where Tij denotes the number of commuting trips from area i to area j, the job ratio is given by:

$$= \frac{\sum_{j=1}^{n} T_{ji}}{\sum_{j=1}^{n} T_{ij}}$$

The NZDep2006 Index of Deprivation was created from data from the 2006 Census of Population and Dwellings. The index describes the deprivation experienced by groups of people in small areas. Nine deprivation variables were used in the construction of the index, reflecting eight dimensions of deprivation. The variables used were the proportions of people: aged 18-64 receiving a means-tested benefit; living in households with income below an income threshold adjusted for household size; not living in own home; aged less than 65 living in a single-parent family; aged 18-64 unemployed; aged 18-64 without any qualifications; living in households below a bedroom occupancy threshold adjusted for household size; with no access to a telephone; and with no access to a car (White *et al* 2008).

Urban areas or All urban	Centres with 1,000 or more people
Main urban areas	Centres with 30,000 or more people
Secondary urban	Centres with 10,000 to <30,000 people
Minor urban areas	Centres with a population of 1,000 to <10,000
Rural centres	Centres of between 300 and 999 people
Rural districts	Areas outside population centres of 300 or more people
Rural areas or All rural	Areas outside population centres of 1,000 or more people
Rural residential	0.5<2 ha
Small holdings	2-8 ha

ANNEX C: MORE ON METHODS

Source of the statistics in Newell's (2011) analysis

The analysis brings together statistics from a wide range of sources using a wide range of assumptions on spatial, ethnicity, employment, industry and other parameters. The statistics presented here integrate various customised tables prepared over more than two decades for Monitoring and Evaluation Research Associates (MERA) by Statistics NZ and published Statistics NZ official released statistics (such as, the 2006 Census Meshblock database, the 'Table builder' system on the Statistics NZ web site, etcetera).

Methodology and caveats on the use of the statistics

All statistics from the Census of Population and Dwellings sources have had the corresponding random rounding, small domain filtering and other confidentialising protocols applied.

Statistical counts should be regarded as estimates only with inconsistencies in the employment, geographic and industry metadata managed as best as is possible with the available statistics for individual censuses.

Time series analysis applies the 2006 geographical definition of the urban-rural typing of area units as close as can be achieved with shifting area unit and mesh-block schemas across the 1981 to 2006 period. An alternative but greatly more difficult approach would have been to use say the 1981 standard classification of rural for 1981 data – but this would introduce a "wild card of changes" in administrative conventions to comparisons of the composition of individual rural communities over time.

The industry jobs time series only crudely resolves differences in the 2001 and 2006 area unit classification. There are historical inconsistencies in the detailed industry classifications and even at industry major division level which at best can only partially be resolved by grouping of industry codes. These discontinuities and inconsistencies are primarily around the transition from NZSIC to ANZSIC systems but also in the transition between ANZSIC93 and the ANZSIC2006 classifications. To work around this, detailed industry categories have been variously aggregated to minimise inconsistencies in classifications over time.

Labour market catchments

Travel to work is used to identify self-contained labour market catchments using the travel to work data in the census. The method isolates relatively self-contained labour market supply/demand commuting clusters representing an association of discrete 'economic' activity job hubs and the residential neighbourhoods of those whose jobs and livelihood are linked to those activity/employment hubs. This method has been used to prepare a 'labour market areas (catchments)' classification of New Zealand as at 1991, 2001 and 2006. This approach is relevant as it explicitly focuses on a concept of 'economic community' which correlates with other concepts of community. Rural New Zealand contains a large number of relatively small and self-contained local labour market catchments.