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Waikato regional economic profile

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Te Kaunihera ā Rohe o Waikato

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Executive summary

This profile provides information so that everyone can have a shared understanding of the economic issues and opportunities facing the Waikato region and can take steps collaboratively to address these. It identifies four regionally important export sectors:

- high value food manufacturing (dairy, meat and other food – aquaculture has growth potential)
- forestry and wood product manufacturing
- high value manufacturing (such as agritech, aviation and materials and equipment manufacturing)
- high value services (such as agriculture, geothermal energy, and information and communications technology).

While the Waikato region makes a reasonable contribution to gross domestic product, national value chains and inputs such as electricity, there is evidence to suggest that the people of the region are not achieving their potential. Indicators such as gross regional product per capita, income and educational attainment are lower than the country as a whole and there are a number of communities with high social deprivation.

In addition, many of the Waikato region's important sectors are closely tied to the resources and waste assimilation services provided by the natural environment. Finite productive land, declining water quality and reliance on finite fossil fuels, for example, mean that neither "business as usual" nor "more of the same" is sustainable. This means that economic growth in the region needs to be considered carefully so that people's wellbeing is uplifted and the natural environment is maintained.

In March 2011 Waikato Regional Council (WRC) adopted a new strategic direction that sees it taking more of a leadership role in regional development[1]. The vision "competing globally, caring locally" recognises that being able to take advantage of global opportunities requires strong local communities with healthy environments.

Critical success factors to achieve this vision are a high quality environment, innovation (including skilled labour), efficient value chains (including transport systems and compliance) and collaborative leadership.

WRC's mission focuses on economic and environmental outcomes. This is supported by WRC adopting a "green growth" approach in July 2012.[2] The mission sets out how it will best add value to the community's and New Zealand's wellbeing and recognises its geographic reach, its intergenerational focus, its business and expertise and its legislative mandate and responsibilities across the four wellbeings.

The Waikato region is not alone in needing to consider how it enhances economic wellbeing. New Zealand's average gross domestic product per capita growth for the last six decades has been lower than all other Organisation for Economic Co-operation and Development (OECD) countries. New Zealand's gross domestic product per capita remains lower than the OECD average and much lower than Australia's.

The present Government's driving goal is to build a more competitive and internationally-focused economy with less debt, more jobs and higher incomes.

The Government considers that a strong economy in turn provides the resources necessary to protect the vulnerable in society, maintain the rule of law, provide high-quality public services, look after the environment, and provide opportunities for young people.

[1] Waikato Regional Council (2011k).
[2] Waikato Regional Council (2012, p. 37).

The Government aims to create an environment that allows businesses to grow, export and create high-value jobs through a Business Growth Agenda that includes a focus on six key inputs to business that the Government directly influences.

This profile considers both the fundamentals and drivers for the Waikato regional economy, drawing on secondary material sourced from a wide range of organisations, and primary data from the Economic Futures Model of the regional economy obtained by WRC. The body is divided into the following chapters:

- Key indicators
- Export sectors
- Infrastructure
- People
- Natural resources
- Institutions
- Iwi
- Business and industry
- Capital
- Innovation system

WRC intends to make available publicly timely information about aspects of the Waikato regional economy on an ongoing basis.

Highlights

The Waikato region is important to the national economy because of its scale and location and its contribution to national export sectors and infrastructure.

At a glance

- Waikato is the fourth-largest regional economy in New Zealand. It accounts for approximately 10 per cent of land area and population and 8.5 per cent of gross domestic product.

- Several sectors are part of national value chains, such as food, forestry and wood product manufacturing, manufacturing and services. The region is an important centre of primary production.

- Waikato's central location between the Auckland, Bay of Plenty, Hawke's Bay, Manawatu-Whanganui and Taranaki regions makes it a nationally significant corridor for infrastructure such as road and rail transport, electricity and natural gas, telecommunications and data.

- Waikato is the most important minerals producing region in New Zealand. Within the region there are important mineral exploration and development operations including coal, aggregates, and gold, sand and limestone.

- Hamilton is the region's "central business district" with concentrations of employment, research, tertiary education and manufacturing. Its industry strengths are inextricably linked to the primary production of the surrounding region, on which it also relies for labour and materials.

- Collaboration is required amongst a broad range of organisations for the country to benefit even more from the opportunities present in the Waikato region. A shared understanding of the region's strengths and opportunities should lead to improved coordination of infrastructure development, regulatory processes, innovation and economic development activities. This will increase the effectiveness and efficiency of these activities and lead to improved economic outcomes.

- WRC plays an important role in enabling regional development. Key infrastructure and productive land are protected through land use and water allocation decisions and flood protection and control works for example. Strategic and integrated planning through instruments like the Regional Policy Statement helps ensure that the productive capability of natural resources is protected. Collectively, these and other actions matter for the wellbeing of both the economy and the environment.

Nationally important sectors

- High value food manufacturing (dairy, meat and other food – aquaculture has growth potential)
- Forestry and wood product manufacturing
- High value manufacturing (such as agritech, aviation and materials and equipment manufacturing)
- High value services (such as agriculture, geothermal energy, and information and communications technology)

- Waikato is New Zealand's most important dairying region, accounting for more than a quarter of milk supply to the country's largest export sector. The vast majority of this is processed and exported.

- Growing, processing and exporting meat and horticultural products is also important in the region.

- A significant proportion of the nationally-important central North Island forestry resource and one of the largest pulp and paper mills are located in the region. Forestry and wood products combined are New Zealand's third largest export sector.

- The region also has strengths in high value manufacturing and services, often related to the primary industries of scale. Examples include agritech, aviation and materials and equipment manufacturing.

- Aquaculture in the Firth of Thames is poised to be an important export sector.

- These sectors are discussed in detail in chapter 3.

Electricity

- Waikato is New Zealand's premier electricity region, generating more electricity than any other single region in the country. The region has almost 40 per cent of installed generation capacity.

- Waikato exports approximately 75 per cent of electricity generated to other regions, predominantly Auckland.

- Almost 60 per cent of electricity produced in the region is from renewable sources.

- 75 per cent of New Zealand's known geothermal resources are located in the Waikato region.

Transport

- Almost a quarter of total national freight movements by land in New Zealand either travel within, to, from, or through the Waikato region (51 million tonnes out of a national total of some 225 million tonnes).

- The Waikato region has more heavy commercial vehicle movements per day than any other region. Heavy vehicle growth rates in the Waikato region are higher than the national average.

- The region contains 16 per cent of the national state highway network (1,740 km).

- There are 329 kilometres of active rail routes in the region, amounting to 8.5 per cent of the national rail network.

- Approximately 16 per cent of New Zealand's rail freight traffic in net tonne kilometres, travelled on lines in the Waikato region. Approximately six million tonnes, nearly 45 per cent of the national total, originated in, had a destination in, or passed through the region.

Minerals

- The Waikato region has the most extensive sub-bituminous coal resources in New Zealand and represents more than one-third of New Zealand's coal output, including about 70 per cent of the coal produced for domestic consumption.

- In 2006 the Waikato region produced the second largest amount of aggregate and industrial minerals, almost seven million tonnes.

- Waikato is also the largest interregional "exporter" of economic aggregate and industrial minerals for roading material. This goes predominantly to Auckland, which "imports" from the Waikato region almost 25 per cent of its needs.

- Mines in Waihi produced 108,000 ounces of gold and 522,129 ounces of silver in 2010.

1 Introduction

1.1 About this profile

Martin (2005) considers that there is a value in identifying regional fundamentals and external economies as primary sources or inputs of regional competitive advantage. He notes that regional competitiveness is probably best seen as an evolving, complex self-reinforcing process, in which outputs themselves become inputs, and thus influence future outputs.[3]

The Ministry of Economic Development[4] created a research framework to measure Auckland's international competitiveness. This framework contains a comprehensive set of indicators that provide an overall picture of Auckland's competitive advantage and distinctiveness. The set of indicators provides an evidence base that reflects the complexity of a city-region system.[5]

This profile uses an analytical framework that draws on both of these models to ensure that it is relevant to the Waikato region. The framework is illustrated by figure 1.

[3] Martin (2005, p. 23).

[4] The Ministry of Business, Innovation and Employment (MBIE) was formed on 1 July 2012, bringing together four separate government agencies into one ministry. These agencies were the Department of Building and Housing, the Ministry of Economic Development, the Department of Labour and the Ministry of Science and Innovation.

[5] Ministry of Business Innovation and Employment New Zealand and Local Government New Zealand (2012, p. 10).

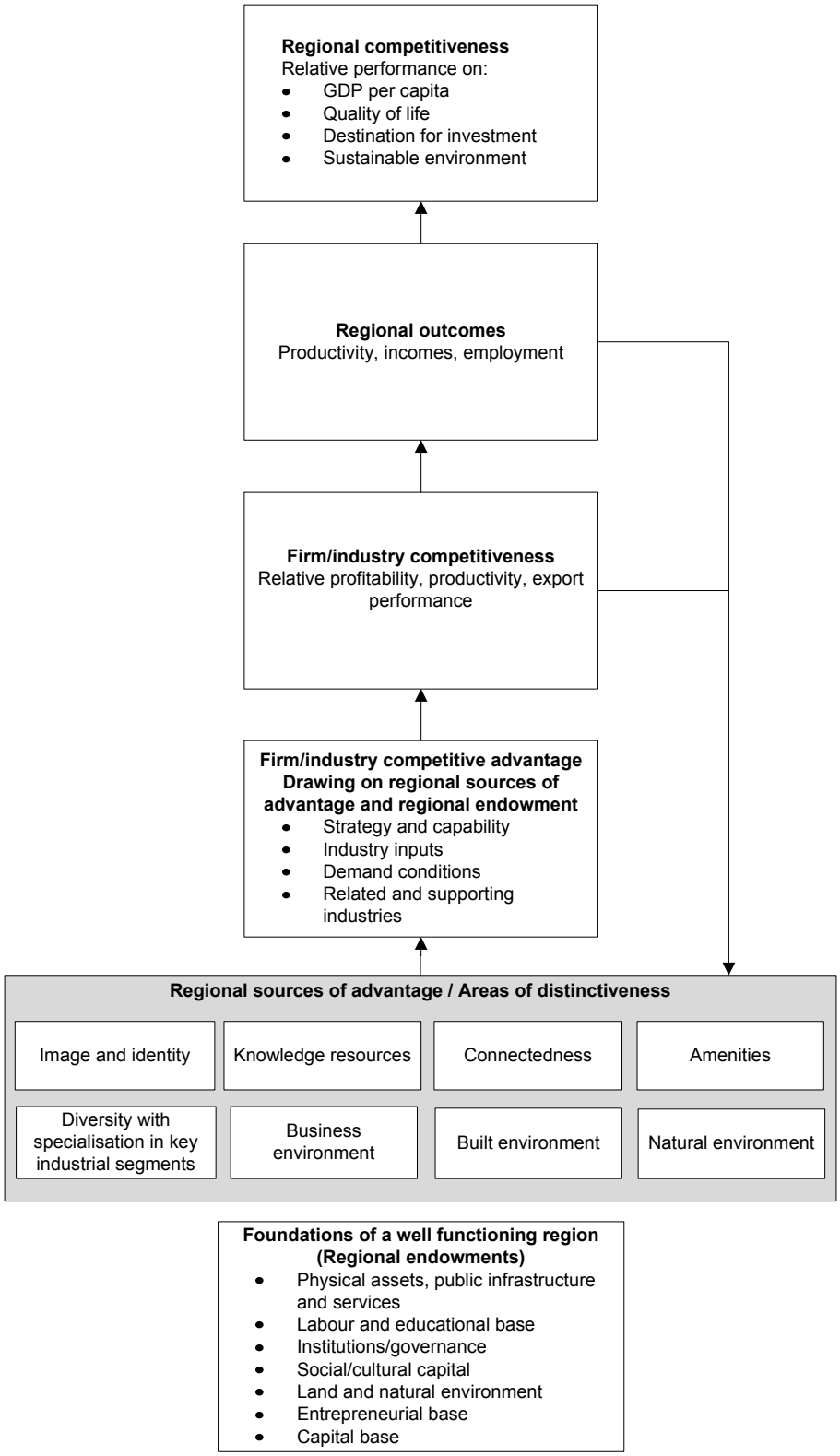


Figure 1: Regional competitiveness as a self-reinforcing process

This profile considers the foundations and areas of distinctiveness of the Waikato regional economy to the extent possible with available information. The body is divided into the following chapters:

- **Key indicators:** this chapter outlines some indicators of the economic wellbeing of people in the Waikato region.
- **Export sectors:** increasing the value of goods and services supplied to customers outside New Zealand is vital to improve the prosperity of people in the region. This chapter discusses those sectors where the Waikato region is already strong, as well as the immediate and emerging opportunities.

- **Infrastructure:** physical networks, principally transport, water, energy and communications are crucial to supporting export-led growth. This chapter describes the state, issues and opportunities for regional infrastructure.
- **People:** The characteristics of the population significantly affect the potential for economic growth. This chapter describes the demographics of the people and communities of the region and the availability of labour and skills.
- **Natural resources:** the Waikato region is endowed with extensive natural resources which provide the foundations for the Waikato economy. This chapter enables a better understanding the current state of these resources, potential constraints and values and their impact on how the economy could grow in future.
- **Institutions:** central and local government institutions set the rules of the game through regulation and can contribute overtly to growth through active support for firms and sectors. This chapter summarises local government economic development activities in the region currently.
- **Iwi:** iwi that have rohe in the region are re-emerging both as part of the governance framework and also as an economic force in their own right. This chapter describes them and some of their economic activities and summarises those Treaty of Waitangi settlements with financial/commercial redress.
- **Business and industry:** firms are the key players in the economy. This chapter discusses the demographics and performance of firms and significant sectors in the region.
- **Capital:** firms gaining access to finance on acceptable terms is crucial for economic development. This chapter describes the sources of finance available for firms at various growth stages.
- **Innovation system:** is vital for sustainable economic development. This chapter describes the education, research and commercialisation sub-system that supports firms to develop new products and processes.

The profile draws on a wide range of informants and secondary sources. Much of the industry-related primary data is drawn from the Economic Futures Model obtained by the Waikato Regional Council (WRC). The Economic Futures Model is based on a multi-regional economic input-output table of commodities flows between industries, constructed using a system of supply and use. The New Zealand commodity-by-industry model was regionalised using the Simple Location Quotient technique and inter-regional trade flows were determined using an optimisation approach. The latest year for which this regional economic data is available is 2007.

Detailed employment data is sourced from the Statistics New Zealand business frame and business demography tables. The latest data available is 2011. Regional household income figures are sourced from the annual income survey (2011), and unemployment figures are available at regional level from the quarterly household labour force survey (2012) but territorial authority break-downs are only available from the 2006 census. Sub-national population characteristics are also sourced from the 2006 census. Statistics New Zealand tourism research and data is available from the Ministry of Business, Innovation and Employment.

1.2 Purpose

The purpose of the regional economic profile is to provide information so that everyone can have a shared understanding of the economic issues and opportunities facing the region and take steps collaboratively to address these. It will therefore be useful to decision makers, analysts, entrepreneurs and students.

The profile will also inform WRC as it determines its next steps to enable regional development. WRC already holds much information about the state of Waikato's environment but relatively little is known about the region's economy. This profile therefore informs WRC's discussions about the relationship between economic and environmental issues, within a broader discussion about its role in contributing to community wellbeing.

WRC identified three flagship goals for the current council term to focus attention on and/or change its approach to these areas of its business, so as to deliver desired outcomes:

- The values of land and water resources are sustained across the Waikato region.
- The people of the region collaborate to achieve a shared vision of the Waikato competing globally, caring locally.
- WRC meets its legislative co-governance requirements with iwi for the Waikato River by working together in good faith and a spirit of cooperation.

The three flagship goals are connected and cut across social, economic, environmental and cultural wellbeing, all groups of activities in the long term plan and functional groups within WRC.

WRC's mission[6] also recognises the linkages between the wellbeings of the Local Government Act 2002 – particularly those between the economy and environment – and the need to ensure that actions today still enable social, economic, environmental and cultural wellbeing to flourish for future generations.[7] WRC contributes to economic wellbeing in a number of ways through its activities:

- Flood protection schemes owned and maintained on the Lower Waikato, Piako River and Waihou Valley in the Waikato region provide a direct protection benefit to 305,000 hectares of farmland.

- Transport planning services under the Land Transport Management Act 2003 and Public Transport Management Act 2008 are important because economic wellbeing is supported by transport infrastructure such as roads, and public transport services that reduce congestion.

- Regulation contributes to a secure operating environment for business and helps achieve the allocative efficiency of natural resources, for example: the Waikato Regional Policy Statement – Geothermal Section and the Waikato Regional Plan Variation 2 – Geothermal Module; and Waikato Regional Plan Variation 6, which will progressively introduce new policies and rules for allocating and using water in the region.

- Strategic collaboration: WRC is part of the Upper North Island Strategic Alliance, a long-term collaboration that also includes the Auckland Council, Bay of Plenty Regional Council, Northland Regional Council, Hamilton City Council, Tauranga City Council and Whangarei District Council for responding to and managing a range of inter-regional and inter-metropolitan issues.

- WRC is actively supporting the work of the Waikato Local Government Forum, which is made up of the WRC Chair and the mayors of the 11 territorial authorities in the Waikato region. The forum is focusing on identifying the potential for efficiencies within local government in the region.

- Information: WRC makes available publicly a wide range of resource and planning information that can assist economic decision-making by firms. There is also demand from territorial authorities, business organisations and the media amongst others for accurate, timely, easy-to-understand information about the regional economy. This profile and subsequent work will contribute to meeting this.

[6] "To provide regional leadership to balance economic and environmental outcomes to enable the social, economic, environmental and cultural wellbeing of current and future generations."
[7] The Local Government Act 2002 Amendment Bill introduced on 30 May 2012 removes reference to these linkages.

The most commonly-used measure of economic progress, gross domestic product (GDP), does not take account of environmental losses or sources of wealth. Tremendous progress has been made in the last 20 years, however, in natural resource accounting, and in developing good social indicators, time use surveys, environmental quality measures, and other means of assessing wellbeing, sustainability, and quality of life. This helped enable three California researchers to develop a genuine progress indicator in 1995, incorporating 26 social, economic, and environmental variables.

The genuine progress indicator nets the positive and negative results of economic growth to examine whether or not it has benefited people overall. The genuine progress indicator is therefore a measure of wellbeing, sustainability and quality of life.[8] The Wellington Regional Strategy uses a genuine progress indicator as a monitoring framework for assessing progress towards the well-being goals of the strategy. The genuine progress indicator is similar to the living standards framework being introduced by the Treasury to assess policy proposals. The framework takes into account how the flow of stocks of financial and physical, natural, social and human capital contribute to improved living standards. WRC has committed to the development of a genuine progress indicator for the region, but this work is not developed enough to inform this profile.

A body of evidence indicates that a "green growth" approach is critical because the Waikato region's economy is closely tied to the resources and waste assimilation services provided by its environment and neither "business as usual" nor "more of the same" is sustainable:

- Three of the region's major industries (livestock and cropping farming, dairy cattle farming and forestry and logging) occupy 83 per cent of the region's productive land.[9]

- The most versatile soils in the Waikato region are found between Hamilton and Cambridge, and around Matamata and Reporoa. However, some of our most versatile soils are being used for urban development, particularly around Hamilton and Cambridge (discussed in chapter 6.4).

- Water is already over-allocated in some catchments and the continued increase in demand for fresh water for irrigation and municipal uses is the main pressure on allocation of the region's fresh water (discussed in chapter 6.6).

- There has been a net deterioration in river water quality across the region. In many cases the deterioration probably results from the widespread and intense use of land for pastoral farming.[10]

- It is predicted that increasing loads of nitrogen and phosphorus entering the Waikato River from larger and more intensively-used areas of farmland will increase the risk of harmful algal blooms occurring over the next few decades.[11]

- It is estimated that two thirds (66.3 per cent) of the total 36,546 terajoules of energy consumed by the Waikato regional economy to the year ending March 2004 was consumed as fossil fuels. Road transport accounted for 15 per cent of all energy consumed, almost all of which was from fossil fuels and dairy product manufacturing consumed 10 per cent – predominantly from fossil fuels.[12] The transport and dairy sectors are therefore particularly vulnerable to both short-term price spikes and a long-term gradual decline in oil supply.

[8] GPI*Atlantic* (2007) The GPI.
[9] Market Economics Ltd (2006b, p. v).
[10] Waikato Regional Council (2010, p. 82).
[11] Waikato Regional Council (2010, p. 82).
[12] Market Economics Ltd (2006b, p. 12).

WRC adopted the concept of green growth in July 2012. Green growth is economic development that has positive environmental outcomes (or at least no negative environmental outcomes). Or put in other words, "green growth means a shift to more sustainable, or greener, ways of operating and developing modern economies".[13]

New Zealand was one of 52 member and associate member countries of the United Nations Economic and Social Commission for Asia and the Pacific that embraced the approach of green growth at the 5th Ministerial Conference on Environment and Development held in Seoul, Republic of Korea in 2005.

The Government announced in January 2011 the establishment of an Advisory Group on Green Growth.[14] The Advisory Group focused on the green growth opportunities and threats that arise under three topics defined in its terms of reference:

- How New Zealand, and in particular government agencies, can help exporters leverage greater value in international markets from our 'clean green' brand.
- Opportunities for smarter use of existing technologies and innovation, as well as greater development and adoption of new technologies (including clean technologies) in our productive sectors.
- Options for our small and medium sized businesses to move to a lower carbon economy while sustaining the desired level of productive growth.[15]

The Advisory Group reported to the government with its considerations in December 2011. The report makes 26 recommendations on policy measures and initiatives. The report states that New Zealand is well positioned for greener growth given its low population, plentiful rainfall, a good wind resource, the large conservation estate and the fact that it has institutions and regulatory frameworks broadly consistent with good environmental stewardship. New Zealand also has good research and monitoring capacity and its Crown Research Institutes and universities have a strong environmental focus.[16]

1.3 Economic wellbeing

1.3.1 National performance

The Waikato region is not alone in needing to consider how it enhances economic wellbeing. New Zealand's average GDP[17] per capita growth for the last six decades has been poorer than all other Organisation for Economic Co-operation and Development (OECD) countries.[18] New Zealand had a relatively high GDP per capita prior to the early 1970s but the United Kingdom's entry to the European Union led to a relative decline until around 1990. New Zealand's GDP per capita is currently lower than the OECD average and much lower than Australia's, as show in figure 2.[19]

[13] Green Growth Advisory Group (2011, p. 2).
[14] New Zealand Government (2011c) Green growth initiative announced.
[15] Ministry of Economic Development (2011b, p. 1).
[16] Green Growth Advisory Group (2011).
[17] This report uses GDP as the primary measure of economic wellbeing because the genuine progress indicator has not yet been developed for the Waikato region.
[18] The Treasury (2011b, p. 13).
[19] Boven et al (2010, p. 2).

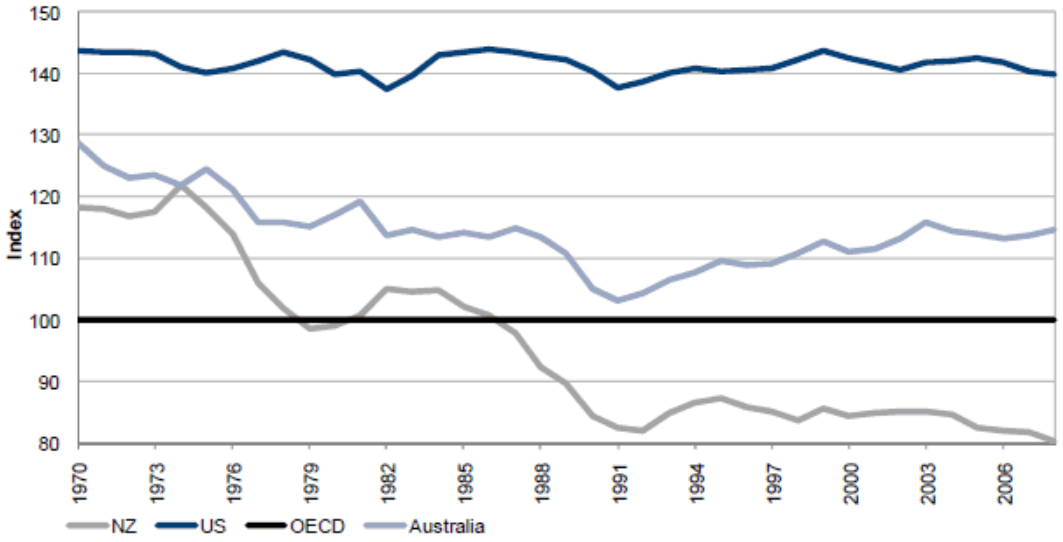


Figure 2: Relative levels of GDP per capita, 1975 to 2009 (OECD average=100)[20]

The main driver of GDP per capita is labour productivity (the economic output per hour worked).[21] The drivers of labour productivity include entrepreneurship, innovation, skills and talent, investment and natural resources.[22] New Zealand has a large labour productivity disadvantage relative to Australia across all major sectors of the private economy, apart from property and rental, as illustrated by figure 3. Importantly the difference in labour productivity between the countries is not driven by one dominant sector. For example, while mining has high productivity in Australia, and requires high value services, it occupies a very small proportion of the workforce so it is not the explanation for Australia's GDP per capita being so much higher than New Zealand's.

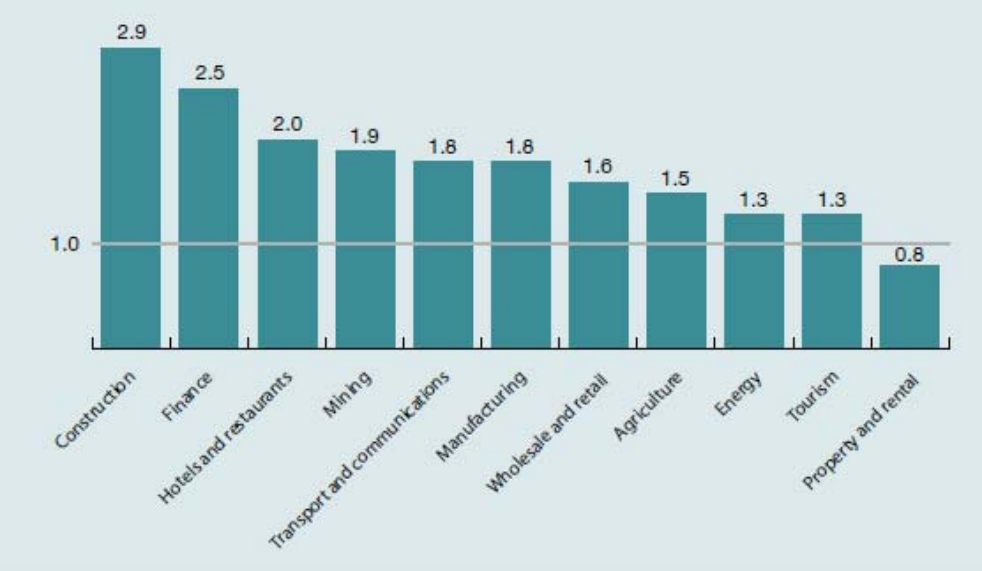


Figure 3: Ratio of labour productivity Australia to New Zealand 2008[23]

Labour productivity is not the only important measure of economic prosperity though. For a small trading nation exports are very important too. New Zealand's exports have grown much more slowly than the OECD average partly because global trade in commodities (where New Zealand exports are concentrated) has grown more slowly than trade in differentiated goods and services, as shown by figure 4.[24]

[20] The Treasury (2011b, p. 13).
[21] Boven et al (2010, p. 2).
[22] Boven et al (2010, p. 15).
[23] Boven et al (2010, p. 16).
[24] Boven et al (2010, p. 2).

Figure 4: Real value of goods and services exports 1971–2007[25]

Note: Index 1970 = 100.

Approximately 31 per cent of GDP comes from exports currently. If this share is to increase to 40 per cent, New Zealand would need to nearly treble the value of its exports, from $60 billion to nearer $150 billion.

1.3.2 Government's Business Growth Agenda

In August 2011, Cabinet noted that a long run decline in New Zealand's international competitiveness was hindering growth, and agreed to refresh the Government's growth strategy with the overarching goal of making New Zealand's economy more competitive.[26]

In March 2012, Cabinet's Economic Growth and Infrastructure Committee noted that the Business Growth Agenda was organised around six key inputs to business that the government directly influences:

- capital markets;
- innovation;
- skilled and safe workplaces;
- resources;
- infrastructure; and
- export markets.[27]

The Government considers that access to these six inputs helps firms become more competitive and internationally connected. New Zealand needs business to sell more high-value goods and services overseas in order to raise living standards.

The Government's Business Growth Agenda includes a focus on:

- increasing business investment in research and development
- improving access to capital for business growth
- supporting the efforts of business to connect internationally
- better aligning our education and training with the needs of businesses
- developing our high-value manufacturing and services industries
- expanding the high-value foods sector, and
- increasing the returns from tourism.

[25] Boven et al (2010, p. 2).
[26] Cabinet Minute of Decision CAB Min (11)31/11 (August 2011).
[27] Cabinet Economic Growth and Infrastructure Committee Minute of Decision EGI Min (12) 3/1 (7 March 2012).

1.4 Regional economic development

1.4.1 International policy trends

There is an opportunity to identify the opportunities and barriers to economic development in Waikato and how this region contributes to national prosperity. In its origins, regional development policy internationally was essentially about the transfer of resources from wealthier regions to lagging regions. The ultimate policy objective was to compensate for regional disparities in employment and other aspects of economic performance in the poorer regions.

Since the late 1990s there has been a new vision for regional policy, conceived as a set of cross-sectoral initiatives supporting a more balanced development pattern on the basis of existing local strengths and assets. This new paradigm has been adopted progressively and regional development policy now increasingly aims to create the conditions for growth in each territory on the basis of local assets, capabilities and economic potentialities.[28] Table 1 sets out the old and new paradigms of regional policy.

Table 1: Old and new paradigms of regional policy[29]

	Old paradigm	New paradigm
Objectives	Compensating temporarily for location disadvantages of lagging regions	Tapping underutilised potential in all regions for enhancing regional competitiveness
Unit of intervention	Administrative units	Functional economic areas
Strategies	Sectoral approach	Integrated development projects
Tools	Subsidies and state aids	Mix of soft and hard capital (capital stock, labour market, business environment, social capital and networks)
Actors	Central government	Different levels of government

Current New Zealand Government policy reflects findings in OECD literature that the driving force behind long-term economic growth is science, technology and innovation in its different forms.[30] There is also a growing recognition internationally of the regional dimension in national innovation strategies in harnessing localised assets and improving policy impacts. The increased relevance of networks and connectivity for innovation also reinforces the importance of regional innovation systems. But regions are not countries and cannot simply replicate national policies at a regional scale. To maximise the impact, and recognise the limits, of innovation policies by, in and for regions, national and regional governments should consider the following areas for policy improvement:

- Acknowledge the diversity of regional economic and innovation profiles;
- Identify the scale and scope for innovation policy in regions by considering:
  1. the institutional context
  2. the regional innovation system, and
  3. the strategic choices made by regions.
- Regions need to adopt more sophisticated policy approaches to become agents of change. To this end, the following four steps are necessary:
  1. Develop a vision and a strategic road map to encourage innovation.
  2. Design a smart policy mix.
  3. Establish multi-level, open and networked governance structures;

[28] OECD (2011, p. 32).
[29] OECD (2011, p. 51).
[30] OECD (2011, p. 18).

4. Foster policy learning through better metrics, evaluation and experimentation.[31]

The emphasis currently is on facilitating more systematic exchange and interaction among key economic actors (firms, research providers, universities etc) because the knowledge system of which they are a part is an important determinant of regional productivity.

Three of the most common categories of measures to build regional economic growth and linkages are:

1. **Real estate based projects**: development of science parks and other industrial spaces designed to facilitate networking and technology development and transfer through "co-location".

2. **Cluster-type policies**: initiatives to support existing or nascent groupings of firms by providing collective services and other measures to build cooperation within the cluster and to enable joint initiatives to export, market, etc.

3. **Linking research and industry**: linking knowledge producers with users in order to promote "systems" of technology and innovation diffusion and better commercialisation of innovation.[32]

1.4.2 New Zealand policy and programmes

Regional development has not been retained as a focus of the Government's Business Growth Agenda, however the current policy reflects aspects of the international paradigm shift, most explicitly in the formation of the New Zealand Food Innovation Network (open-access food development facilities), which capitalises on complementary regional strengths in Auckland, Waikato, Palmerston North and Canterbury.

Regional development last became a focus of New Zealand government attention during the decade after the election of the Labour-led coalition in 1999. The Government's goal for regional development at the time was for "sustainable, inclusive development in each region that sees economic growth that can be maintained over the long term without compromising the environment and which helps to meet the social needs of people"[33].

The Regional Partnerships Programme was established as the Government's principal regional development programme in 2000 and ran for seven years, ceasing in June 2007. The programme's objective was to build the economic capability of New Zealand's regions and it was delivered by New Zealand Trade and Enterprise.

Under the Regional Partnerships Programme, 26 sub-regions were formed and funded to develop regional economic development strategies and to build economic development capability. The Regional Partnerships Programme had three components:

1. **Regional economic development strategy** – funding ($100,000 over three years) for a group of stakeholders within a region to produce an economic development strategy.

2. **Capability building** – funding to develop the necessary expertise in the region to implement the strategy (up to $100,000 per region over 12 months).

[31] OECD (2011, p. 19).
[32] OECD (2005, p. 9).
[33] New Zealand Government (2000, p. 28).

3. **Major regional initiatives** – major projects (up to $2 million over three years) identified in regional strategies as being likely to help contribute to the region's economic growth objectives. They were intended to build on a comparative advantage and would result in increased level and quality of private sector investment; the growth of quality, productive employment; and/or raised revenues and incomes (especially export revenues). They would be public-private initiatives, led by businesses. A minimum regional contribution, in cash or kind, of 25 per cent was also required.

The Regional Strategy Fund was established as part of refreshed policy in July 2007 and the 26 sub-regions were replaced by 14 regions. The regions were encouraged to develop comprehensive regional economic development strategies with input from the Ministry of Economic Development and its strategy development guidelines and to undertake further research to deepen understanding of region specific issues and strategic priorities in order to reflect these findings in the published regional strategy. The Regional Strategy Fund could also support projects that implement the innovation and enterprise aspects of the strategy where these projects are not more appropriately funded by other central government organisations. The Regional Strategy Fund has up to $750,000 available to each region over a three year cycle.

The Regional Strategy Fund was complemented by the Enterprising Partnerships Fund, which could support commercially driven projects that helped to implement the regional strategy. Projects needed to align with national strengths, be of national significance and offer substantial economic development benefits, but were not limited to large-scale projects. For example a mid-sized project with a total cost of $1 million could be supported by up to $700,000 of Enterprising Partnerships Fund funding. The Regional Strategy Fund was discontinued in June 2010.

1.4.3 Waikato experience

Under the former Regional Partnerships Programme, the Waikato region was organised into five sub-regions. These sub-regions were Thames-Coromandel, Central Waikato (which included Hamilton city, Waikato and Waipa districts), King Country (including Waitomo and Ōtorohanga), Taupō and South Waikato.

The five Waikato sub-regions received a total of $11,559,070 under the Regional Partnerships Programme. This consisted of $803,245 for strategy funding, $2,401,775 for capability funding and $8,354,050 for major regional initiatives. Major regional initiatives funded included:

- Waikato Innovation Park (Hamilton) was funded $2 million in 2002
- Aviation Waikato, owned by The Katolyst Group, was funded $2 million in 2005
- The New Zealand Clean Energy Centre (Taupō) was funded $2 million in 2006
- Taupō Motor Sport Park was funded $2 million in 2006, and
- Waihi Heart of Gold Tourism Discovery Centre was funded $1.8 million in 2007.

Waikato Innovation Park was awarded $4 million over 3 years from 2008 from the Enterprising Partnerships Fund. Half of this amount went towards the construction of a new 300m^2 building and the other half was for the support of business development services.

Under the 2007 changes to regional economic development policy, these sub-regions chose to work together as a single region. The region established a governance group[34] and gained funding through the Regional Strategy Fund to develop an

34 The Regional Governance Group consisted of the following people: Philip Burton, (Communications and Promotions Manager, Hamilton City Council [Acting Chair]), John Birch (Director, Central Capital), Jerry Rickman (Chairman, Hamilton International Airport), Chris Williams (CEO, King St Advertising), David Wright (Company Director, Taupo), Mark Townsend (Farming Investor, past Fonterra Director), Steve Perdia (Business Development Manager, WINTEC), Sandra Perry (Economic Development Agencies of New Zealand representative for Waikato/Bay of Plenty, CEO Business Development Centre), Chris Hale (Manager, Hauraki Coromandel Development Group), Amanda Scott (Development Manager, South Waikato District Council), David Hearn (Acting CEO North King

economic development strategy for the whole region and to undertake specific analysis of seven target areas that were considered to be regionally important.

The strategy identified seven economic platforms for the whole region:

- tourism and international events
- information and communications technology/digital
- energy
- specialised manufacturing
- food and beverage – aquaculture, specialty food products and horticulture
- logistics, and
- leadership.[35]

Over the three years the Regional Strategy Fund operated, Waikato completed projects in all identified strategic areas and accessed the full amount of funding available. The Regional Governance Group was disbanded when the Regional Strategy Fund was discontinued. The authors of this profile were unable to identify any evaluations conducted by the Ministry of Economic Development or New Zealand Trade and Enterprise of the effectiveness of these initiatives in meeting the intended outcomes.

Country Development Trust), David Pearks (Waikato Regional Council [Advisor to the Regional Governance Group]).

[35] Kane (2009, p. 4).

2 Key indicators

2.1 Summary

A comprehensive picture of economic wellbeing would ideally be based on a framework that provides an indication of wealth – such as the genuine progress indicator approach. As described in section 1.2, the development of a genuine progress indicator will, in future, provide a more complete picture of economic wellbeing in the region. In the interim, this chapter outlines several key indicators of economic wellbeing in the Waikato region.

Gross regional product is a measure of economic activity that refers to the market value of all final goods and services produced within the region in a given period. **Gross regional product per capita** is calculated to be lower than GDP per capita nationally and export sectors contribute a relatively small proportion of gross regional product and **employment**. **Median weekly household incomes** are lower than the national average despite the level of employment being similar to the country as a whole. There are a number of very deprived communities even though **social deprivation** in the region is only slightly worse than the country as a whole.

2.2 Gross regional product

GDP refers to the market value of all final goods and services produced within a country in a given period. Similarly, gross regional product (GRP) is for a particular region. Waikato GRP was estimated at $14.2 billion in the year ended June 2010.[36] GRP per capita in 2011 is estimated at $40,000, which was lower than GDP per capita nationally at the same time, of $44,000[37].

Industry sector contribution to GRP, or value added, is calculated by subtracting the cost of inputs from the total output of each sector. The largest contribution to GRP in 2011 was from the construction and real estate sector, as illustrated by figure 5. Most of the other large sectors (business services, wholesale and retail trade and health and education) primarily fulfil domestic demand. It is the agriculture and manufacturing sectors which provide income from exports, and these sectors form a relatively small proportion of GRP.

[36] It is problematic to calculate the growth rate because previous estimates were based on an earlier version of the Statistics New Zealand supply-use table. This affects the regionalisation process and therefore earlier figures are not directly comparable.

[37] Statistics New Zealand (2011) Gross Domestic Product and National Population Estimates: June 2011 quarter and National Population Estimates: June 2011 quarter.

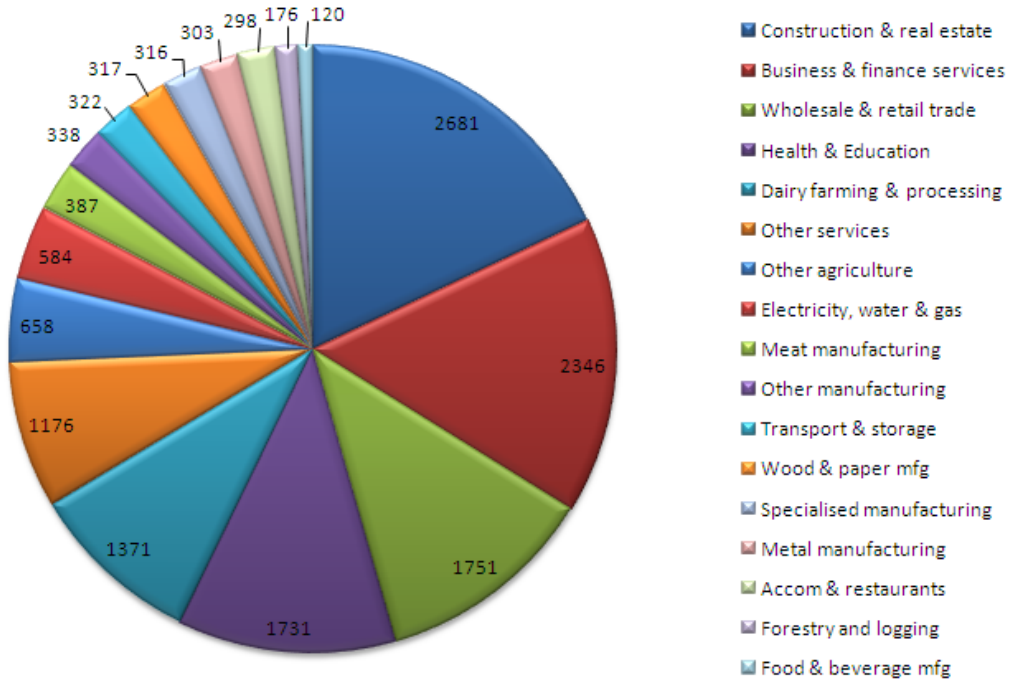


Figure 5: Economic value added by sector in the Waikato region (2011)

Service industries constitute 63 per cent of value-added and 64 per cent of employment but only 36 per cent of international exports. Manufacturing, on the other hand, constitutes 15 per cent of value added and 56 per cent of international exports. Primary industries (agriculture, forestry, fishing and mining) do not add a large amount to GRP, employment or international exports but constitute 74 per cent of interregional exports, as shown in table 2.

Table 2: Output, value-added and exports by sector group (2007)

Sector group	Gross Output	Value Added	International exports	Interregional exports
Primary industries	3,380	1,618	163	3,262
Manufacturing	6,171	1,980	1,341	765
Utilities & construction	4,168	1,382	23	238
Services	13,225	7,946	856	157
Grand Total	**26,943**	**12,928**	**2,383**	**4,422**

2.3 Employment

There were 164,000 employees in the Waikato region in 2011, plus 26,000 owner-operators (modified employment count). Health and Education is the largest sector by employment share, as illustrated by figure 6. Wholesale and retail trade constituted 16 per cent of total employment but only 12 per cent of GRP. Business services on the other hand employed only 13 per cent but added 16 per cent to GRP.

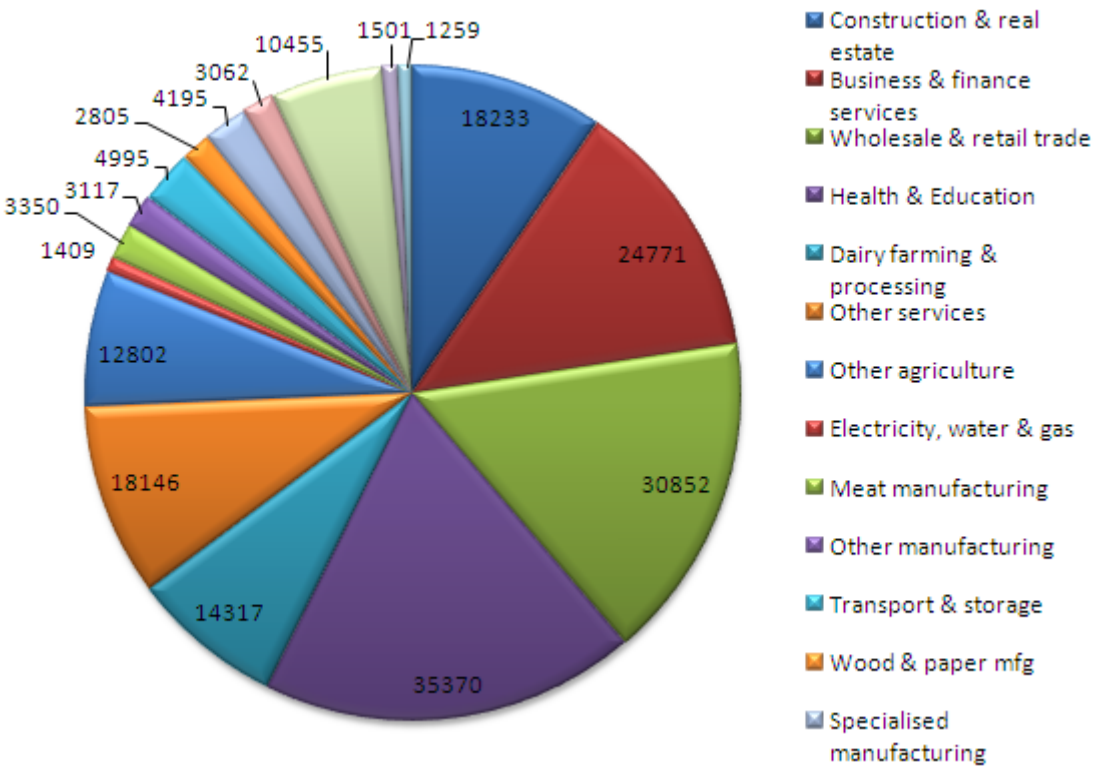


Figure 6: Employment by sector including owner-operators (2011)

2.4 Unemployment

Unemployment rates have tracked fairly closely to the national rate for the past 25 years, with occasional spikes and troughs, as shown in figure 7. This could indicate that the Waikato region is very susceptible to the effect of recessions and periods of high growth or be explicable by events outside normal cycles, e.g. new firm openings and redundancies from firm closures etc. Unemployment in the region has tended to be lower than Auckland but higher than Wellington and Canterbury. In 2012, however, it was lower than only Manawatu-Wanganui and Northland, as illustrated by figure 8.

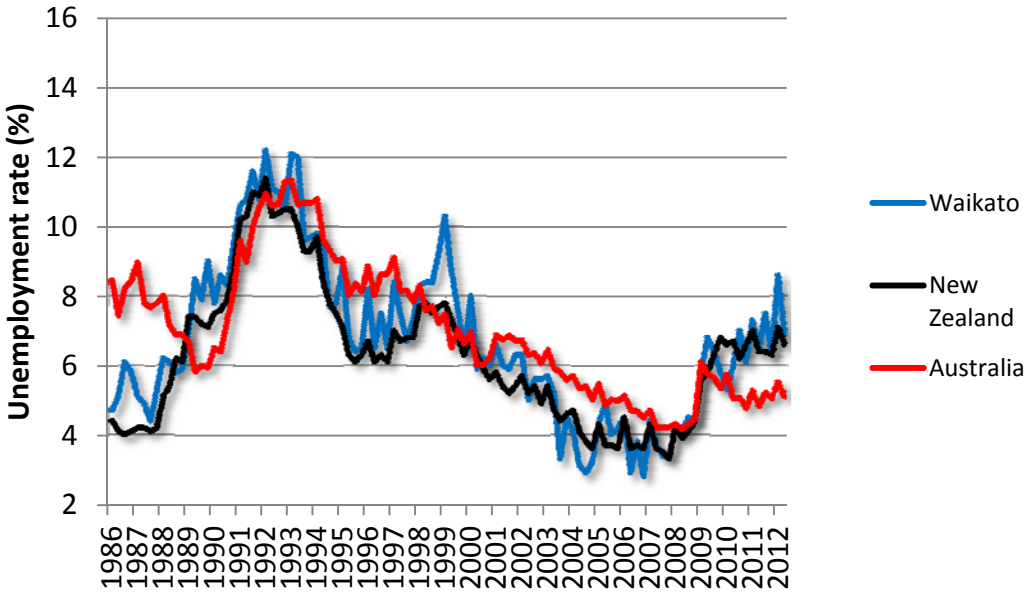


Figure 7: Unemployment rate for Waikato, New Zealand and Australia, 1986 to 2012

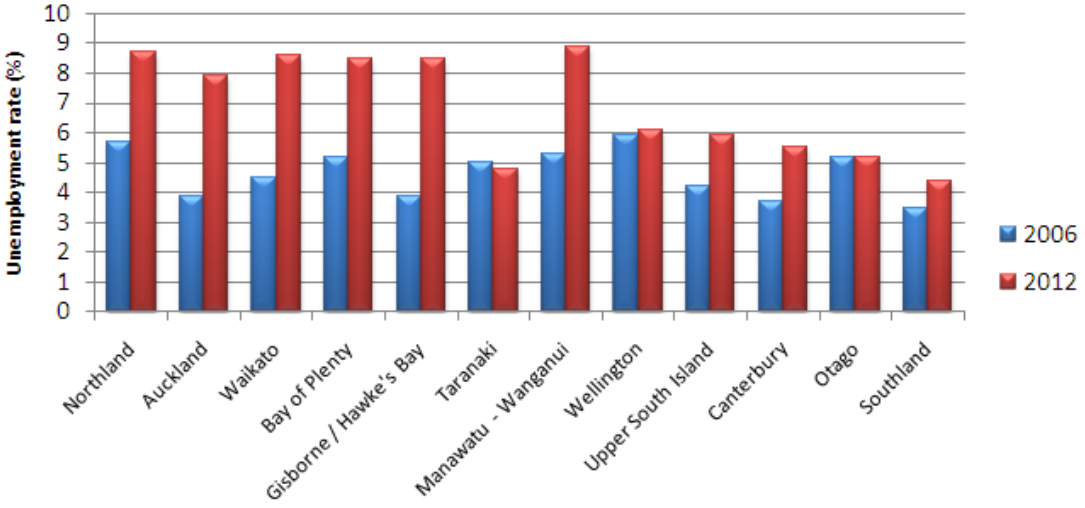


Figure 8: Unemployment by region, 2006 and 2012

2.5 Income

Median weekly household income is lower in the Waikato region than New Zealand as a whole. The Waikato median weekly household income increased from $738 in 1998 to $1189 in 2011, an annual average growth rate of 3.7 per cent. The New Zealand median weekly household income increased from $761 to $1289 or 4.1 per cent per year over the same period, as shown in figure 9.

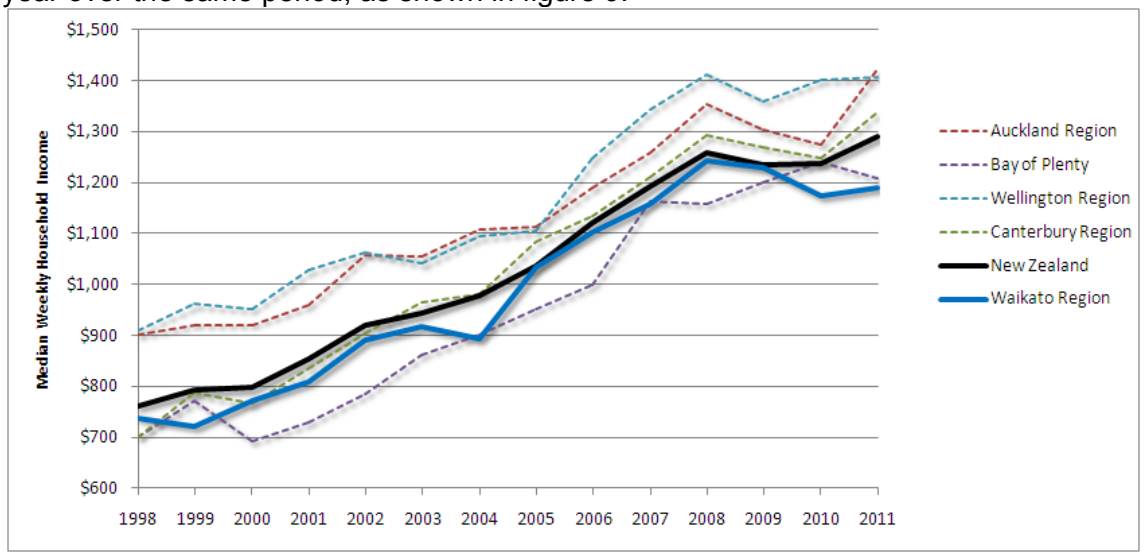


Figure 9: Median weekly household income 1998 to 2011

Auckland region had the highest median weekly household income in 2011 ($1423) and Northland region was the lowest ($1044). Median weekly household income in the Waikato region was higher than only three other regions, as shown in figure 10.

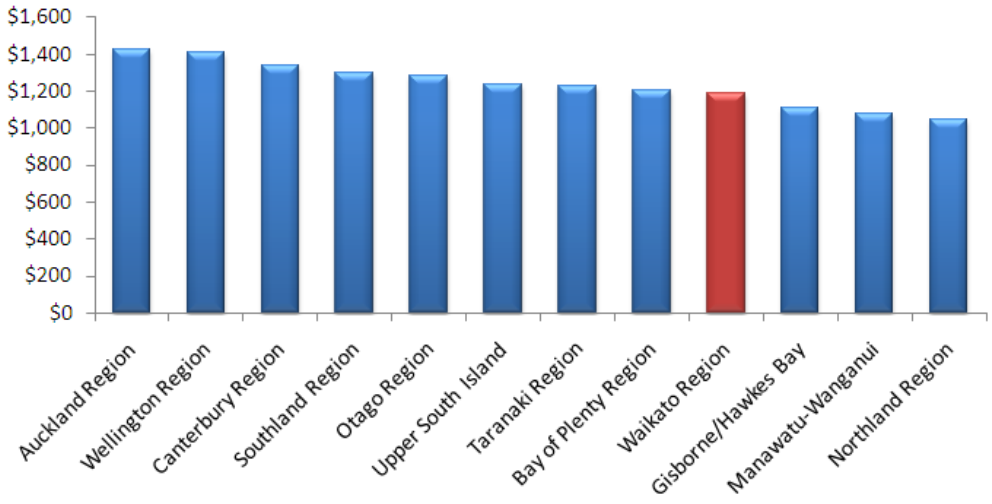


Figure 10: Weekly household income by region (2011)

Waikato region incomes have a narrower distribution than the rest of New Zealand. There are more households in the middle income bands and fewer households with incomes above $150,000 per year, as illustrated by figure 11.

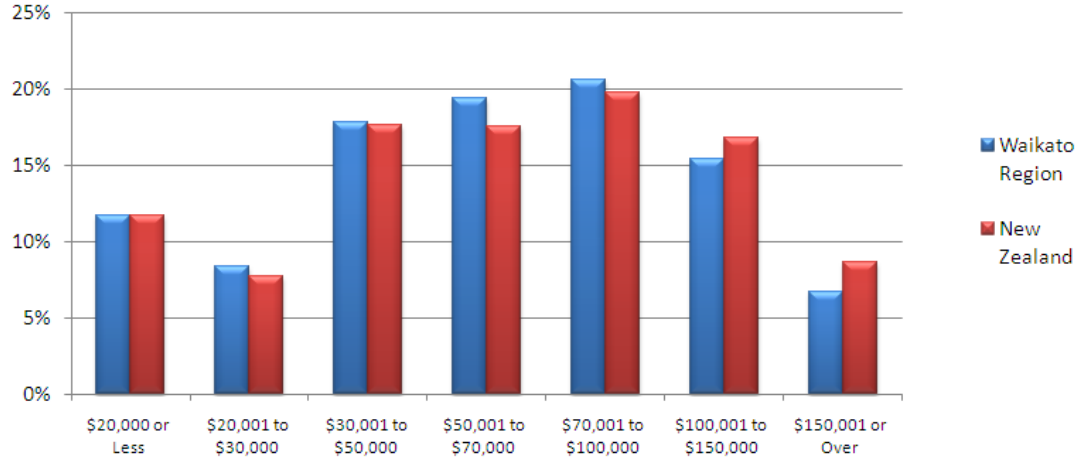


Figure 11: Distribution of Waikato region and New Zealand annual household income (2010)

There is significant variation in incomes between different territorial authorities in the region. Median income by territorial-level data is only available from the 2006 census and is presented in figure 12. The median annual household income for New Zealand was $53,500 in 2006. The small portion of Rotorua district's population which is within the Waikato region is largely comprised of dairy farmers and had the highest median household income ($63,552). Franklin district (now part of Waikato district) was the second highest. Hauraki and Thames-Coromandel district have high proportions of retired residents and single-person households, which may explain the low median incomes. These figures include usual residents only, not owners of holiday homes for example.

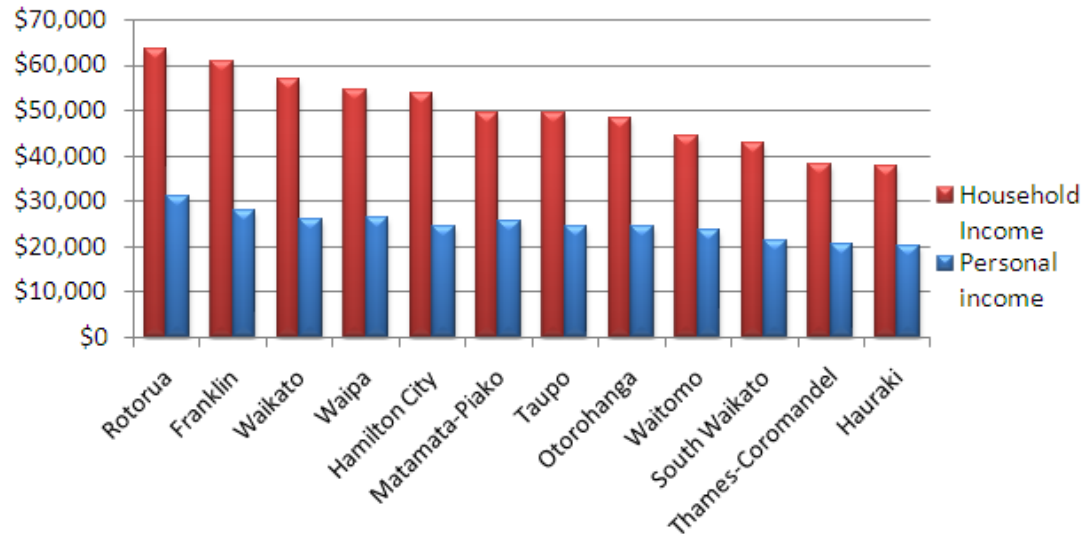


Figure 12: Median household and personal income by territorial authority (2006 Census)

2.6 Social deprivation

The latest New Zealand deprivation index was calculated from the 2006 census and ranges from one (least deprived) to ten (most deprived). At a national level there are equal numbers of households in each of the ten categories but at a sub-national level there can be clusters of high deprivation meshblocks in a region or district. The average deprivation score for New Zealand is 5.5. The most deprived regions are Gisborne (7.2), Northland (6.7) and West Coast (6.2). The least deprived regions are Tasman (4.6), Marlborough (4.8) and Canterbury (4.8). The Waikato average is 5.8, slightly worse than the national average.

There is significant variation in social deprivation within the Waikato region as well, as shown in figure 13. The least deprived territorial authority is Waipa district (4.5) and the most deprived is South Waikato district (7.3).

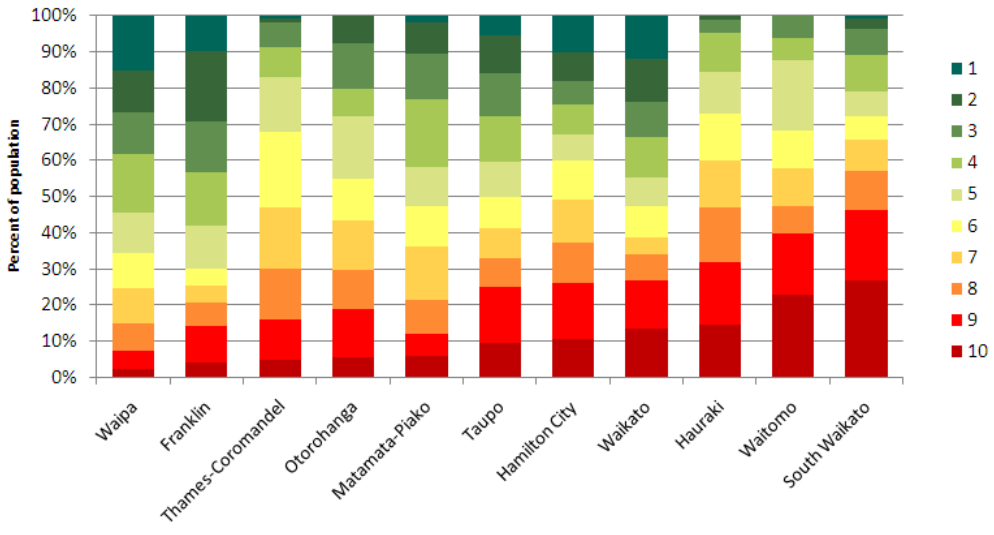


Figure 13: Deprivation by territorial authority

Figures 14 and 15 show deprivation at area-unit level. The least deprived areas tend to be rural areas near Auckland and Hamilton. Smaller urban areas tend to have higher levels of deprivation, although there are high deprivation neighbourhoods in Hamilton and Taupō also.

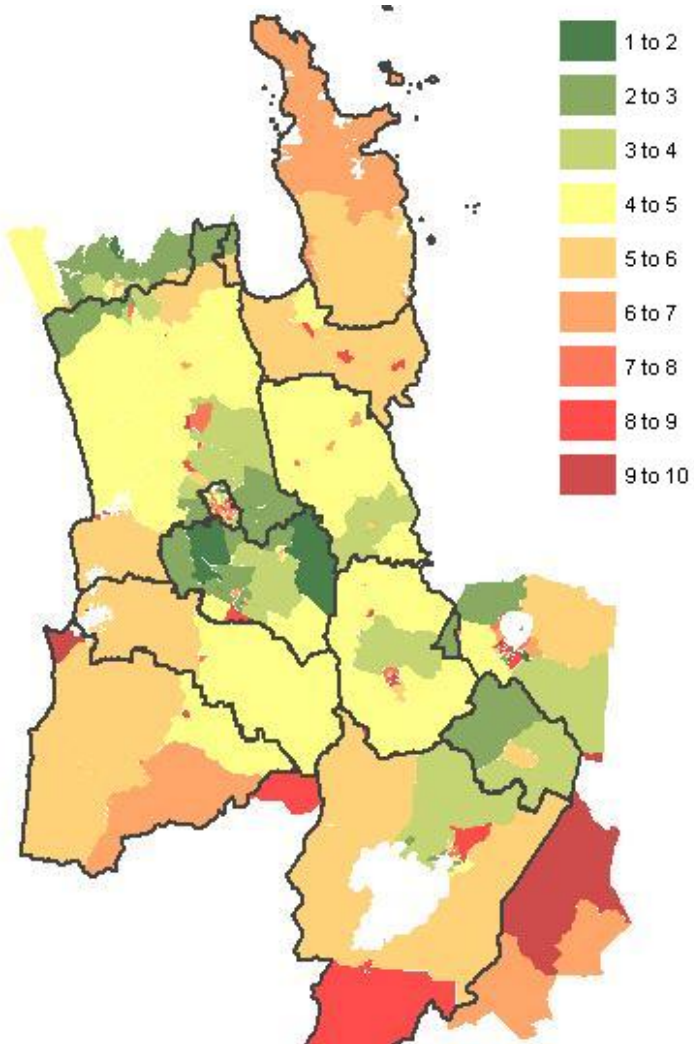


Figure 14: Deprivation by area

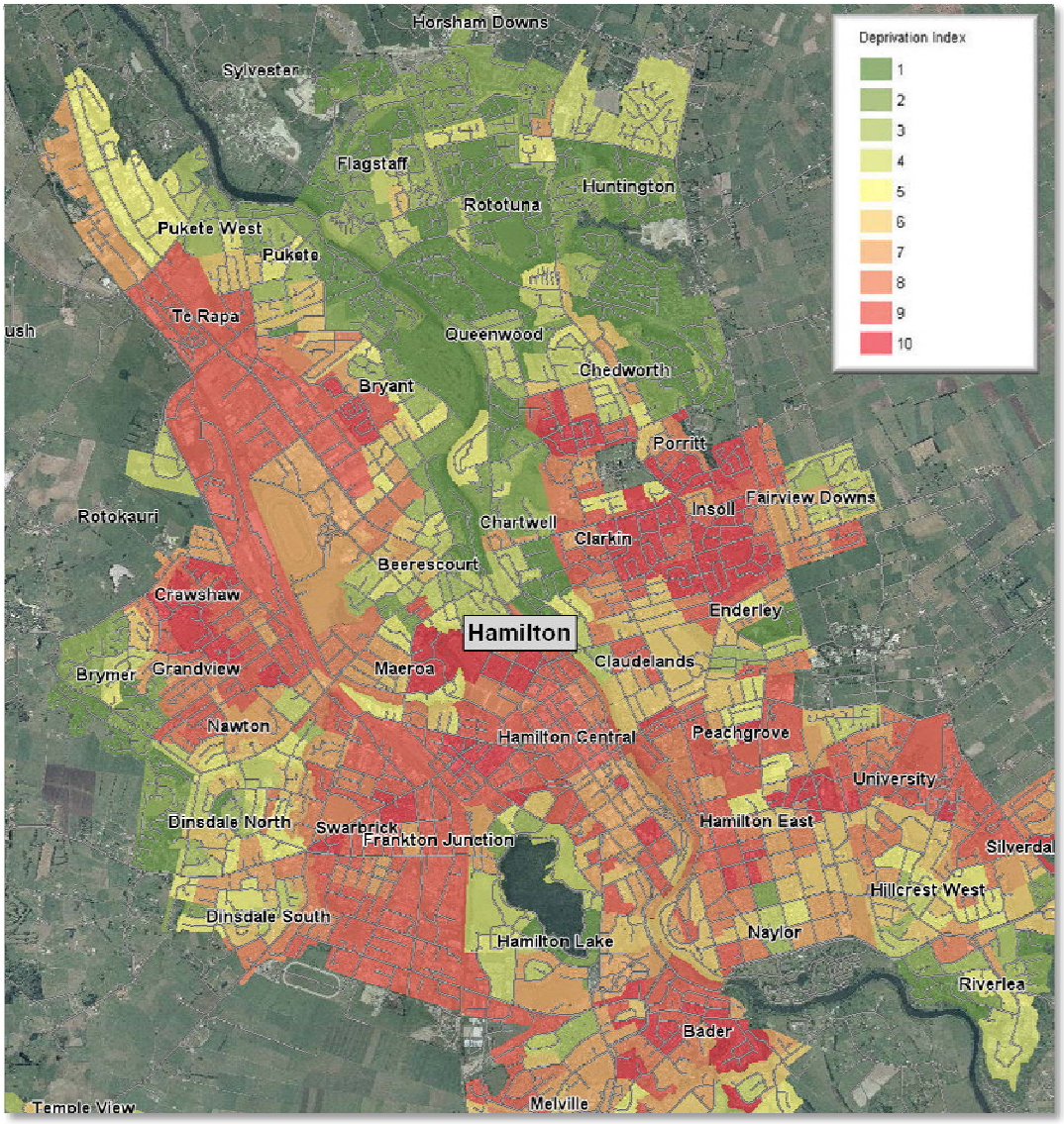


Figure 15: Deprivation in Hamilton city

Environmental (and some social) indicators and trends are reported on the WRC website and in regular technical reports.

3 Export sectors

3.1 Summary

Increasing the value of international exports is important to achieving New Zealand's economic growth objectives and this chapter discusses a number of the Waikato region's export sectors in detail. Dairy cattle farming, livestock and cropping farming and forestry have been identified as making up a significant proportion of the region's productive land use and they provide inputs into high value food manufacturing and wood product manufacturing. They have also contributed to Waikato's strength in high value manufacturing and services. The region's international exports have grown in all of these sectors and it is possible to increase sustainably the value of these exports through innovation because of their relationship to Waikato's education, research and commercialisation strengths. Aquaculture is an emerging sector with some export potential and tourism is part of the strategies of many parts of the region.

3.2 International and inter-regional exports

The value of international exports from the Waikato region in 2007 (the last year for which data are available currently) was $2.383 billion. The largest proportion (39 per cent) came from Hamilton city. The largest exporting industry sectors were dairy product manufacturing (22 per cent), meat products (9 per cent) and wholesale trade (9 per cent), as shown in table 3.

The value of Waikato's inter-regional exports (i.e. to other parts of New Zealand) in 2007 was $4.422 billion. More than 80 per cent of this was dairy products. As approximately 95 per cent of New Zealand's dairy produce is exported rather than consumed by domestic customers[38], it is reasonable to infer that most of this was exported also.

Table 3: Exports from the Waikato region in 2007

Sector group	International exports ($millions)	Interregional exports ($millions)
Dairy products	419	3,564
Wholesale & retail trade	350	23
Meat manufacturing	285	70
Business & finance services	166	21
Equipment manufacturing	148	16
Metal manufacturing	134	16
Wood & paper manufacturing	127	86
Accommodation, restaurants and bars	122	2
Food & beverage manufacturing	118	1
Other agriculture	111	105
Other manufacturing	106	11
Transport & storage	98	6
Other services	89	117
Health & Education	69	60
Forestry and logging	30	158
Electricity, water & gas supply	13	167
Grand Total	**2,383**	**4,422**

[38] International Dairy Federation (2010) NZ dairy statistics.

In addition to dairy products contributing the highest proportion of international exports, this sector also had the highest growth from 2001 to 2007, as illustrated in figure 16. Other sectors that grew strongly over the same period were manufacturing, business services, wood product manufacturing and meat manufacturing.

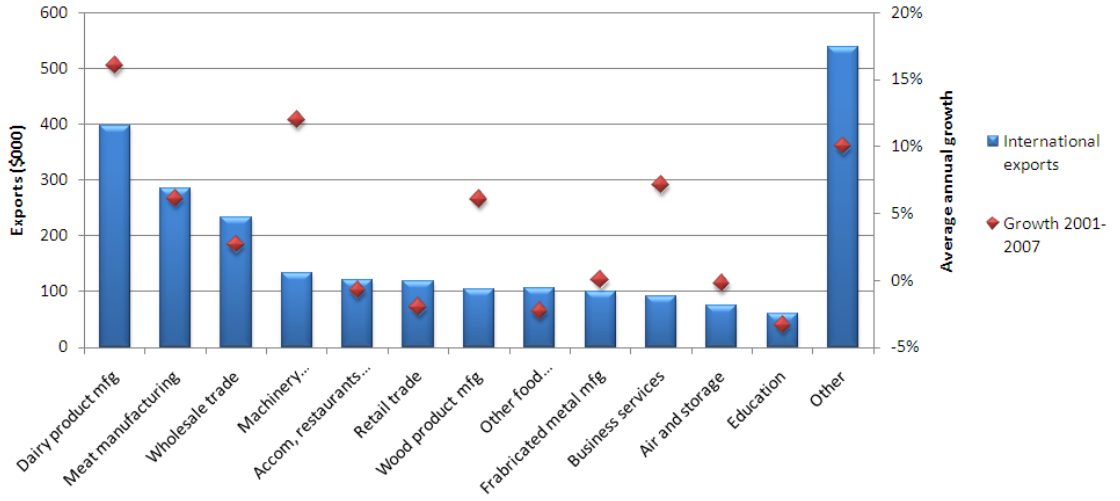


Figure 16: International exports and export growth by sector (2007)

3.3 Export sector analysis

3.3.1 Dairy cattle farming[39]

The New Zealand Dairy Statistics 2010-11 notes that the Waikato region is home to more than 1.26 million dairy cows (27.9 per cent of the total in New Zealand) and more than 3,768 herds (32.1 per cent of the total).[40] Waikato cows produce more than 408 million kg milksolids (26.9 per cent of the total) at an average of 116,257 kg per herd.[41] South Island farms have, on average, higher per herd production than herds in the North Island, with North Canterbury recording the highest average herd production at 285,412 kilograms of milksolids. This reflects a combination of larger herd sizes, a high stocking rate, and high kilograms of milksolids per cow.[42]

Several districts in the Waikato region have significant dairy farming sectors. The Matamata-Piako district contributes a quarter of dairy farming exports as shown in figure 17, followed by Waikato district (17 per cent) and Waipa district (15 per cent).

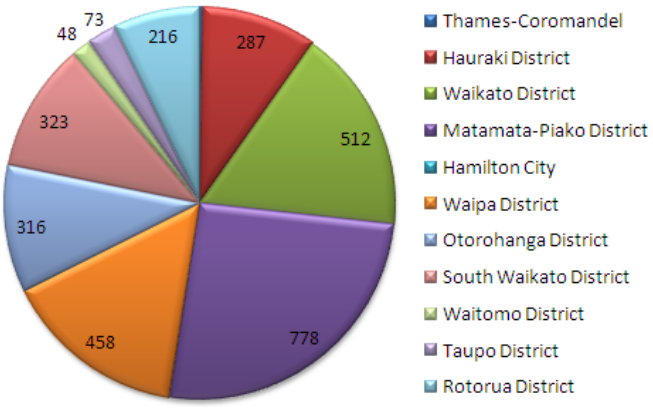


Figure 17: Dairy farming exports[43] by territorial authority ($m 2007)

[39] ANZSIC code A016 in the Statistics New Zealand business frame dataset.
[40] DairyNZ (2011, p.16). This figure excludes herds in the portions of Rotorua and the former Franklin districts within the Waikato region, as data at sub-territorial authority level is not available.
[41] DairyNZ (2011, p.18). This figure excludes herds in the portions of Rotorua and the former Franklin districts within the Waikato region, as data at sub-territorial authority level is not available.
[42] DairyNZ (2011, p.15). This figure excludes herds in the portions of Rotorua and the former Franklin districts within the Waikato region, as data at sub-territorial authority level is not available.
[43] This and subsequent figures include both international and interregional exports.

There were 5,882 dairy farming business units in the Waikato region in 2010. The majority (58 per cent) of these are owner-operated and have no other employees, as shown in figure 18. As dairy farms become more automated, larger herds can be run with fewer staff so dairy farming is unlikely to be a large source of employment growth. However, employment growth may occur in linked sectors such as services to agriculture and dairy processing.

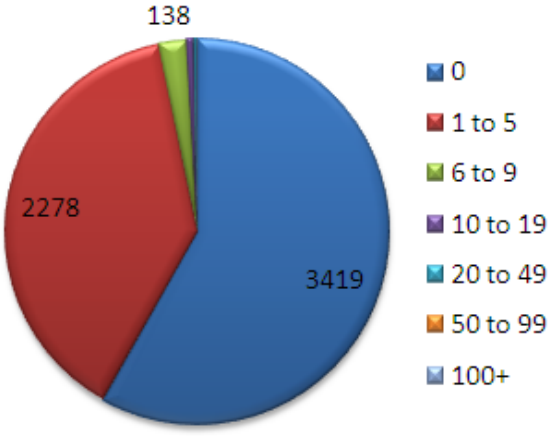


Figure 18: Dairy farming business units by number of employees (2010)

A location quotient measures the relative importance of a sector in a geographic area[44]. Figure 19 shows district-level location quotients and the area-units where people in the dairy cattle farming sector are employed. Note the circles do not represent individual businesses but the total number of employees in the sector in an area-unit. Almost all rural districts except for Thames-Coromandel in the Waikato region have a high location quotient for dairy cattle farming compared with the national average. The highest is in Ōtorohanga district, which does not have the highest absolute number of dairy farming employees but does have the highest proportion of the labour force employed in dairy farming.

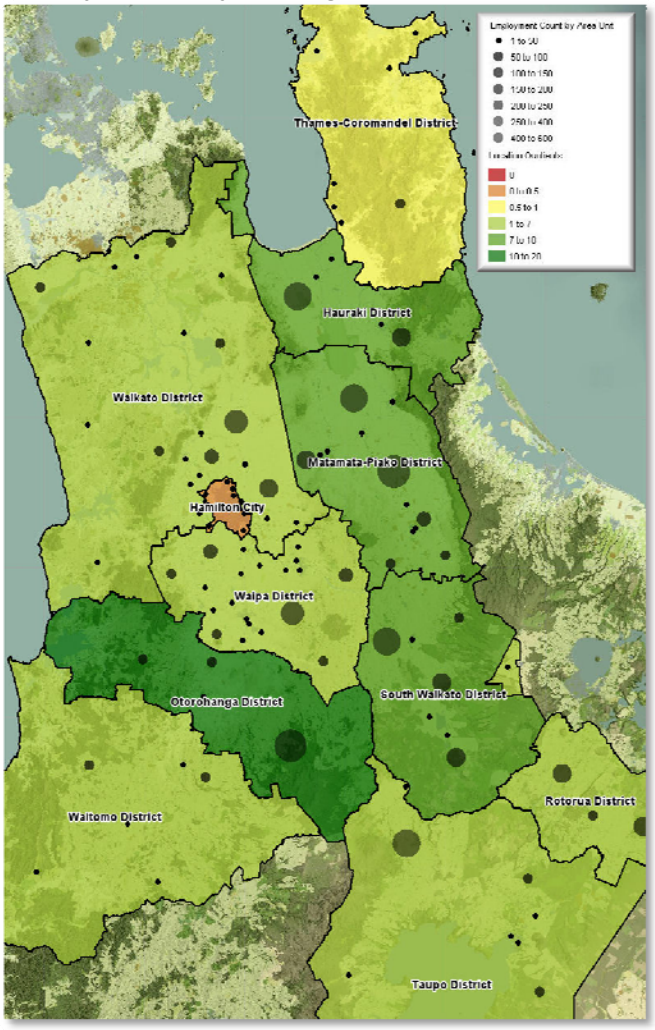


Figure 19: Location quotient and employees – dairy cattle farming

[44] Location quotients are explained in more detail in chapter 9.3.

In May 2009, DairyNZ launched the Strategy for New Zealand Dairy Farming, which guides the investment and activities of the industry until 2020. The strategy has five desired outcomes:

- Increasing farm profitability.
- Talented people are attracted to, and retained by, the industry.
- An internationally competitive milk supply maximises return to farmers.
- Industry reputation enhanced locally and globally.
- Achievement of shared goals through genuine partnership between industry, government and the wider community.[45]

DairyNZ considers that the industry could make an even bigger contribution to New Zealand's economy by earning greater market returns through higher value products and producing more milk to a higher standard, with a lower environmental footprint at a cost-competitive price.

3.3.2 Livestock and cropping farming[46]

There were 515,358 beef cattle in the Waikato region as at June 2011, accounting for approximately 13.4 per cent of New Zealand's total, the third-highest regional total nationally behind Manawatu-Wanganui (593,632 beef cattle) and Canterbury (517,760) according to the Statistics New Zealand Agricultural Production Census. There were also more than 1.8 million sheep (5.9 per cent and the sixth-highest regional total), 76,961 deer (7.1 per cent and the fifth-highest regional total) and 43, 941 pigs (13.4 per cent and the second-highest regional total behind Canterbury, which had 176,693 pigs).

The Waikato region accounted for approximately 5.3 per cent of New Zealand's total horticultural land area in 2007, the seventh-highest region nationally according to the Statistics New Zealand Agricultural Production Census. The major regions were Hawke's Bay, Marlborough, Canterbury and Bay of Plenty. The major crops in the Waikato region were onions (32.2 per cent of area planted nationally), asparagus (22.8 per cent), potatoes (20.1 per cent), berryfruit (13.6 per cent), cucumber (28.9 per cent of square metres indoor nationally), tomatoes (28.4 per cent) and flowers, bulbs etc (15.8 per cent).[47]

Livestock or crop farming directly contributes 1.4 per cent of GRP, 2.5 per cent of employment including owner-operators and 1.3 per cent of exports. A significant proportion of exports of food products originate in this sector. The Waikato and Waitomo districts are the largest producers and exporters of livestock and cropping output, as shown in figure 20.

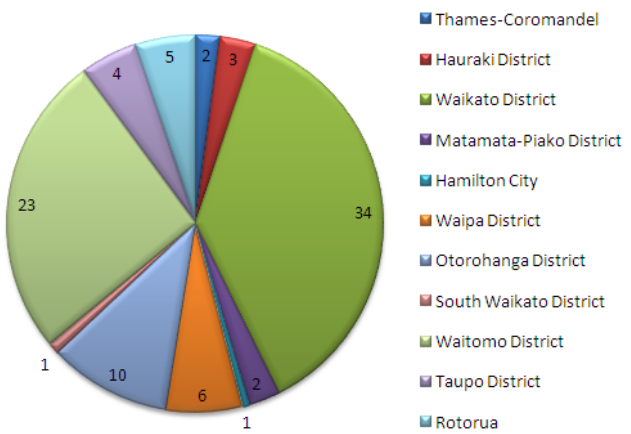


Figure 20: Livestock & cropping exports by territorial authority ($m 2007)

[45] DairyNZ et al (2009, p.5).
[46] Livestock and cropping includes sheep, beef and deer farming, and cropping (ANZSIC codes A014, A015, A018 and A019).
[47] New Zealand Institute for Plant and Food Research Ltd (2011, p26-27).

Livestock and cropping farms are even more likely to be single-operator businesses than dairy farms. Over 80 per cent of livestock and cropping farms have no employees apart from the owner, as shown in figure 21.

Many rural districts in the Waikato region have a high location quotient for livestock and cropping businesses compared with the national average, as illustrated in figure 22. The highest is in Waitomo district, which does not have the highest absolute number of livestock and cropping farming employees but does have the highest proportion of the labour force employed in livestock and cropping farming.

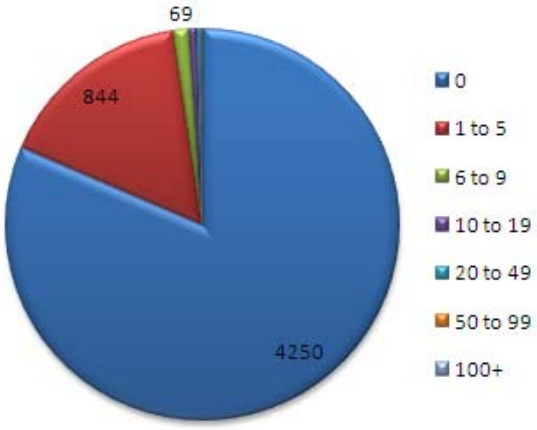


Figure 21: Livestock & cropping business units by number of employees (2010)

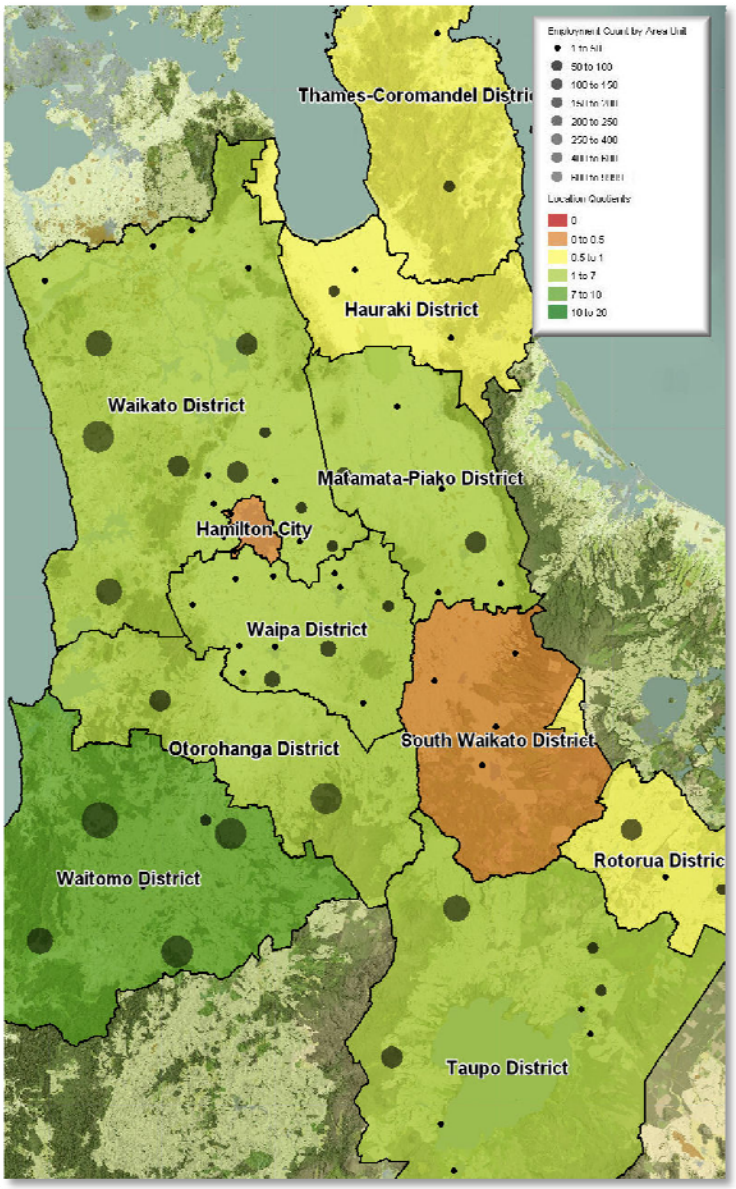


Figure 22: Location quotient and employees – livestock and cropping

New Zealand exported $716.9 million of wool, $787.6 million of other animal products such as hides and skins, crude animal materials and tallow[48] and $704.1 million of processed animal products such as leather and dressed skins and meat meal and animal feeds in 2011.[49] Although profitability has increased recently, the red meat sector is fragmented and faces threats from competing land uses, declining stock numbers and lack of coordination between suppliers and processors.[50] Developed with input from both suppliers and processors, the Red Meat Sector Strategy focuses on three core strategic themes and associated high-level actions the sector needs to consider to be successful[51], as illustrated in table 4.

Table 4: Red Meat Sector Strategy themes and activities

Core strategy themes	High level activities
Coordinated in-market behaviour	Creating a strong brand position in premium markets
	Acting with scale through greater coordination of exports in target markets
Efficient and aligned procurement	Shifting the focus of competition from the "farm gate" to offshore competitors
	Ensuring suppliers are receiving a fair and sustainable reward for their performance
	Increasing transparency of information
Sector best practice	Improving productivity at all stages in the supply/value chain
	Enabling a "single voice" to provide clear leadership
	Creating a strategy coordination group able to support sector initiatives
	Developing New Zealand's farming systems
	Selling the New Zealand story

New Zealand exported $2.2 billion of horticultural and arable products in 2011, mostly fresh fruit and vegetables.[52] The horticulture growth strategy "Growing a New Future" was commissioned by Horticulture New Zealand and developed in 2009 through engagement with the wider industry. The strategy seeks to grow industry revenue from NZ$4.2 billion revenue to NZ$10 billion by 2020.[53] The four outcomes, the strategic actions required to achieve the outcomes (the 6 hexagons around the core) and the environmental factors which are enablers or impediments to the achievement of the vision are shown in figure 23.

[48] Beef and Lamb New Zealand Inc (2012, p. 19).
[49] Beef and Lamb New Zealand Inc (2012, p. p20).
[50] Deloitte (2011, p. 8).
[51] Deloitte (2011, p. 8).
[52] Beef and Lamb New Zealand Inc (2012, p. 20).
[53] Horticulture New Zealand (2009, p. 9).

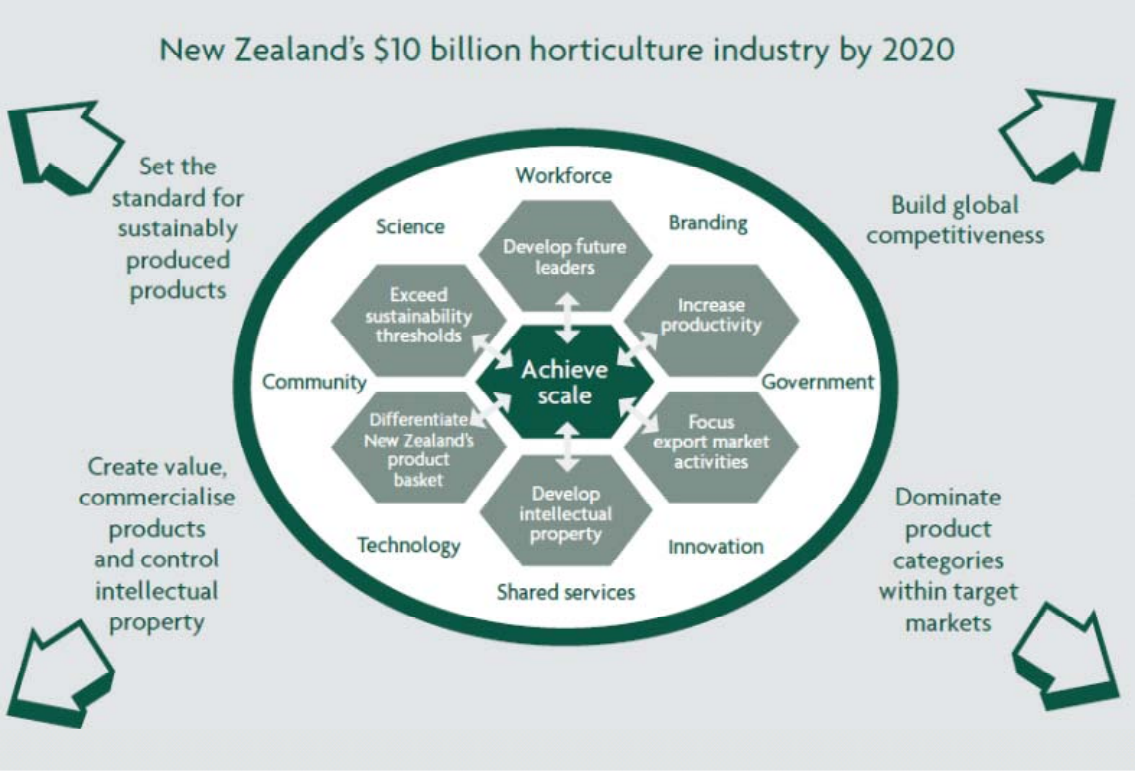


Figure 23: Diagram of horticulture growth strategy[54]

3.3.3 High value food manufacturing[55]

A number of major food manufacturers are located in the Waikato region, including:

- Fonterra: the world's largest dairy exporter was formed in 2001 following the merger of the New Zealand Dairy Board, Kiwi Co-operative Dairies of Taranaki and the Waikato-based New Zealand Dairy Group. Its Waikato sites (Canpac, Hautapu, Lichfield, Morrinsville, Reporoa, Te Awamutu, Te Rapa, Tirau and Waitoa) make a wide range of products. These are products such as skim milk and whole milk powders, cream, butter and canned butter, cheese, cream cheese, casein, whey protein concentrate, hydrolysate, lactoferrin, milk protein concentrate and lactose, caseinate, lactic casein, lactalbumin, nutritional and infant powders, cheese powder and complex lipid powder.[56]

- Tatua Co-operative Dairy Company: the oldest independent dairy company in New Zealand operates a factory at Tatuanui. Tatua's business focuses on six key areas: dairy ingredients, specialty nutritionals, flavour ingredients, bionutrients, foodservice and consumer products.[57]

- Open Country Dairy: was formed in 2001 and its cheese plant at Waharoa, commenced production in September 2004. The site was further developed by adding a whey plant in 2006, an Anhydrous Milk Fat Plant in 2007 and a whole milk powder plant in 2008.[58]

- Silver Fern Farms: was known as Primary Producers Co-operative Society until 2008. Its Te Aroha plant processes beef and its Paeroa plant processes veal.

- Greenlea Premier Meats: operating since 1993, exports beef from its processing plants in Hamilton and Morrinsville.[59]

[54] Horticulture New Zealand (2009, 8).
[55] Food manufacturing includes dairy, meat and other food and beverage products (ANZSIC codes C11 and C12).
[56] Fonterra (2012) Fonterra in New Zealand.
[57] Tatua Co-operative Dairy Company Ltd (2012) Location.
[58] Open Country Dairy Ltd (2012) About Open Country.
[59] Greenlea Premier Meats (2012) Quality meat processing & export meat company.

- Wallace Meats: is a subsidiary of Wallace Corporation, with beef processing plants at Thames and Waitoa.[60]

- AFFCO: this meat company began operations in 1904. It operates a slaughtering and processing facility and rendering plant at Horotiu.[61]

- Prolife Foods: was founded in 1984 and its head office is located in Hamilton. Its product range includes nuts, dried fruits, muesli bars, cereals, grains, chocolates, confectionery and more.[62]

Figure 24 illustrates exports of the food manufacturing sectors from the Waikato region. These sectors make up 33 per cent of international exports and 14 per cent of interregional exports from the Waikato region. Hamilton city produces 20 per cent of the output value but a third of food exports. Matamata-Piako district is the second largest food product producer with 26 per cent of exports, and Waipa district is third with 14 per cent.

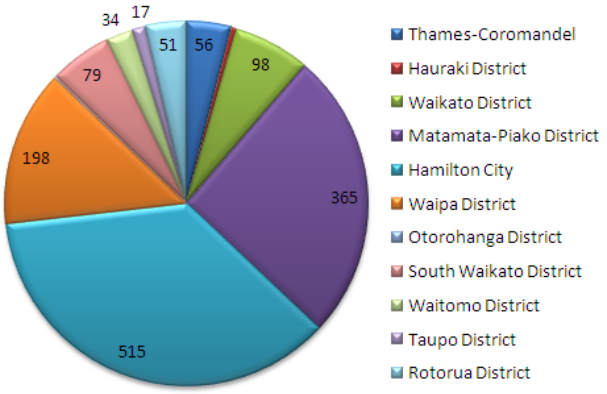


Figure 24: Food product exports by territorial authority ($m 2007)

There are many small-scale food manufacturing businesses in the Waikato region with five or fewer employees, as illustrated by figure 25. But there are also 20 businesses with more than a hundred employees. Of the 7,500 employees in food and beverage manufacturing, 70 per cent are employed by the largest 20 business units. The average number of employees per business unit is 25.

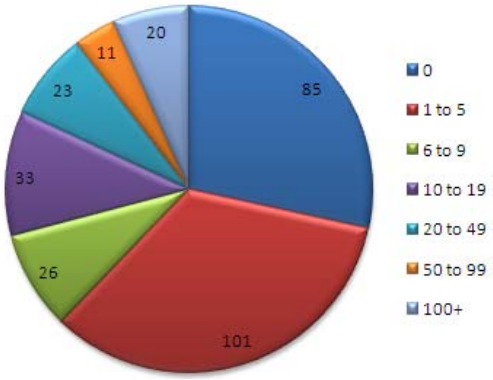


Figure 25: Food manufacturing business units by number of employees (2010)

[60] Ministry of Economic Development (2012e) Wallace Corporation Ltd.
[61] AFFCO New Zealand (2010) Horotiu – ME23.
[62] Prolife Foods Ltd (2012) Home.

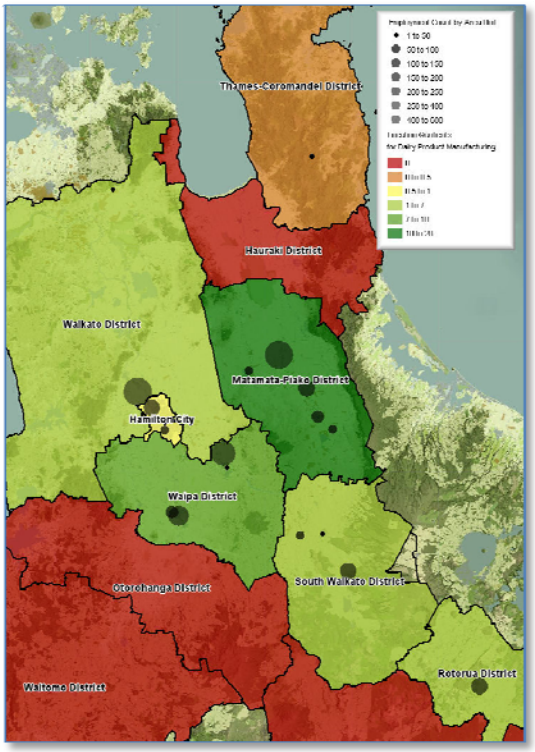


Figure 26: Location quotient and employees – dairy product manufacturing

Dairy product manufacturing is more tightly clustered than dairy farming and occurs in only 19 out of the 200 area-units in the Waikato region.

Matamata-Piako district has the highest number of dairy manufacturing employees (1,060) and the highest proportion of the labour force employed in dairy manufacturing (8.2 per cent), as shown in figure 26.

Meat product manufacturing is also limited to a small number of sites throughout the region, as shown in figure 27.

Matamata-Piako district has the largest number of employees (1,560) and the highest location quotient is Waitomo district, where 15.7 per cent of the labour force is employed in meat manufacturing.

Excluding dairy and meat product manufacturing, food and beverage manufacturing has a relatively low location quotient in the Waikato region, as shown in figures 28 and 29. It is, however, a more significant industry in Thames-Coromandel district, particularly in Whitianga. The majority of food manufacturing in Thames-Coromandel is seafood-related, and some small scale bakery operations.

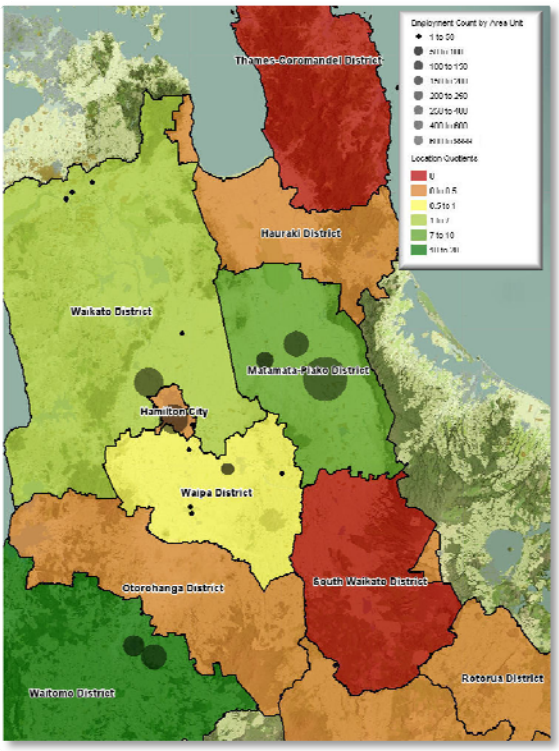


Figure 27: Location quotient and employees – meat product manufacturing

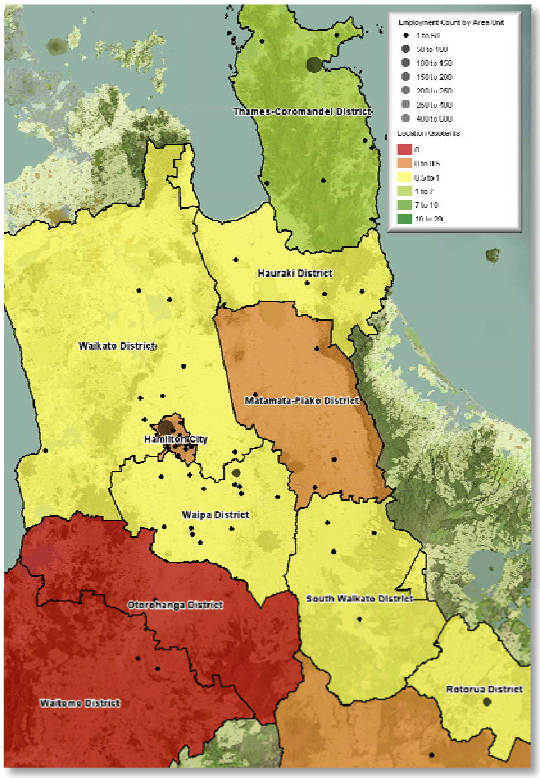


Figure 28: Location quotient and employees – other food & beverage manufacturing

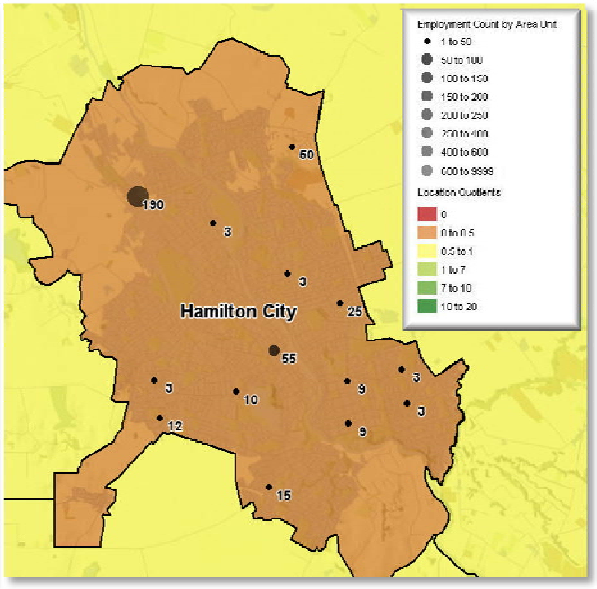


Figure 29: Location quotient and employees – Hamilton other food & beverage manufacturing

The Waikato region makes a significant contribution to national food exports and is a key centre of food innovation. New Zealand exported $12.1 billion of dairy products, $5.6 billion of meat (mostly lamb, beef and veal) and $2.1 billion of wine in 2011.[63] New Zealand's exports of processed foods excluding these sectors experienced strong compound annual growth of 18 per cent from 2000 onwards and accounted for $2.1 billion of exports in 2010. The Government wants to encourage food product manufacturers to create more value from their products to more than double this export figure by 2020.[64]

The Government is spending up to $21 million to establish a network of open-access food development facilities across the country.[65] This will help small and medium sized firms access the facilities that allow them to develop, test and prove new products. The New Zealand Food Innovation Network consists of four centres around New Zealand, each with a different and complementary focus. Each centre also offers facilities and/or business support for businesses in the food industry.[66]

New Zealand Food Innovation (Waikato) Ltd (NZFIW) is the regional component of the network, located at and 100 per cent owned by the Waikato Innovation Park (discussed in chapter 11.4.3). The first stage is an independent development dairy processing facility and the focus will expand to meat at a later stage. The facility is a multi-purpose, New Zealand Food Safety Authority export certified, nominal ½ tonne/hr powder spray drying facility. The centre is operated as a contract manufacturer and became commissioned and operational in July 2012.[67]

[63] Beef and Lamb New Zealand Inc (2012, p.19-20).
[64] New Zealand Government (2010) New $21 million food innovation network.
[65] New Zealand Government (2010) New $21 million food innovation network.
[66] Innovation Waikato Ltd (2011c) NZ Food Innovation (Waikato) Ltd.
[67] Innovation Waikato Ltd (2011c) NZ Food Innovation (Waikato) Ltd.

3.3.4 High value manufacturing[68]

Although the Waikato region lacks a large and concentrated labour force, it is home to a number of successful, internationally-connected manufacturers. Many of them reflect the relationship with our primary industries in their origins, which they have used as the foundation for innovation and growth. Established firms include:

- The Gallagher Group comprises a number of highly successful companies including Gallagher Animal Management Systems, Gallagher Security Management Systems, PEC Fuel Pumps and Electronic Services, Sunplas Engineering and Gallagher Plastics. The group markets systems and products through a distribution network in more than 130 countries.[69]

- NDA Group leads the world in the fabrication of stainless steel process vessels and heat exchangers for industry and other specialist products for key markets. The group's high precision manufacturing capability and commitment to global service excellence have given it a foothold in the USA, Asia and Australasia. Companies within the group design, manufacture and service products for a wide range of process industries including dairy, wine, brewing, chemical mining, pulp and paper and pharmaceutical. NDA was established in 1894 as a co-operative to supply vats to the dairy industry.[70]

- Pacific Aerospace Corporation (PAC) is the second largest aircraft manufacturer in the Southern Hemisphere and has more than 50 years experience designing and manufacturing aircraft for international markets. The company has manufactured 1000 aircraft ranging from agricultural aircraft to military trainers. PAC has grown to more than 160 staff and is vertically integrated from aircraft design and certification, machining and forming of metal and composite components through to the assembly of the aircraft and its systems and test flights.[71]

Firms like these have also formed collaborative networks for the development of their industries as a whole, such as:

- **Aviation Industry Cluster**. Based in the Waikato, the cluster has 55 members and aims to position New Zealand as a global leader in light aircraft design, modelling, prototyping, certification and production.[72] A specialist aviation paint facility was opened near Hamilton International Airport in May 2012 and 26 new aircraft related designs are in different stages of development.[73]

- **AgBio New Zealand Cluster**. The Waikato Innovation Park, in partnership with James & Wells, coordinates events and activities for AgBio New Zealand – a cluster initiative made up of companies in the biotechnology, agricultural technology and agricultural science industries, as illustrated by figure 30. AgBio NZ was formed in 2002, with initial support from the Hamilton City Council. The Waikato Innovation Park took over management of the cluster in 2005 and has kept in close contact with cluster members, working on several commercial ventures together.[74]

[68] Manufacturing includes clothing, rubber products, fabricated metal products, furniture, equipment and machinery (ANZSIC codes C13, C19, C22, C23, C24 and C25).
[69] Opportunity Hamilton (2011, p. 17).
[70] Opportunity Hamilton (2011, p. 19).
[71] Opportunity Hamilton (2011, p. 15).
[72] Aviation Industry Cluster (2011) About us.
[73] Opportunity Hamilton (2011, p. 14).
[74] Innovation Waikato Ltd (2011a) AgBio Cluster.

Figure 30: AgBio New Zealand products and services

Manufacturing tends to require access to specialised labour, infrastructure and a variety of services and therefore tends to locate in or near areas of high economic density. Almost two-thirds of exports from these manufacturing sectors are produced in Hamilton city, with small amounts in other districts, as shown in figure 31.

Manufacturing in the Waikato region is dominated by small firms, as illustrated by figure 32. The average number of employees per business unit is 5.2. This presents a challenge to economic growth because it is larger firms which tend to start exporting internationally. Smaller firms may lack economies of scale and specialised skills required to compete internationally.

There are many small manufacturing operations around the region, as shown in figures 33 and 34. The majority of manufacturing employees are in Hamilton city (4,830). Matamata-Piako district also has a relatively high location quotient, particularly in machinery and chemical manufacturing.

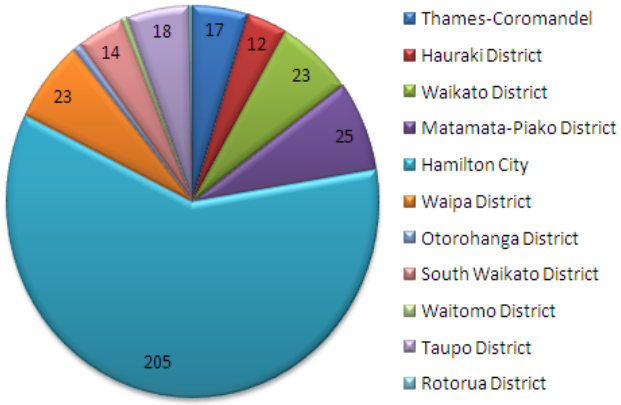


Figure 31: Manufacturing exports by territorial authority ($m 2007)

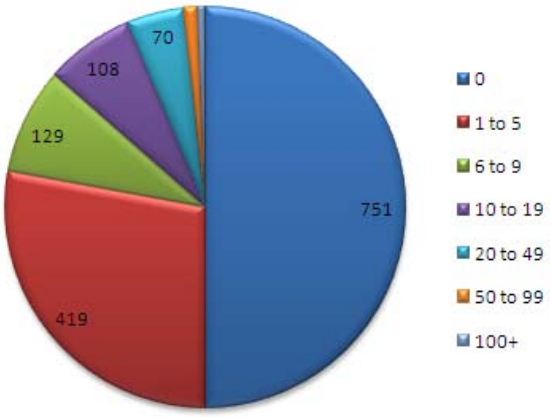


Figure 32: Manufacturing business units by number of employees (2010)

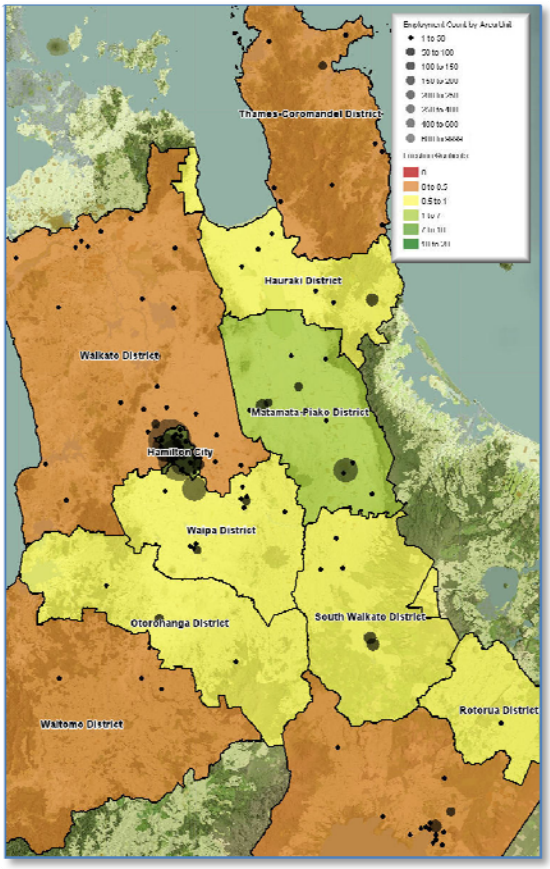


Figure 33: Location quotient and employees – manufacturing

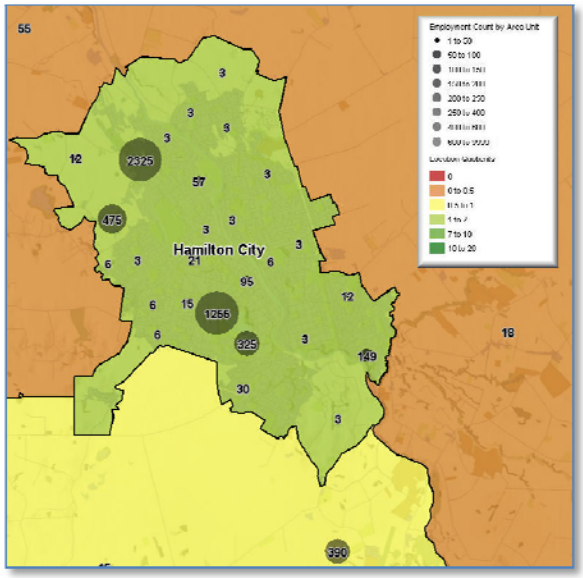


Figure 34: Location quotient and employees – manufacturing in Hamilton

New Zealand high value manufacturing exports in 2011 included $2.3 billion of machinery and equipment and $1.3 billion of aluminium.[75]

A review of the high value manufacturing and services sector was undertaken in 2011 by an independent panel to see how research organisations can better support businesses in the sector. The panel report highlights a number of areas where New Zealand can lift its game including:

- increasing the connections between research organisations and businesses
- changing the innovation culture to promote greater commercialisation of new ideas
- developing capability and skills to bridge the gap between research and business, and
- focusing government R&D investment to build scale in key sub-sectors of the high-value manufacturing and services sector.[76]

3.3.5 Forestry and logging and wood and paper manufacturing[77]

527,400 hectares of plantation forests (30.1 per cent of the national total) are located in the central North Island wood supply region, which encompasses most of the Waikato and Bay of Plenty regions.[78] This figure excludes the Coromandel Peninsula, which is also in the Waikato region. At least 20,000 hectares of plantation forests are located there also. Almost 3.8 million cubic metres of exotic timber was harvested in the Waikato region in 2011, approximately 15.7 per cent of New Zealand's total, according to the Statistics New Zealand Agricultural Production Census. This was the second-highest quantity behind the Bay of Plenty region, which harvested more than 5.8 million cubic metres (24.3 per cent of the national total).

[75] Beef and Lamb New Zealand Inc (2012, p. 20).
[76] Ministry of Science and Innovation (2011b) High value manufacturing review.
[77] Forestry and related manufacturing include ANZSIC codes A03, C14 and C15.
[78] New Zealand Forest Owners Association Inc (2011, p7).

Five of New Zealand's six largest forest owners/managers as at 2010[79], including the three largest, own plantation forests in the Waikato region. These include:

- Hancock Natural Resource Group: is the largest forest manager in New Zealand. It manages approximately 257,000 hectares of forests[80] on behalf of a number of investment clients, including forests near Taupō.

- Kaingaroa Timberlands: is the second largest forest owner/manager in New Zealand and owns the 189,000 hectare Kaingaroa Forest, located between Rotorua and Taupō.[81]

- Matariki Forests: is the third largest forestry company in New Zealand with approximately 130,000 hectares of plantations across the country, including forests in the northern Waikato, Thames-Coromandel and Hauraki districts.[82]

- Ernslaw One: owns approximately 100,000 hectares of forests in a number of regions, including one located at Whangapoua in the Coromandel Peninsula.[83]

- Crown Forestry (MAF): administers 47,130 hectares of forests throughout the North Island and the West Coast of the South Island.[84]

The land underlying the forests is both freehold and leasehold to different degrees in each case. The leasehold land is leased from the Crown, Māori incorporations and other parties.[85]

Major wood and paper manufacturing employers in the Waikato region include:

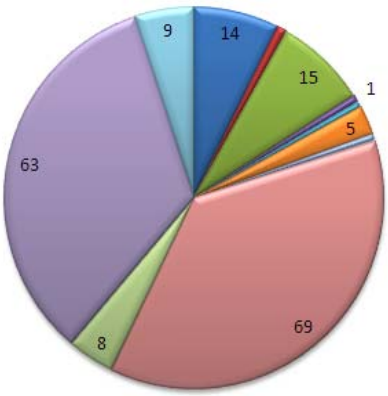
- Carter Holt Harvey Kinleith Mill: located near Tokoroa, Kinleith is Carter Holt Harvey's largest mill and the Waikato region's largest processing site, producing bleached and unbleached softwood kraft pulp and a range of linerboards and medium used in packaging.[86] Wood products such as structural timber, laminated veneer lumber and plywood are also manufactured here.[87]

- Tenon Manufacturing: is a specialised producer of radiata pine clearwood products such as pine lumber, pine boards, pine mouldings and outdoor wood products[88], located in Taupō. Tenon Manufacturing produces more than 100,000 m^3 of product annually.[89]

- Southern Cross Forest Products: its wholly owned subsidiary Thames Timber was founded in 1948 and produces 80,000 m^3 of lumber and select board annually.[90]

South Waikato and Taupō districts produce 29 and 26 per cent respectively of the Waikato region's forestry, wood and paper exports each, as illustrated by figures 35 and 36. Hamilton city produces the third largest amount with 15 per cent, primarily through the manufacture of wood products.

[79] New Zealand Forest Owners Association Inc (2011, p9).
[80] New Zealand Forest Owners Association Inc (2011, p9).
[81] Kaingaroa Timberlands (2012) Kaingaroa forest.
[82] Rayonier | Matariki Forests (2012) About us.
[83] Ernslaw One Ltd (2009) Forest locations.
[84] Ministry for Primary industries (2012) Crown forestry.
[85] New Zealand Forest Owners Association Inc (2011, p10).
[86] Carter Holt Harvey Pulp and Paper (2012) Our business.
[87] Carter Holt Harvey Wood Products New Zealand (2012) About us.
[88] Tenon New Zealand (2011) Products.
[89] New Zealand Forest Owners Association Inc (2011, p19).
[90] Southern Cross Forest Products Ltd (2012) Thames Timber Ltd.



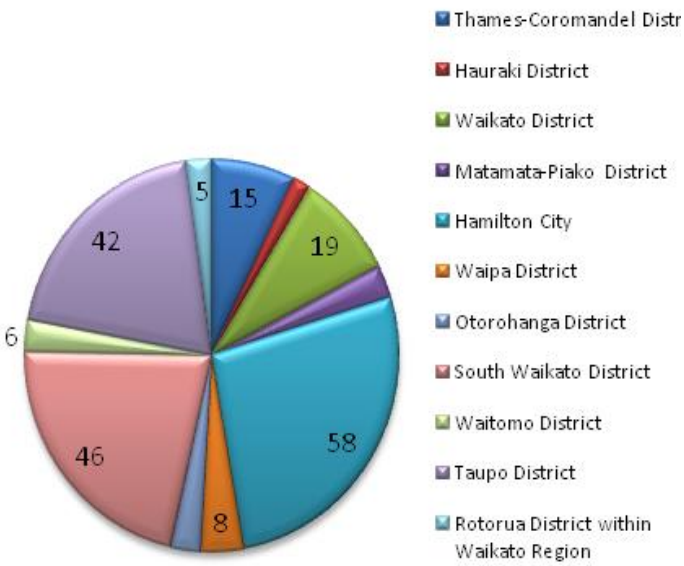


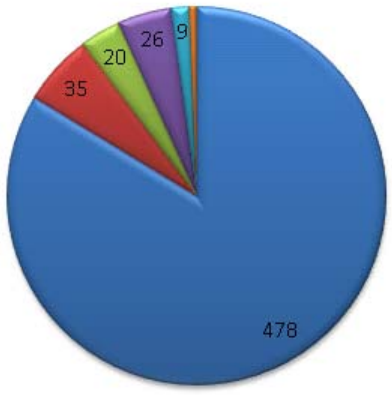
Figure 35: Forestry exports by territorial authority ($m 2007)

Figure 36: Wood & paper exports by TA ($m 2007)

The vast majority of business units in forestry and logging are sole-operator businesses with no other employees, as shown in figure 37. There are no business units in the Waikato region with more than one hundred employees.

The role of the forestry and wood processing sectors in supporting local employment is significant in four districts in the Waikato region: South Waikato (15.85 per cent of workforce, second highest ratio in the country and due mainly to the Carter Holt Harvey Kinleith Mill), Rotorua (7.45 per cent), Taupō (7.29 per cent), and Thames-Coromandel (3.82 per cent).[91] There are 1,180 wood processing employees in the Rotorua district but none of these are within the Waikato region boundary.

Wood and paper manufacturing business units have an average of 11 employees each, as illustrated by figure 38, although this figure is likely to be skewed by a small number of large employers such as the Carter Holt Harvey Kinleith Mill. One-third are owner-operator businesses and another one-third have one to five employees.



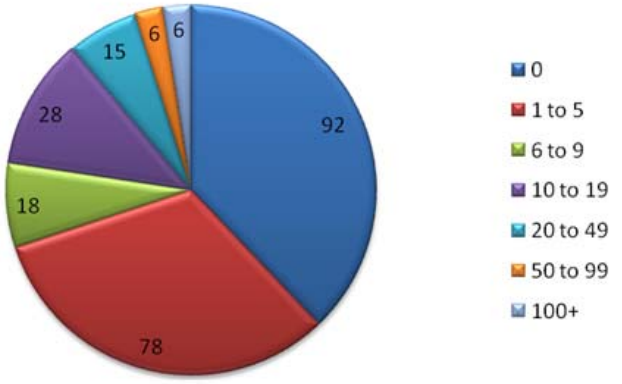


Figure 37: Forestry & logging business units by number of employees (2010)

Figure 38: Wood & paper business units by number of employees (2010)

Forestry and logging is heavily concentrated in South Waikato, Taupō, and to a lesser extent Thames-Coromandel, Ōtorohanga and Waitomo, as shown in figure 39. The wood and paper manufacturing sector is also significant in these districts, as illustrated by figure 40.

[91] New Zealand Institute of Economic Research Inc (2011, p. 10).

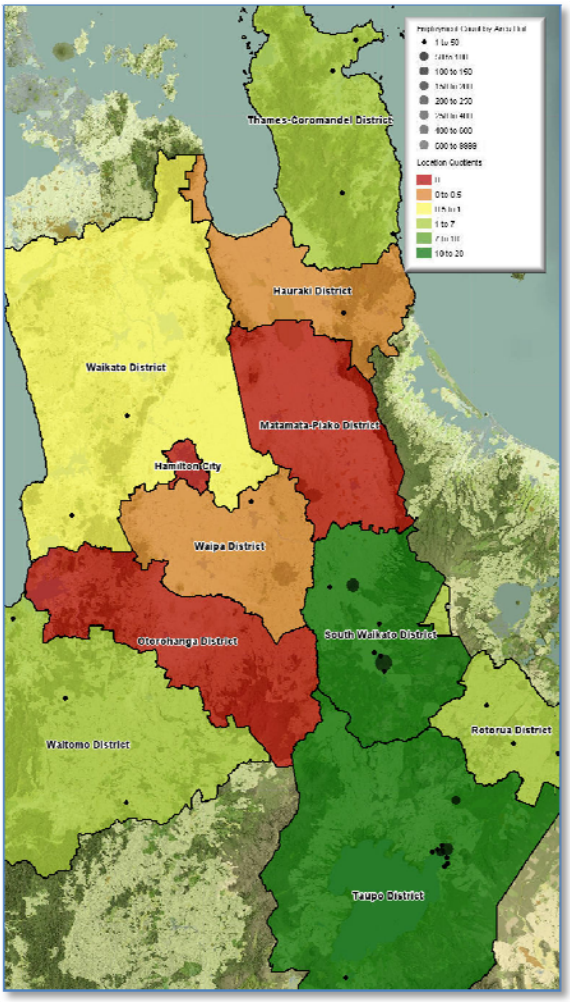


Figure 39: Location quotient and employees – forestry & logging

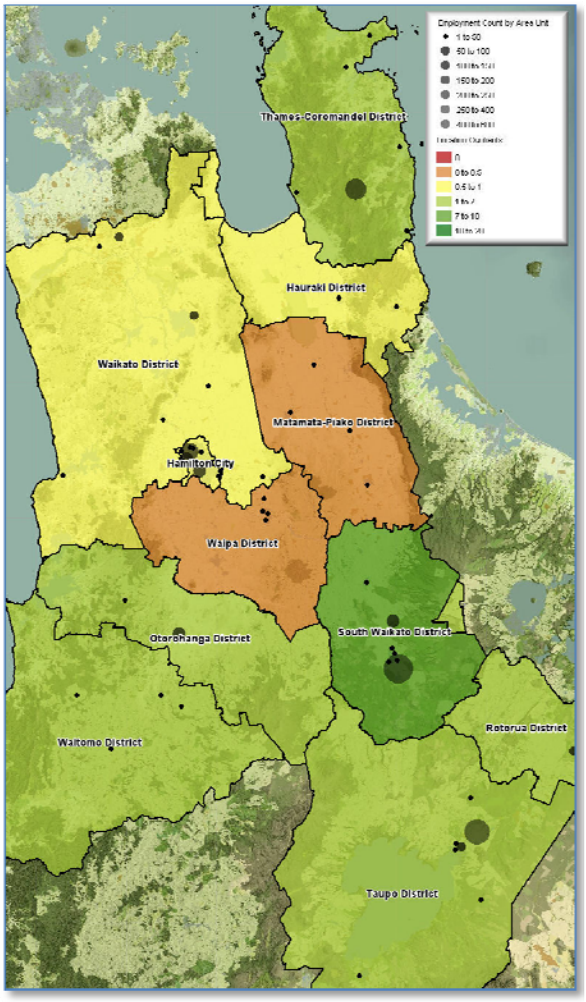


Figure 40: Location quotient and employees – wood & paper manufacturing

The combined exports of forestry and wood related products earned New Zealand $4.6 billion in the year to March 2011, putting these combined exports in third ranking ahead of either meat or food excluding dairy according to a 2011 report. Furthermore, forestry and wood related products accounted for 13.3 per cent of New Zealand's total goods exports.[92]

A forest industry strategic study in June 2011 identified strong support for a pan-industry strategy and a mandate for the Wood Council of New Zealand Inc to develop one.[93] The resultant New Zealand Forest and Wood Products Industry Strategic Action Plan was released in March 2012. The vision for the plan is for annual export earnings to more than double to $12 billion in the 10 years to 2022, from a New Zealand forest and wood products industry that is:

- delivering innovative wood-based solutions from a sustainable resource to meet our customers' needs
- manufacturing a range of high-value, fibre-based products, including new biochemical and biofuel value streams
- recognised as a world-leader in timber-engineered building solutions
- underpinned by forest growing as a valued and profitable land use
- recognised as a key New Zealand growth industry, delivering strong economic and environmental benefits
- connected and collaborative across the value chain, from end-product to seedling

[92] New Zealand Institute of Economic Research Inc (2011, p. ii).
[93] Hilliard et al (2011, p. 3).

- characterised by industry players that have pride in each other, with the sector regarded as a preferred career option for our brightest talent.[94]

This is also considered to be an important sector in the neighbouring Bay of Plenty region. For example, the Bay of Connections launched a Bay of Plenty regional forestry and wood processing strategy in September 2011.

3.3.6 High value services[95]

Waikato has research and education strengths in agriculture, geothermal energy and information and communications technology (among other sectors) that are supported by commercial capability and regulatory arrangements that have enabled innovation. There is an opportunity to increase the commercialisation of this knowledge and provide valuable services to international clients. There are several examples of collaboration for export in this sector, including:

- **Dairy SolutioNZ (NZ) Ltd and Beef SolutioNZ (NZ) Ltd:** Waikato Innovation Park is a partner in these two commercial consortiums of established agricultural producers and suppliers. These consortiums combine the experience, technology and delivery capabilities of the AgBio Cluster to provide leading edge, low cost, sustainable farm production systems.

  They design and build (or convert) large scale farm operations that adopt leading low cost technologies and systems. A feature of their offering is the "Best of Breed" turnkey solutions for large scale land development and technology deployment. They also deliver support and education for ongoing farm operations.[96]

- **Geothermal New Zealand:** Geothermal New Zealand is an evolving collaboration that extends the diverse skills of New Zealand's geothermal expertise to countries exploring their geothermal potential. It also aims to open up opportunities for the direct use of geothermal resources within New Zealand.[97] There are approximately 70 New Zealand firms with geothermal expertise across the value chain; from exploration and drilling through to design, project management, construction, and operation.[98]

- **Digital Industry Forum:** This is an industry cluster group that aims to grow, support and promote the collective capabilities of Waikato's digital industry. The cluster was established by SODA Inc in 2009 and is currently made up of 50 participating companies plus nearly 400 individual members.

  Through its collective approach the forum believes it can help its members to achieve substantially more export growth. The resulting global exposure will provide value for members and will create a positive perception of the Waikato as a sought after place for highly skilled entrepreneurs, creatives and technologists to live and work.

[94] Wood Council of New Zealand (2012, p. 6).
[95] Professional, scientific and technical services (ANZSIC code M).
[96] Innovation Waikato Ltd (2011b) Large scale dairy development.
[97] New Zealand Trade and Enterprise (2011a, p. 12).
[98] New Zealand Trade and Enterprise (2011a, p. 16).

Most providers of high value services in the Waikato region are located in or near Hamilton city. Waikato and Waipa districts are the next largest exporters of high value services, followed by the urban area of Taupō district, as shown in figure 41.

Nearly two-thirds of high value services businesses in the Waikato region are sole operator businesses, as illustrated by figure 42. There are, however, 14 business units with more than 100 employees each.

There are many small high value services operations around the region, as shown in figures 43 and 44. The majority of high value services employees are in Hamilton city (5840). Waikato district also has a relatively high location quotient.

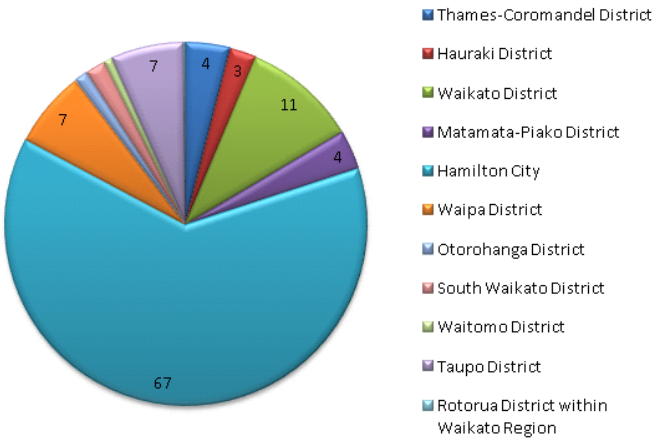


Figure 41: High value services exports by territorial authority ($m 2007)

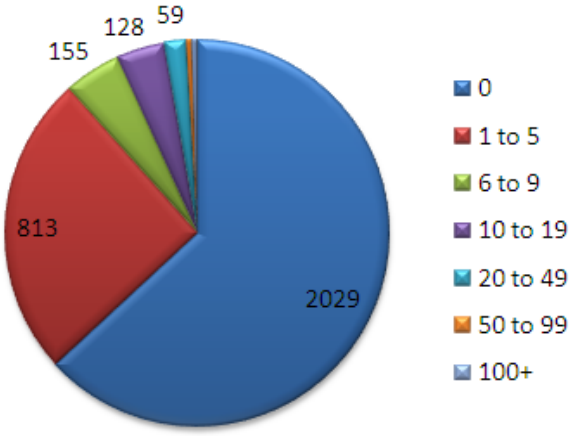


Figure 42: High value services business units by number of employees (2010)

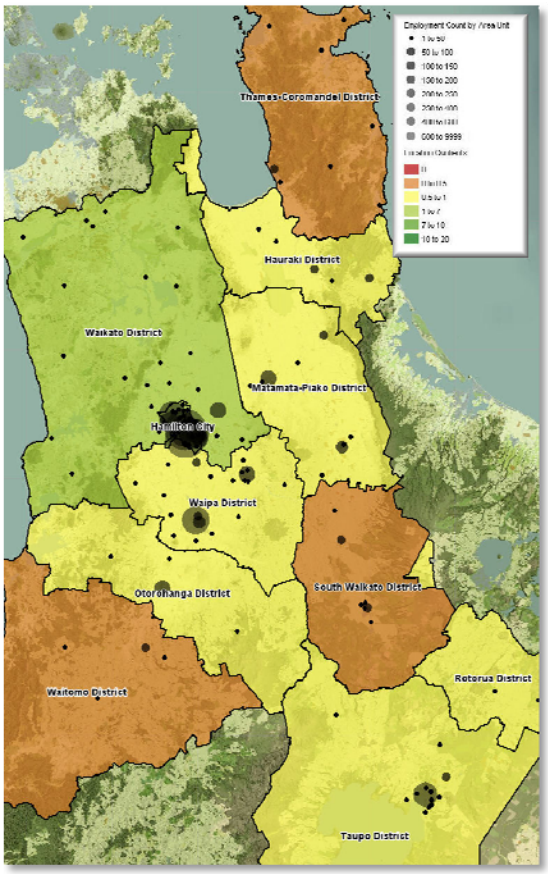


Figure 43: Location quotient and employees – high value services

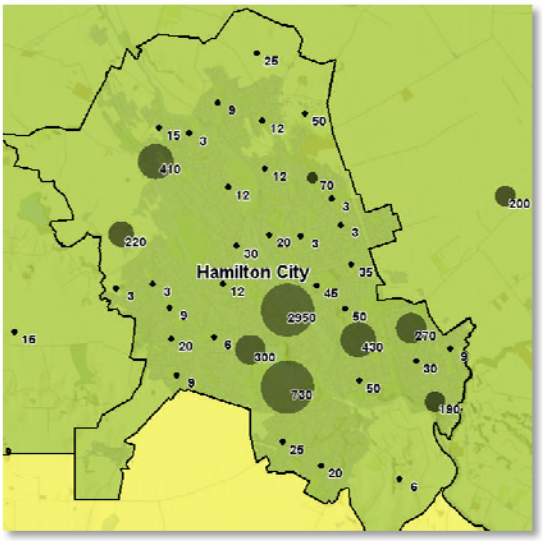


Figure 44: Hamilton location quotient and employees – high value services

High value services are included in the broader category of commercial services that accounted for approximately $2.9 billion, or just over five per cent, of New Zealand exports in 2009.[99] The commercial services sector is expected to play a key role in lifting New Zealand's economic performance and exports given the growing global demand for expertise and specialised services and the lack of typical natural resource constraints (i.e. land availability and environmental pressures).[100]

3.3.7 Aquaculture

Aquaculture – both marine and land-based – is a small sector currently, but has the potential to grow significantly, with a combination of sustainable natural resources and regulatory reform. As an additional primary industry, it offers an opportunity to broaden food manufacturing in the region.

The waters off the Coromandel Peninsula are second only to the Marlborough Sounds for aquaculture production, with 24 per cent of national mussel production and nearly 20 per cent of farmed oysters coming from the peninsula's 925 hectares of long-line mussel farms and 70 hectares of inter-tidal oyster farms.[101] Marine farms and marine farming zones in the Waikato region are shown in figure 45.

According to a 2011 report, aquaculture contributed an estimated $31.4 million of GRP to Waikato in 2010/11. This is comprised of aquaculture farming (approximately 43 per cent of total) and aquaculture processing (approximately 57 per cent). In terms of employment, there are an estimated 432 full time equivalents resulting from aquaculture and its supplying industries located in the region. These are comprised of 297 direct farming and processing jobs, 73 indirect jobs as a result of activity in other industries, and 62 induced jobs.[102]

[99] Saravanaperuma and Charteris (2010, p. 1).
[100] Saravanaperuma and Charteris (2010, p. 1).
[101] Sapere Research Group (2011, p. 12).
[102] Sapere Research Group (2011, p. iii).

When measured for its value to the national economy, the Coromandel aquaculture industry contributes $77.4 million in GDP to the national economy – and generates a total of 1,193 full time equivalents. These results show that Coromandel production generates significant benefits from aquaculture processing in adjoining regions, and from inputs sourced in other regions.[103]

The report also considers the benefit of future aquaculture developments in the Coromandel. Development in this area is highly likely because new marine farming zones have been established as part of recent law reforms and further shellfish farming consents were issued in 2011. Production at a point in the future, 2025, was chosen because it allows for consideration of the benefit of full development of shellfish farms, the introduction of fish farms and to allow for comparison with the sector strategy and other industry projections.[104]

The mussel and oyster industry is expected to contribute a total of $60.7 million to Waikato GRP in 2025 (a 93 per cent increase over value-added in 2010), and provide 835 full-time Waikato jobs (a 93 per cent increase over 2010 employment). There are also flow-on effects to the national economy. The Coromandel mussel and oyster industry is expected to contribute $149.3 million to GDP in 2025 and provide 2,301 full-time equivalent jobs.[105]

The study also estimates the contribution of the introduction of fish farming. Production of 6,000 tonnes of kingfish per annum is estimated to add an additional $34.9 million to GRP. The water space allocated to fish farming could produce 12,000 tonnes per annum and other species, such as hapūku, could generate higher returns per tonne.

Assuming that the processing can be done on the peninsula (either at the existing shellfish factory in Whitianga, or at new plants built at Coromandel or Thames), this will create an additional 354 full-time equivalent jobs. At the national level, fish farming in the Coromandel is predicted to contribute an additional $45.6 million to New Zealand GDP, and create 474 new full-time equivalent jobs.[106]

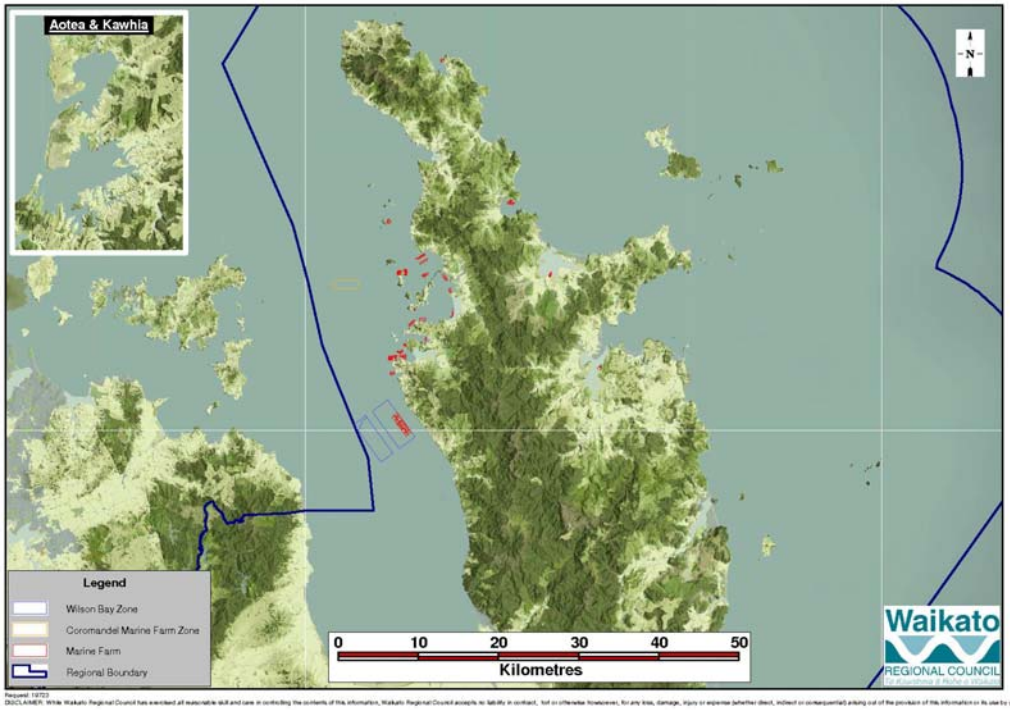


Figure 45: Marine farms and marine farming zones in the Waikato region

[103] Sapere Research Group (2011, p. iii).
[104] Sapere Research Group (2011, p. v).
[105] Sapere Research Group (2011, p. vi).
[106] Sapere Research Group (2011, p. vi).

In the past 30 years aquaculture in New Zealand has grown from small beginnings to a significant primary industry, sustainably producing three flagship products – Greenshell Mussels, King Salmon and Pacific Oysters. Currently estimated to be worth in excess of $380 million per year, New Zealand's aquaculture sector has a target goal of reaching $1 billion in sales by 2025.[107]

The National Institute of Water & Atmospheric Research Ltd (NIWA) notes that worldwide eel aquaculture is estimated to be worth over US$1 billion, accounting for 65 per cent of the total eel production. Asia and Europe are the largest eel markets, but a decline in glass eel stocks in both regions has opened up opportunities for exploitation of species in other areas. NIWA considers that New Zealand has the potential to reap large commercial benefits by supplying international eel markets through aquaculture. Eels (tuna) are a traditional food source for Māori, with high cultural and spiritual significance. Aquaculture can help replenish wild eel populations, allowing cultural harvesting to continue without the threat of over-exploitation.[108]

A 2009 report identified freshwater aquaculture opportunities in relation to four species that are of significance to Māori: tuna/eel, koura, whitebait and kanae/grey mullet. While commercial opportunities for farming these species may currently be limited (for a variety of reasons), there are some options for customary stock enhancement.[109]

On 1 October 2011 legislative reforms came into effect. The reforms made changes to the Aquaculture Reform (Repeals and Transitional Provisions) Act 2004, the Fisheries Act 1996, the Māori Commercial Aquaculture Claims Settlement Act 2004, and the Resource Management Act 1991. The Government considers that these reforms level the playing field for aquaculture development and put safeguards in place to better manage coastal space and ensure development can only occur within environmental limits.[110]

In 2012 the Government adopted the Aquaculture Strategy and Five-year Action Plan. The strategy and action plan establishes a whole-of-government pathway to enable the aquaculture sector to grow.

This strategy and action plan aligns with both the aquaculture industry's strategy and the Ministry for Primary Industries' 2030 Strategy, setting out how the Government can support the growth ambitions established by the sector. It also complements existing Government environmental and economic initiatives and upholds the Crown's obligations under the Treaty of Waitangi.

Through the strategy and action plan the government will support industry in achieving its goals while acting in the public interest to ensure an appropriate balance of economic, social, cultural and ecological values. [111]

Aquaculture is also considered to be an important sector in the neighbouring Bay of Plenty region. It is a key focus area within the Innovative and Productive Industry Sectors theme in the Bay of Connections Regional Economic Development Strategy (Bay of Plenty). The Strategy and Action Plan for Aquaculture was one of the first sector strategies to be developed under the Bay of Connections framework.

3.3.8 Tourism

Because of its relatively low labour productivity (discussed in chapter 9.4.2) and contribution to exports[112], tourism is likely to have relatively modest growth potential. It

[107] Aquaculture New Zealand (2011) Industry.
[108] National Institute of Water and Atmospheric Research Ltd (2011) Eel.
[109] Te Wai Māori (2009, p. 3).
[110] New Zealand Government (2011a) Aquaculture enters new era.
[111] New Zealand Government (2011b) Aquaculture Strategy.
[112] It is recognised that spending by international visitors represents export earnings, but it is not clear how large this group is *vis a vis* domestic visitors. Further research into this area would provide useful data about the relative importance of this sector to the Waikato regional economy.

is not considered by this profile to be of primary importance in the Waikato region. It is, however, a priority sector for most territorial authorities so is described in more detail.

There is no specific industry sector called tourism. According to the Statistics New Zealand tourism satellite account[113], 22 per cent of visitor spending is on accommodation and food services. Air transport makes up 21 per cent and other transport and retail sales the remainder. Only a small fraction of air transport spending would provide income for Waikato, and it is problematic to separate visitor retail spending from resident retail spending. The accommodation and food services sector (ANZSIC code "H") therefore is the sector that is used to indicate the relative importance of tourism in the region.

Four Regional Tourism Organisations promote the Waikato region's offering currently:

- Destination Coromandel (funded by Hauraki and Thames-Coromandel district councils).
- Hamilton & Waikato Tourism (funded by Waikato, Waipa, Matamata-Piako, Ōtorohanga, South Waikato and Waitomo district councils and Hamilton City Council)
- Destination Great Lake Taupō (also manages the iSITEs in Taupō and Turangi); and
- Destination Rotorua Marketing (business unit of Rotorua District Council).

The Regional Tourism Organisations promote the Waikato region's tourism offering, such as the beaches, rainforests and goldmining heritage of Coromandel; Lake Taupō and other natural attractions and outdoor activities; the geothermal and cultural attractions and outdoor activities of Rotorua; Waitomo Caves, Hobbiton and business events in Hamilton city and the surrounding districts.

Business events in the region include the annual Fieldays, described as the definitive agri-business exhibition, with over 128,000 visitors over four days in 2012[114] and Flair, a new aviation expo event. These events align well with regional economic strengths and opportunities. International business delegates spend more when visiting New Zealand than the average visitor and tend to stay longer than the average tourist as well.[115]

International business events include meetings, incentives, conventions and exhibitions. This industry is very competitive internationally and a host's attractiveness as a business event destination is closely correlated to its attractiveness as a tourism destination generally. Entry barriers are also high with the cost of an appropriate venue in close proximity to related facilities such as accommodation, restaurants and bars. The role of the convention and visitor bureau is crucial.

The Government proposes to take a more active approach with regards to the marketing, promotion, bidding and prospecting for business events so that its outcomes under its Business Growth Agenda are supported. The New Zealand International Convention Centre and national convention centre network is also supported.[116]

In the year ended March 2012 there were 1,080,000 visitor nights spent in the Hamilton Waikato tourism area, 970,000 in Taupō and 710,000 in Coromandel[117]. The amount of visitor spending in each area is not known precisely, but is expected to be correlated with the number of visitor nights.

[113] Data sourced from the Statistics New Zealand (2011) Tourism Satellite Account.
[114] New Zealand National Fieldays Society Inc (2012) The largest agricultural event in the Southern Hemisphere.
[115] Ministry of Economic Development (2011f, p. 5).
[116] Ministry of Economic Development (2011f, p. 2).
[117] Data sourced from the Ministry of Economic Development Commercial Accommodation Monitor.

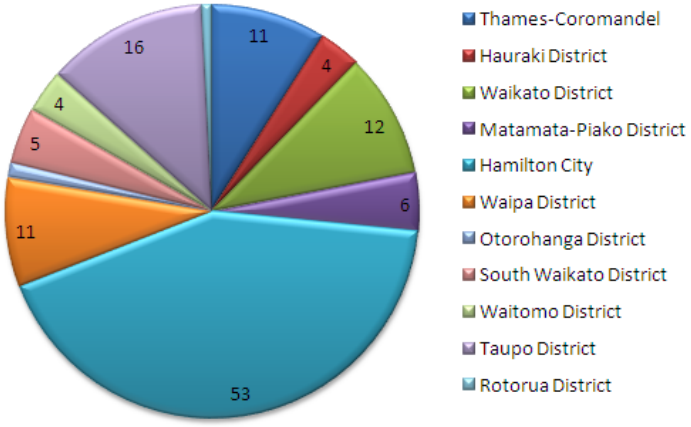


Figure 46: Accommodation and food services exports by territorial authority ($m 2007)

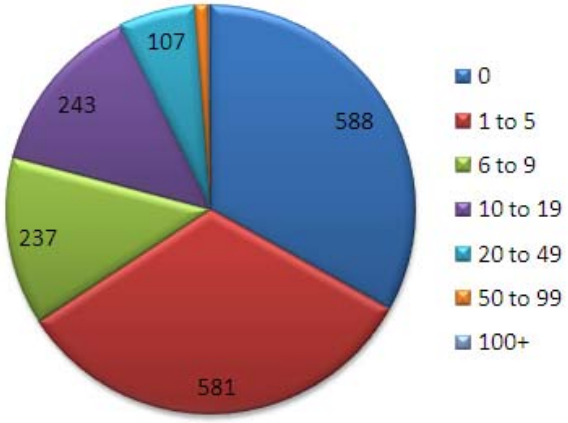


Figure 47: Accommodation and food services business units by employee count (2010)

Hamilton city is the largest provider of accommodation, restaurants and bars, contributing 43 per cent of inter-regional and international exports from this sector. Taupō, Waikato, Thames-Coromandel and Waipa districts also have significant sectors, as illustrated by figure 46.

A district does not necessarily need to be a tourist destination in order to benefit from visitor spending and business visitors are perhaps more important to the economy than holiday-makers, particularly when such travel facilitates knowledge transfers and business connections.

Accommodation and food services businesses tend to be larger than businesses in other sectors, as shown in figure 47. Only a third of businesses are single-operator, and on average there are 6.3 employees per business unit.

Tourism has a relatively low location quotient in several parts of the Waikato region, as shown in figure 48. It is, however, a more significant industry in Thames-Coromandel, Waitomo and Taupō districts and the portion of Rotorua district within the Waikato region.

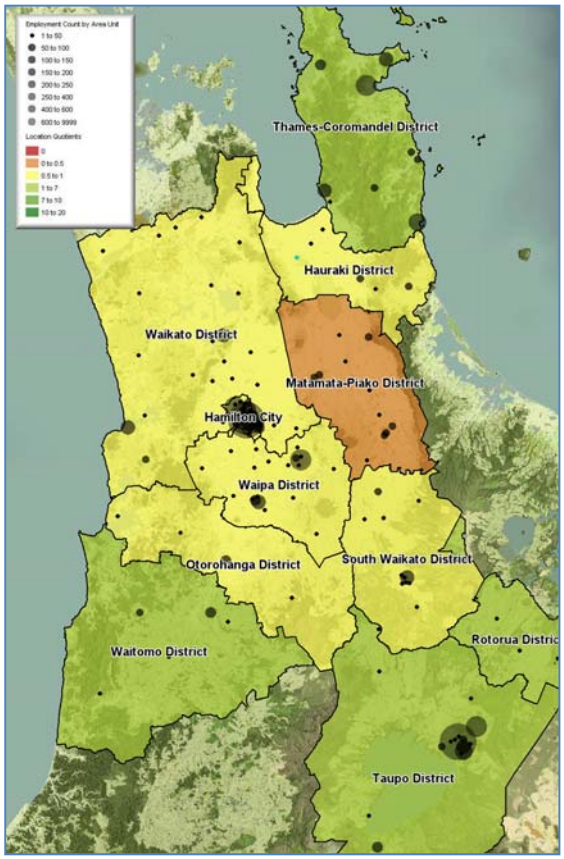


Figure 48: Location quotient and employees – tourism

Note about data:

In contrast to the industry classifications used in this profile, tourism is defined broadly by the United Nations as "a social, cultural and economic phenomenon related to the movement of people to places outside their usual place of residence. The activities carried out by a visitor may or may not involve a market transaction, and may be different from, or similar to, those normally carried out in his/her regular routine of life."[118] This highlights the challenge in collecting accurate data about this sector.

The Ministry of Business, Innovation and Employment wants to make sure its tourism data meets the needs of the industry and researchers as well as government. Following a consultation process it has developed the Tourism Domain Plan to inform changes to the collection, analysis and dissemination of data on tourism. It is hoped that this will allow more comprehensive data to be available at the regional level.

[118] Ministry of Economic Development (2011i, p. 4).

4 Infrastructure

4.1 Summary

Infrastructure is the fixed, long-lived structures that facilitate the production of goods and services and underpin many aspects of quality of life. Infrastructure refers to physical networks, principally transport, water, energy and communications.[119] This profile has already noted the importance of natural infrastructure to the regional economy, such as biodiversity corridors. The National Infrastructure Plan (2011) notes that there are more than $115 billion worth of infrastructure assets in New Zealand as a whole. Infrastructure is crucial to supporting export-led growth. For example, transport and communications networks connect us to overseas markets.[120] It also supports how people live, work and play in the region. Due to its location in the upper North Island, the Waikato region is an important part of national infrastructure networks.

The region carries very large volumes of people and freight and the quality of local roads is generally higher than more urbanised regions. The timely completion of the region's Roads of National Significance should help to improve the speed and safety of inter-regional road transport. Waikato needs efficient road and rail transport infrastructure to move goods and people to and from air and sea ports outside the region, on which it depends for international connections. Hamilton airport is a useful transport hub for the North Island. The quality of intra-regional transport links, including improvements to road quality, is important to enable the movement of workers, students and goods between smaller centres and Hamilton city.

Waikato industry is heavily reliant on oil and gas as energy sources so is vulnerable to looming supply constraints of these fuels. The region has a large and growing share of renewable electricity generation from hydro, geothermal and wind sources and is an important electricity supplier to the upper North Island. Waikato is also well-endowed with reserves of coal and is exploring new techniques to extract this resource. The region is a large consumer of gas and the pipeline from Taranaki to the rest of the upper North Island passes through Waikato also.

Urban water infrastructure assets are valuable and appear to be of higher quality in larger urban areas across the region, presumably due to the ability to achieve economies of scale and spread costs over a larger population. Most councils have had to respond to higher drinking water quality regulations by improving their infrastructure, which creates additional expense in addition to budgeting for maintenance and renewal over the longer term.

The Waikato region has some legacy public irrigation assets that are still in use and the government is looking to support this activity once again. The region's flood protection schemes are important not only for protecting productive land, but also buildings and roads.

The roll-out of ultra-fast broadband is an important development in telecommunications infrastructure and equitable access for rural areas – which will not all benefit from the Rural Broadband Initiative – will help to overcome their remoteness and small scale. Detailed information about other telecommunications networks at the regional level is not available.

[119] New Zealand Government (2011d, p. 1).
[120] New Zealand Government (2011d, p. 10).

4.2 Transport

The current transport system in the Waikato region includes:

- a comprehensive road network (including state highways managed by the New Zealand Transport Agency and local roads managed by the city and district councils)
- two main railway lines (including part of the North Island Main Trunk and the East Coast Main Trunk) along with several shorter branch lines owned and operated by KiwiRail Group
- a public transport (bus) network throughout the region managed by WRC in addition to school buses and private buses and taxis, and
- local pedestrian and cycleways developed and managed by road controlling authorities (the New Zealand Transport Agency, territorial authorities and the Department of Conservation).

In addition, the region contains a major airport (Hamilton International Airport), a regional airport in Taupō, an inland port (Crawford Street inland port) facility in Hamilton and a small sea port (Taharoa).

4.2.1 Road

Around 92 per cent of all freight (by weight) within New Zealand is moved by road.[121] As average land transport costs per unit distance are around seven times those of international sea transport[122], the efficiency of this is of vital importance. An efficient freight industry with access to cost effective transport is vital to the competitiveness of New Zealand businesses.

Almost a quarter of total national freight movements by land in New Zealand either travel within, to, from, or through the Waikato region (51 million tonnes out of a national total of some 225 million tonnes).[123]

The Waikato region has more heavy commercial vehicle movements per day than any other region. Heavy vehicle growth rates in the Waikato region are higher than the national average[124], a trend that will continue into the foreseeable future as the demand for freight movement doubles by 2031.[125]

The state highway network in the region is the backbone of the roading network and contains 16 per cent of the national state highway network (1,728 km).[126] By virtue of its central location between the population centres of Auckland and Tauranga, the Waikato region carries a high proportion of through-traffic, particularly inter-regional freight traffic to and from the Ports of Auckland and Port of Tauranga. Strategic corridors in the Waikato region are illustrated in figure 49.

Seventy per cent of international tourists arrive in Auckland and a vast majority travel down State Highway 1[127] to visit key national tourism assets accessed through the region (Rotorua) or in the region (Waitomo Caves, Lake Taupō). Traffic volumes on state highways in the region are shown in figure 50.

The government has identified seven essential state highways that are linked to New Zealand's economic prosperity, called the roads of national significance.[128] The government has reaffirmed its commitment to complete the Waikato Expressway (designated as a road of national significance) within 10 years (2019) through the

[121] Paling et al (2008, p. ii).
[122] New Zealand Productivity Commission (2011, p. 10).
[123] Paling et al (2008, p. vii).
[124] Data sourced from New Zealand Transport Agency Traffic data sets, 2009.
[125] Paling et al (2008, p. 215).
[126] Data sourced from New Zealand Transport Agency – Network Statistics 2009/10.
[127] Data sourced from the Tourism Flow Model, Ministry of Tourism.
[128] New Zealand Government (2009, p. 1).

release of the Government Policy Statement on Land Transport Funding 2012/13-2021/22.

The Waikato Expressway is the key strategic corridor for the Waikato region. Due for completion by 2019, the objective is to provide a continuous divided four-lane highway between Auckland and Cambridge that will improve safety and reduce travel times and congestion on State Highway 1.

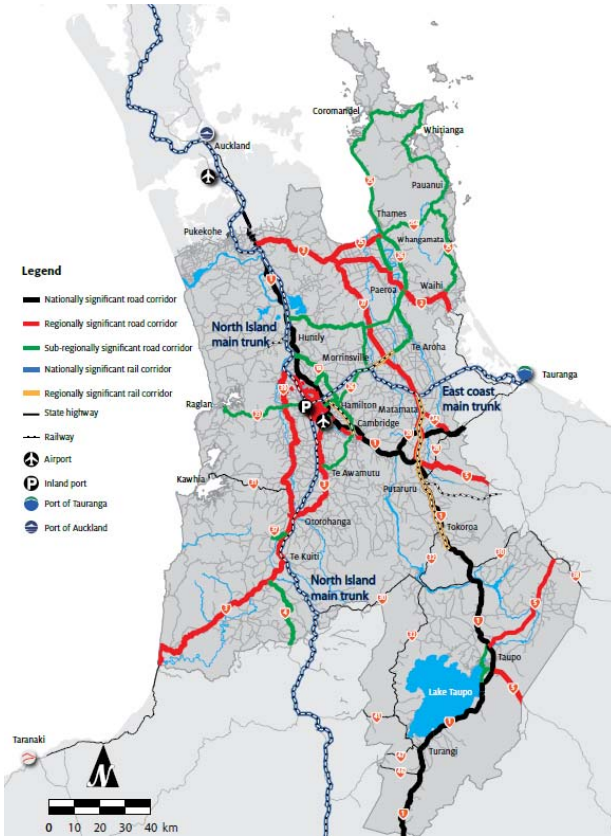


Figure 49: Strategic corridors in the Waikato region[129]

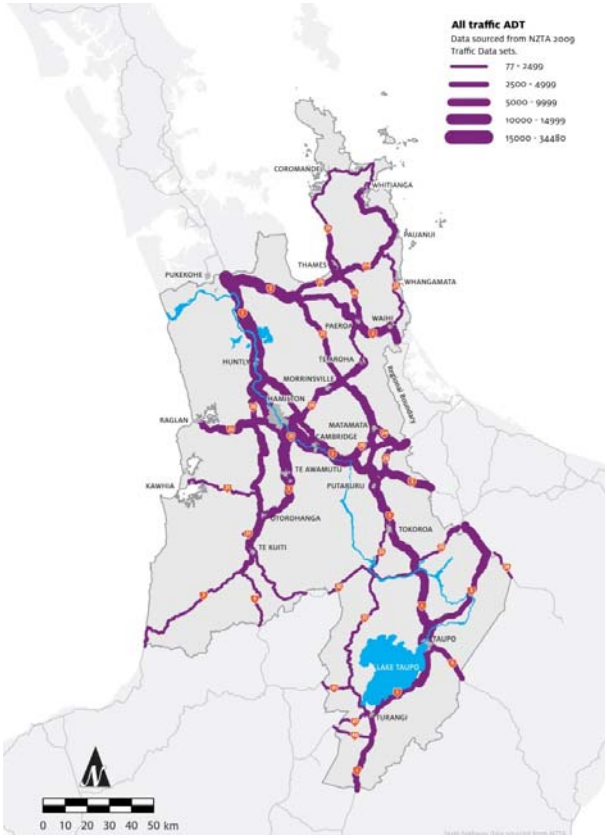


Figure 50: State highway traffic volumes[130]

The local roads network is an integral part of the regional land transport network as it provides important access for local communities to access employment and essential services and facilities.

The Waikato region has 9,456 kilometres of local roads, representing 11.4 per cent of New Zealand's total local roads. 78 per cent of local roads in the region are sealed, while only 62 per cent of local roads nationally are sealed.[131]

Although information about the quality of the state highway network in the Waikato region is not available, the New Zealand Transport Agency compiles this information for the local roading network from data provided by all local roading authorities in New Zealand. There are three measures of road quality: smooth travel exposure[132], condition index[133] and pavement integrity index[134].

[129] Waikato Regional Council (2011k, p. 81).
[130] Waikato Regional Council (2011k, p. 21).
[131] Data sourced from New Zealand Transport Agency – Network Statistics 2010/11.
[132] Smooth travel exposure measures the proportion (percentage) of vehicle kilometres travelled in a year that occurs on 'smooth' sealed roads and indicates the ride quality experienced by motorists. A 'smooth' road is one smoother than a predetermined National Association of Australia State Road Authorities roughness threshold. The thresholds used vary with traffic density and road location. Heavily trafficked roads have a lower (smoother) threshold. High volume urban roads have lower roughness thresholds than low volume rural roads.
[133] Condition index is a combined index, a 'weighted sum', of the surface faults in sealed road surfaces. Condition index combines alligator cracking, scabbing, potholes, pothole patches and flushing. 100 – condition index ensures that the higher the number, the better the condition.

Local roads in the Waikato region as a whole exceed the national average for each of these measures. Although scores in the condition index are lower than several other regions, Waikato has among the highest scores for both smooth travel exposure and the pavement integrity index, as shown in figure 51.

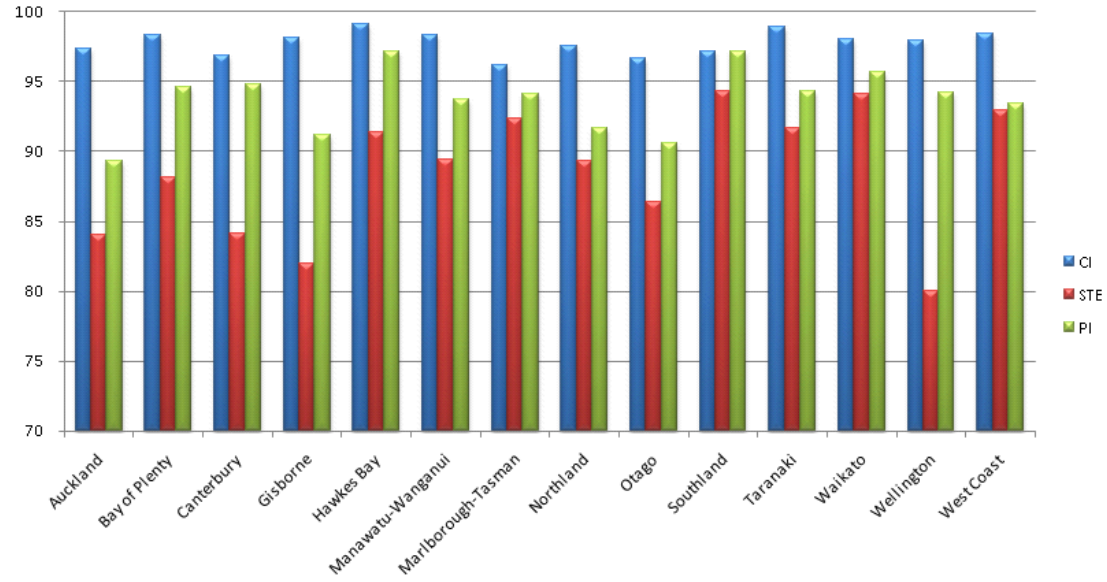


Figure 51: Condition index (CI), smooth travel exposure (STE) and pavement integrity index (PI) by region (2011)[135]

At a local level, condition index scores for local roads in all territorial authorities except Ōtorohanga district exceed the national average. Only South Waikato district scores below the national average for smooth travel exposure. Ōtorohanga and Thames-Coromandel are the only districts below the national average for pavement integrity, as shown in figure 52.

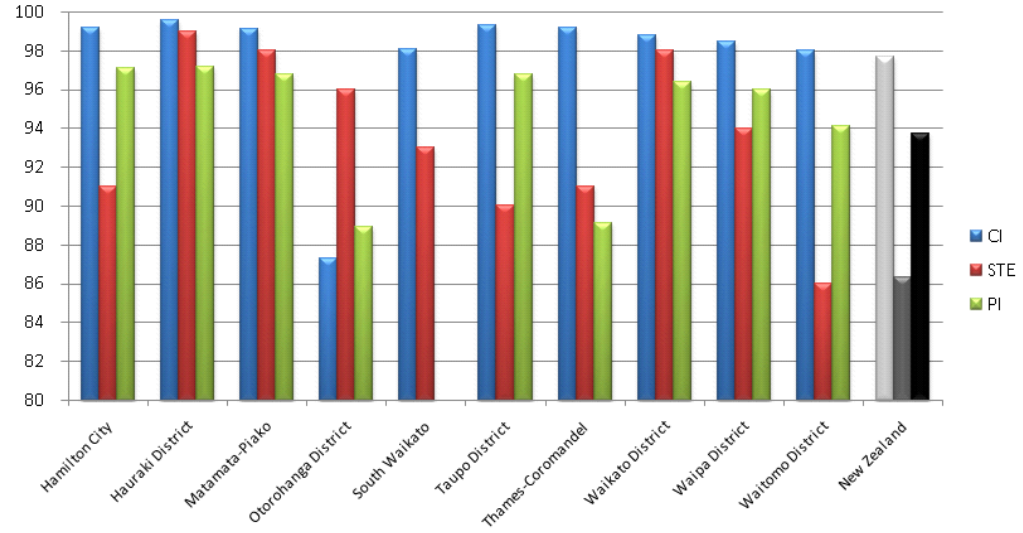


Figure 52: Condition index (CI), smooth travel exposure (STE) and pavement integrity index (PI) by TA (2011)[136]

[134] Pavement integrity index is a combined index of the pavement faults in sealed road surfaces. It is a 'weighted sum' of the pavement defects divided by total lane length. PII combines surface faults (condition index) with rutting and shoving. 100 - pavement integrity index ensures that the higher the number the greater the pavement integrity.
[135] Data sourced from the New Zealand Transport Agency Road Network Trends Wizard 2011.
[136] Data sourced from the New Zealand Transport Agency Road Network Trends Wizard 2011.

4.2.2 Rail

Rail is an integral part of the regional transport network. There are 329 kilometres of active routes in the region, and a further 28 kilometres of inactive routes.[137] The active routes amount to 8.5 per cent of the national network[138] as illustrated in figure 53.

The main rail routes include the North Island Main Trunk line which runs between Auckland and Wellington, and the East Coast Main Trunk line which runs from Hamilton to Tauranga and Kawerau through the Kaimai rail tunnel. These lines are supported by a feeder network of 160 kilometres, including the:

- Kinleith branch, which provides access to the Kinleith pulp and paper mill in Tokoroa
- Cambridge branch, which provides access to Fonterra's Hautapu dairy factory
- Rotowaro branch, which links the North Island main trunk line with the Huntly coal mines at Rotowaro
- Waitoa industrial line, which services Fonterra's Waitoa dairy factory, and
- Putaruru to Rotorua line, currently disused, of which approximately 28 kilometres is located within the region.

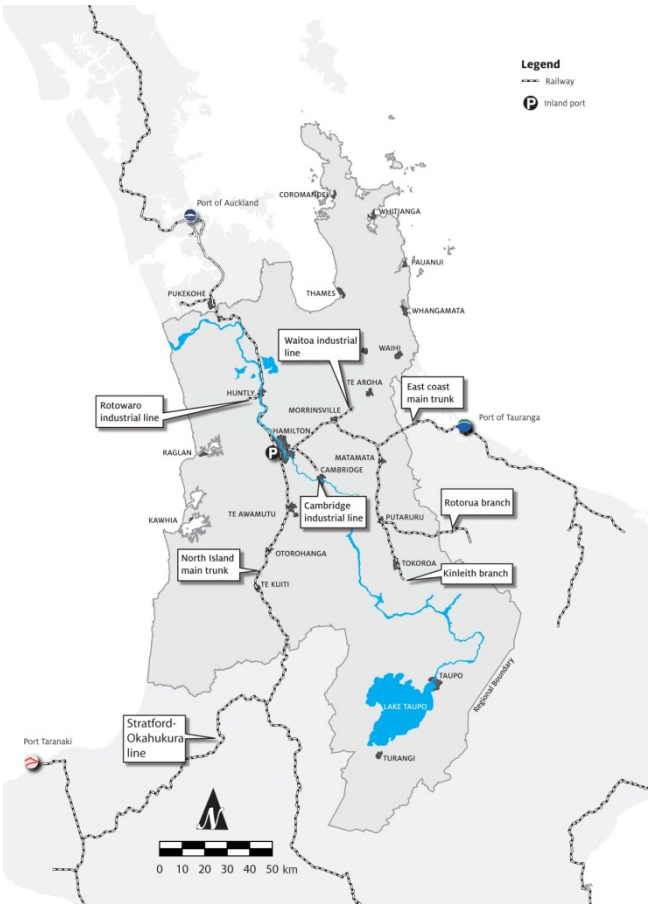


Figure 53: Regional rail network[139]

In 2008, the Waikato region's rail lines carried approximately 1,494 million gross tonne kilometres and 630 million net tonne kilometres of freight. Approximately 16 per cent of New Zealand's rail freight traffic in net tonne kilometres, travelled on lines in the Waikato.[140] Approximately six million tonnes, nearly 45 per cent of the national total, originated in, had a destination in, or passed through the region, as illustrated in figure 54. The principal flows of freight rail traffic on Waikato lines are:

[137] King et al (2008, p. 3).
[138] King et al (2008, p. 3).
[139] Waikato Regional Council (2011k, p. 25).
[140] King et al (2008, p. 6).

- Waikato to, or from, the Bay of Plenty region (30 per cent)
- through traffic between the Bay of Plenty and north of Waikato, both directions (25 per cent)
- Waikato to, or from, the north (20 per cent), and
- through traffic between areas to the north of Waikato and the south of the region (18 per cent).[141]

Of the total freight volumes impacting on the Waikato region, rail carried about six million tonnes including 27 per cent of through traffic and 18 per cent of freight to or from the region.[142]

KiwiRail has recognised the importance of the Waikato region in the distribution of freight by rail, with the region involved in three of the nine Routes of National Significance identified in the KiwiRail Turnaround Plan. This plan, which was announced by the government in 2010, aims to turn KiwiRail into a financially self-sustainable business by prioritising investment in the state owned enterprise's physical assets.

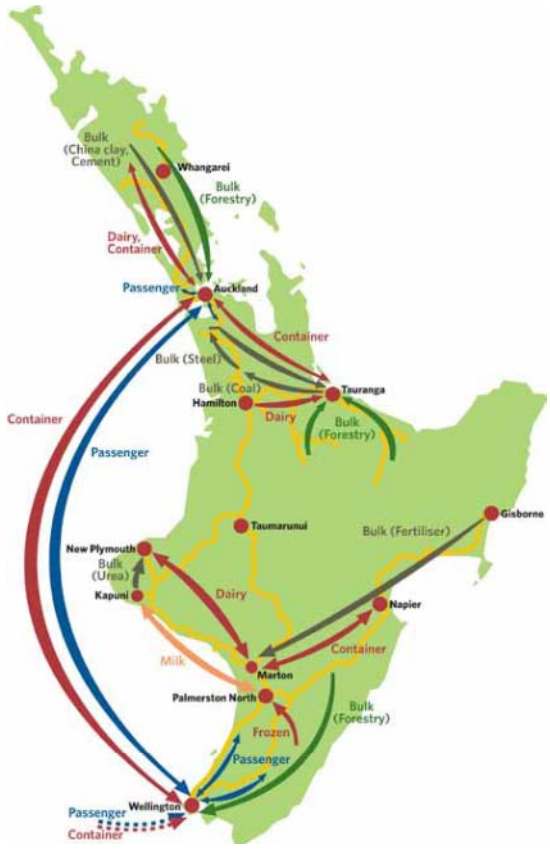


Figure 54: KiwiRail major traffic flows map[143]

The Regional Land Transport Strategy preferred strategic approach recognises the nature of the region as an important inter-regional freight corridor and the need to protect, maintain and develop key strategic corridors to ensure they can continue to facilitate regional economic development by catering for future growth. Rail plays a very important role as a strategic corridor and as a freight mode.

The Regional Land Transport Strategy recognises that rail clearly has an important current and future role in the transport system within the region, especially for the longer distance inter-regional movements and providing the links between Waikato producers and their markets.

[141] King et al (2008).
[142] Waikato Regional Council (2011k, p. 24).
[143] KiwiRail (2009?, p. 26).

Increasing the volumes of freight transported by rail also reduces the pressure on the highway network, not only within the region itself, but over a wider area. The cost of improving the rail network to ease this pressure is also generally lower when compared to achieving similar gains through road improvements. A recent example has been the $13 million spent on building new and extending existing crossing loops on the East Coast Main Trunk (Hamilton to Tauranga), which will double capacity on that line.

4.2.3 Public transport

The Waikato region has the fourth largest public transport service in New Zealand, with over 4.8 million annual passenger trips.

The public transport network in the region comprises two parts:

- Contracted urban bus services operating in Hamilton. These urban services account for approximately 95 per cent of all regional trips.
- Contracted rural bus services which include:
  - intra-regional services connecting Hamilton with Huntly, Te Kauwhata, Meremere, Pukekohe, Paeroa, Te Awamutu, Cambridge and Raglan
  - services connecting Mangakino with Taupō and Tokoroa
  - services within Taupō and Huntly.

In addition there are school bus services provided by the Ministry of Education and schools individually, and community services provided by a number of organisations.

4.2.4 Freight hubs

The region's primary integrated freight hub is located at Crawford Street in Hamilton. The hub, developed and operated by Fonterra, is integrated with the KiwiRail network which provides important rail connections to both the Port of Tauranga and Ports of Auckland. Fonterra has recently opened a new cool store at their Crawford Street Inland Port facility, which is expected to ship more than 235,000 metric tonnes of butter and cheese per year. The site contributes significantly to the Waikato transport network by transferring a considerable amount of freight from road to rail – the equivalent of 65,000 truck movements per year.

Tainui Group Holdings Ltd and Chedworth Park Ltd are planning to create a 500 hectare development at Ruakura, on the outskirts of Hamilton. This would include a regional freight hub and logistics centre. The East Coast Main Trunk runs through it, and the proposed Waikato Expressway flanks it on the east. It is intended to meet increased growth in freight volumes expected in coming years in the upper North Island. This is a long-term project, to be built in stages over 20-30 years.[144] Tainui Group Holdings Ltd is currently seeking changes to industrial land allocation in the Proposed Waikato Regional Policy Statement, and changes to the Hamilton City District Plan, to allow the proposal to proceed.

4.2.5 Sea port

There is no major trading port in the Waikato region as illustrated in figure 55 and coastal shipping currently makes a minor contribution to land transport outcomes within the region. Currently Waikato provides a range of commercial and recreational port facilities, including:

- the Port at Taharoa (Port Waikato) for the specific purpose of loading iron sand;
- a small commercial fishing port at Raglan;
- ferry operations in Coromandel; and
- aquaculture operations around the Coromandel Peninsula.

[144] Tainui Group Holdings (2011, p. 8).

Approximately 40 per cent of all export tonnes through the Port of Tauranga originate from the Waikato region, or approximately 11 per cent of New Zealand's total exports.[145]

The role of coastal shipping will continue to be minor in the foreseeable future, with growth most likely to come from operations outside of the Waikato region. Future developments in the aquaculture industry may generate greater demand for coastal shipping in the future.

Figure 55: Heavy vehicles by annual average daily traffic, port tonnage and value[146]

4.2.6 Airports

Two airports service the Waikato region – Hamilton International Airport in the Waipa district and Taupō Airport in the Taupō district. Hamilton International Airport is located 13 km south of Hamilton.

Hamilton International Airport is a useful transport hub for the North Island and carries the sixth largest international airport in New Zealand by passenger numbers. Total passenger numbers have increased as shown in Figure 56 after declining from 2008-2010 due to the cancellation of international flights by Air New Zealand and the unfavourable economic climate. In the year ended June 2011 362,000 passengers arrived or departed Hamilton International Airport, an average of 41 passengers per hour. Auckland Airport, by comparison, processed 1,578 passengers per hour and

[145] Waikato Regional Council (2011k, p. 7).
[146] New Zealand Transport Agency (2011, p. 14).

Wellington Airport 593 per hour. The only freight handled by Hamilton International Airport is general cargo carried on domestic flights.

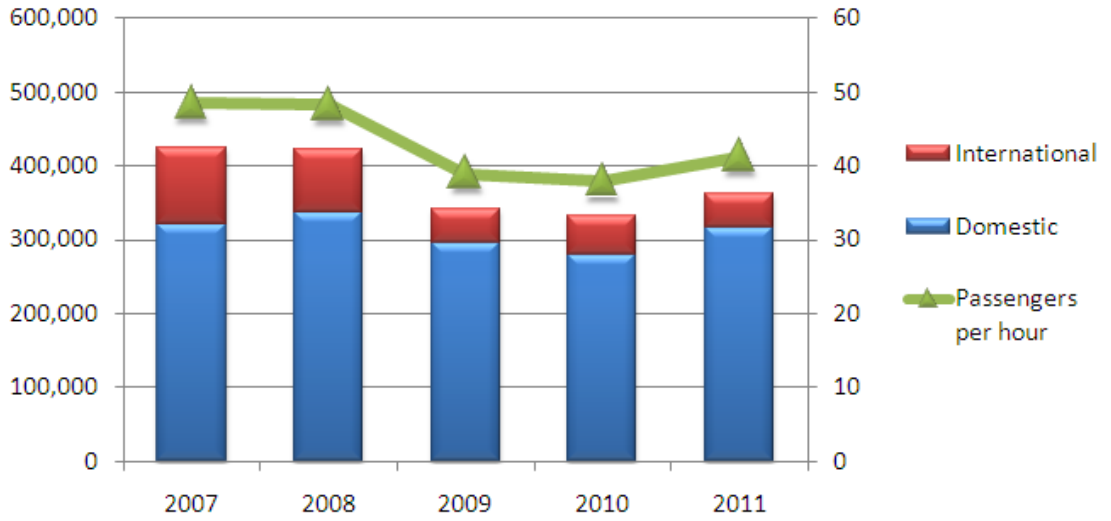


Figure 56: Hamilton International Airport passengers (2011)

In the year ended June 2011 there were 10,400 international arrivals to Hamilton International Airport, 0.42 per cent of the national total. More than two-thirds of international passengers arrive or depart through Auckland Airport, as shown in figure 57.

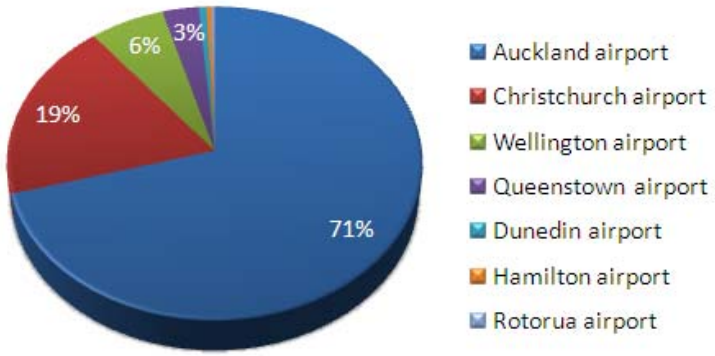


Figure 57: International arrivals by airport (2011)

The majority of international visitors who arrive at Hamilton International Airport state the purpose of their trip is to visit friends or family (71 per cent in 2011), as shown in figure 58. Holiday/vacation is the next most popular reason at 21 per cent, followed by business at 3 per cent. Christchurch and Queenstown get a much higher share of vacationers (62 and 80 per cent), while Wellington gets the highest share of visitors for business reasons (18 per cent). The number of international arrivals in Hamilton, particularly business visitors, peaked in the early 2000s after the extension of the runway and the entry of trans-Tasman carrier Freedom Air. Air New Zealand took over Freedom Air's international operations in 2008 and cancelled international flights from Hamilton in 2009. Virgin Australia currently provides the only international flights from Hamilton International Airport, with Brisbane as the sole destination.

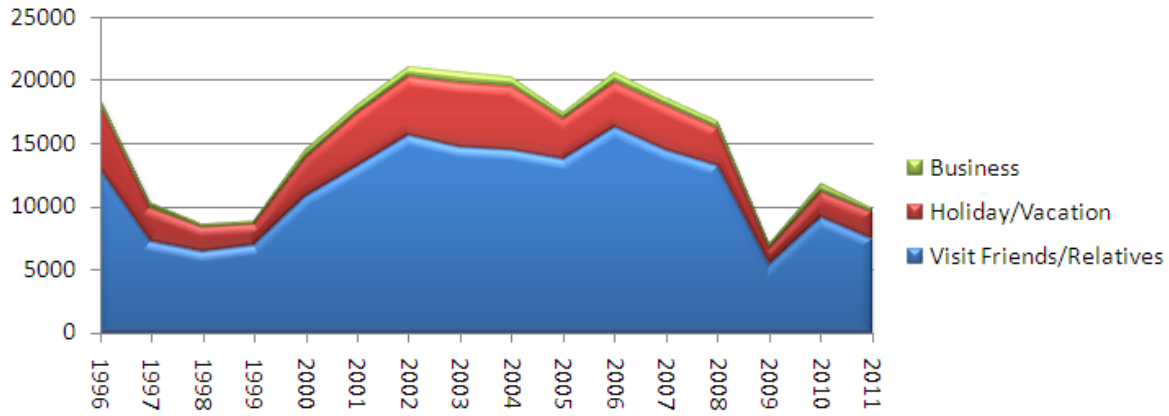


Figure 58: International arrivals to Hamilton by trip purpose (2011)

Hamilton International Airport is also home to CTC Wings, a British flight training organisation. Training aircraft make up a significant proportion of total aircraft movements.

The Hamilton International Airport runway is 2,195 metres long. In 2011, Hamilton International Airport received approvals and recommendations to extend the main runway to just short of 3,000 metres. There is no immediate timetable for an extension and the runway extension would only proceed when a business case exists. This approval is currently subject to appeals submitted to the Environment Court.

4.3 Energy

The National Infrastructure Plan (2011) focuses on the infrastructure required to extract, generate, store and distribute energy. Electricity, oil and gas are addressed separately as each has its own infrastructure network.

The key issues the National Infrastructure Plan identified for the energy sector were that:

- the market framework does not always ensure that the projects of most value to the overall energy network are completed first;
- New Zealand's energy mix will need to change over the next 20 to 40 years, in part because of resilience issues.[147]

Energy use is measured in terajoules (heat equivalents).[148] Figure 59 shows the 10 industries that used the most energy in the region in the year ending March 2004, by the main types of energy. For the purposes of reporting, these energy types have been aggregated into four categories: fossil fuels; electricity; wood/black liquor[149]; geothermal.[150]

It is estimated that a total of 36,546 terajoules of energy were consumed by the Waikato economy to the year ending March 2004. Two thirds (66.3 per cent) of this energy was consumed as fossil fuels. Electricity accounted for 19.9 per cent of energy consumed and wood/black liquor accounted for a relatively smaller share (13.7 per cent). Geothermal energy comprised less than one per cent of all energy consumed.[151]

[147] New Zealand Government (2011d, p. 33).
[148] Market Economics Ltd (2006b, p. 12). The terajoule is equal to one trillion joules. The joule is a derived unit of energy, work, or amount of heat. It is equal to the energy expended (or work done) in applying a force of one newton through a distance of one metre, or in passing an electric current of one ampere through a resistance of one ohm for one second.
[149] Black liquor is the spent cooking liquor from the kraft process when digesting pulpwood into paper pulp removing lignin, hemicelluloses and other extractives from the wood to free the cellulose fibres.
[150] Market Economics Ltd (2006b, p. 12) It is important to note that the energy accounts do not include electricity production i.e. as undertaken by the region's hydro, geothermal and thermal power stations.
[151] Market Economics Ltd (2006b, p. 12).

The 10 largest energy using industries accounted for 73 per cent of all energy consumed in 2003-2004. Road transport was the single largest consumer of energy at 5,628 terajoules (15 per cent of all energy consumed in the region), almost all of which was from fossil fuels. Paper product manufacturing was the second largest consumer of energy at 4,781 terajoules (13 per cent) with over half of this energy (58 per cent) provided from wood/black liquor. The third largest consumer of energy was dairy product manufacturing (3,758 terajoules, 10 per cent) – predominantly from fossil fuels.[152]

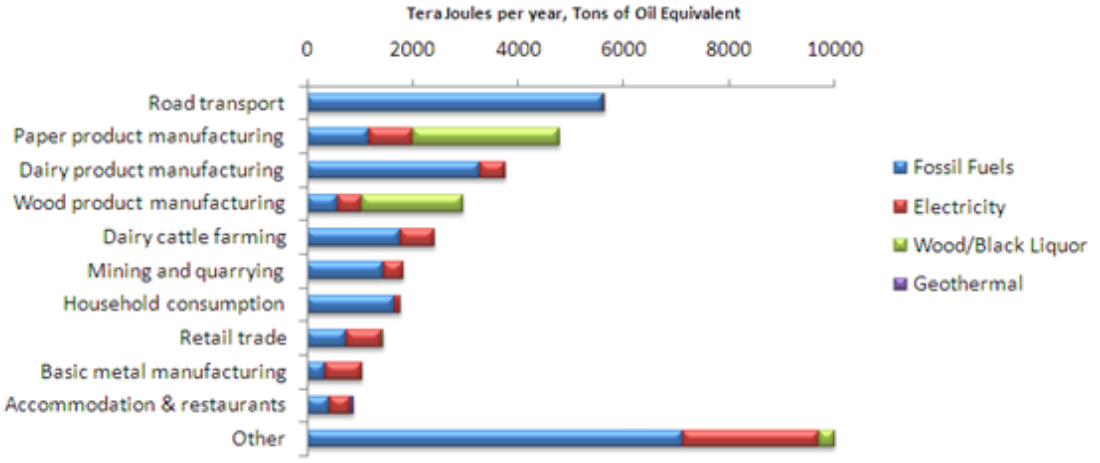


Figure 59: Top 10 energy consuming industries by energy type[153]

4.3.1 Electricity

Electricity[154] demand nationally has increased at approximately 2.5 per cent a year since the 1970s. That trend is strongly related to economic growth and population size and, based on Statistics New Zealand projections, demand is forecast to continue growing at a rate of around 1.5 per cent a year through to 2050,[155] despite the fact that there has been no increase in demand for the past four years. Security and reliability of supply is of such great importance that the Electricity Industry Act 2010 requires the Electricity Authority to appoint a Security and Reliability Council to provide independent advice to the Authority on the performance of the electricity system and the system operator and reliability of supply issues.

The Waikato region plays a major role in ensuring the security of electricity supply for the country as a whole. Waikato is New Zealand's premier electricity region, generating more electricity than any other single region in the country. The region has almost 40 per cent of installed generation capacity.[156] The generation type, capacity and location of plants in the region are shown in table 5 and figure 60.

Table 5: Generation capacity and plant type in the Waikato region (2011)

Plant Type	Number of plants	Rated capacity (megawatts[157])
Thermal	5	1519
Hydro	10	1450
Geothermal	7	610
Wind	1	0.8

[152] Market Economics Ltd (2006b, p. 13).
[153] Market Economics Ltd (2006b, p. 13).
[154] Electricity is energy produced in the form of electrons flowing in a conducting material, such as copper or aluminium as used in power lines. It is a secondary energy source produced from other forms of energy.
[155] Electricity Authority (2011, p. 3).
[156] Waikato Regional Energy Forum (2009, p. 5).
[157] The megawatt is equal to one million watts. The watt is a derived unit of power, defined as one joule per second.

The New Zealand Energy Strategy has signalled a target of having 90 per cent of New Zealand's electricity needs being met by renewable forms of energy by 2025. Waikato is likely to play an important role in this because it already produces up to one-third of the nation's renewable (non-fossil fuelled) electricity. Furthermore, in addition to major hydro-power generation (Waikato River and Tongariro schemes), the Waikato is well positioned with energy resources including:

- 75 per cent of New Zealand's geothermal resources;
- cogeneration plants at major forestry and dairy industries; and
- significant potentials for wind power, wave power and biofuels.[158]

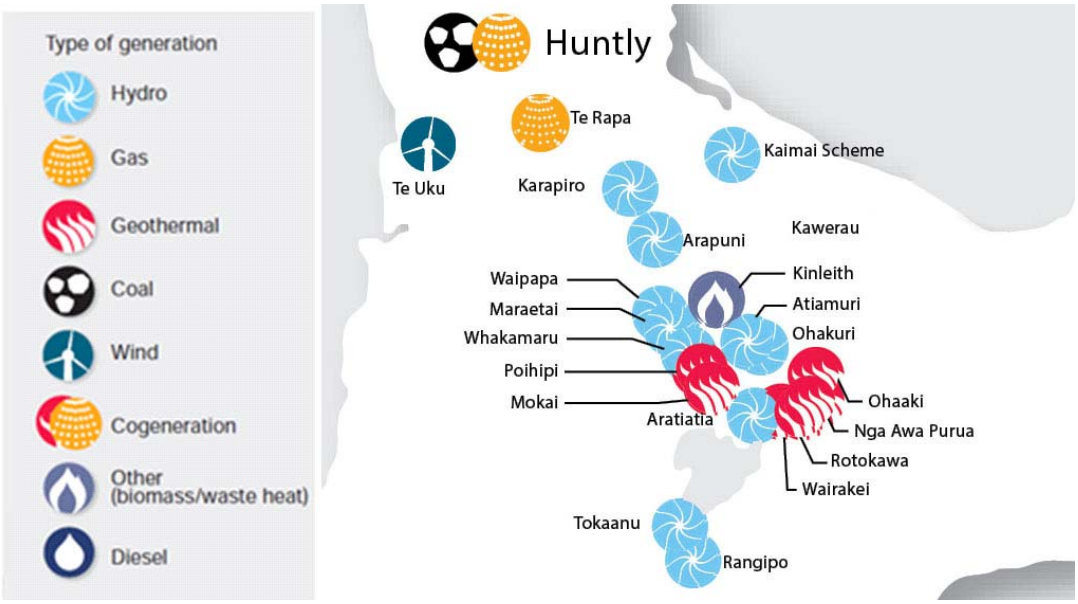


Figure 60: Location of electricity generators in the Waikato region[159]

Hydro generation is considered a "mature" technology in the region in that there is not much scope for future development of large dams in addition to the now fully developed Waikato River Hydro Scheme.

New Zealand is one of the most geothermally active countries in the world, and about 75 per cent of the nation's geothermal resources are in the Waikato region, as shown in Figure 61.[160] In addition to the existing geothermal power stations in the region, which began with Wairakei in 1958, ongoing developments include Mighty River Power's 82 megawatt Ngatamariki plant north-east of Taupō[161] and Contact Energy's 159 megawatt Te Mihi plant north of Taupō[162]. Both are due to be completed in 2013.

[158] Waikato Regional Energy Forum (2009, p. 28).
[159] Electricity Authority (2011, p. 21). Does not show the Tauhara One/Te Huka plant.
[160] Waikato Regional Council (2010, p. 85).
[161] Mighty River Power (2012) Mighty River Power development projects update.
[162] Contact Energy (2012) The Te Mihi project.

Figure 61: Map of geothermal systems in the Waikato region[163]

Further windfarm projects of 600 megawatts approximately are at various stages of progress, with one in development, one consented but on hold and one consent being progressed. New technologies to convert marine energy (particularly wave energy) have been suggested for the region's west in an assessment of renewable energy potentials.[164]

In addition to having the capacity to generate up to 20,425 gigawatt hours, Waikato is also a major corridor for electricity transmission. As many of the nation's key electricity generation facilities are in Waikato or to the south, much of New Zealand's electricity is transported through the region, as shown in figure 62. A significant portion of this electricity is actually generated in Waikato itself – and exported to other regions.[165]

[163] Waikato Regional Energy Forum (2009, p. 63).
[164] Waikato Regional Council (2010, p. 54).
[165] Waikato Regional Energy Forum (2009, p. 30).

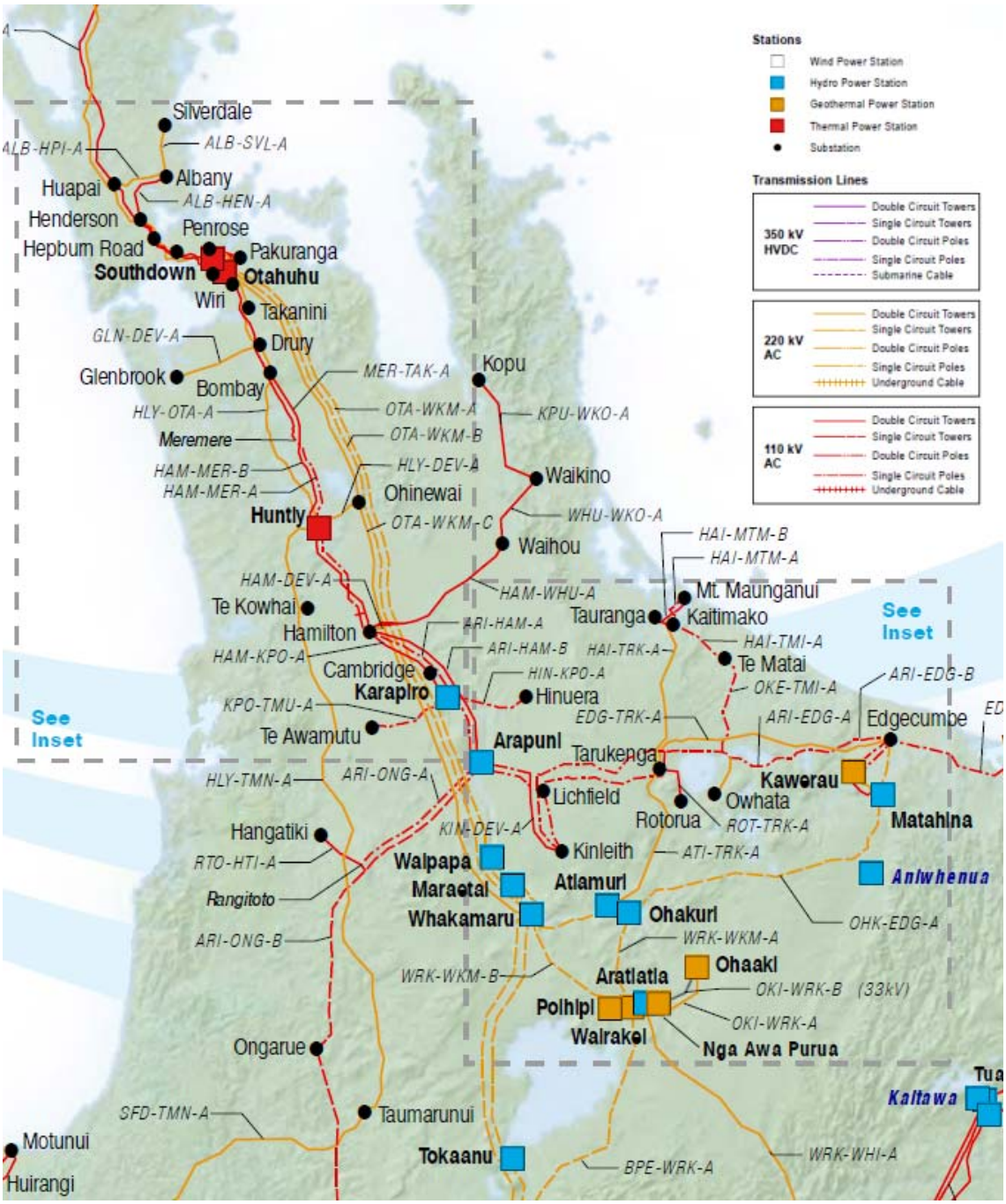


Figure 62: Transpower transmission map of the Waikato region[166]

[166] Transpower (2011) Transpower Transmission Network: North Island.

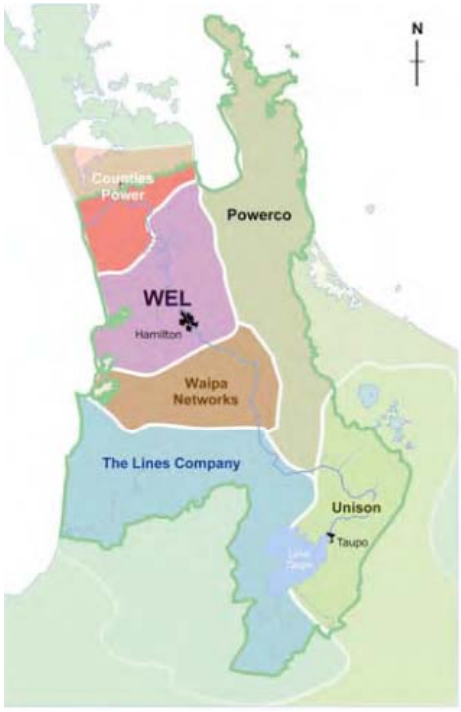


Figure 63: Line companies in the Waikato region[167]

Six line companies operate distribution networks in the Waikato region, as shown in figure 63.

WEL Networks Ltd is based in Hamilton, and therefore has a large load centre. Waipa Networks with the towns of Cambridge and Te Awamutu, and Counties Power with Pukekohe also have reasonably sized load centres. However all Waikato line companies have sizeable parts of their networks in rural and remote areas.[168] Urban networks tend to be more reliable than rural networks because cables are underground rather than overhead, they are generally closer to Transpower points of connection and greater density offers multiple supplies in case of failure.

Nationally, there are 14 electricity retailers that sell power to the consumer.[169] In the Waikato region, the major retailers include Contact, Genesis, Meridian, Trustpower and Mercury (owned by Mighty River Power).[170]

4.3.2 Coal

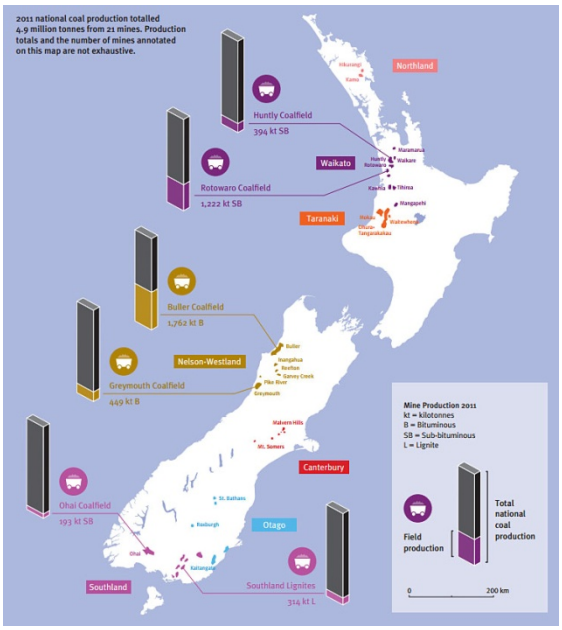
The Waikato region is the predominant source of coal in the North Island and contains 13 coalfields extending from Maramarua to Mangapehi, as illustrated in figure 64. The main coalfields are Maramarua, Waikare, Huntly and Rotowaro in the north of the region, and Kawhia, Tihiroa and Mangapehi in the south.[171]

Waikato (especially the northern part of the region) produces a high quality thermal coal. Coals cover the full sub-bituminous rank range, from sub-bituminous C in the Tihiroa, Kawhia, Waikare and Maramarua fields, to sub-bituminous A in Glen Massey, Rotowaro, Huntly and Pukekawa fields. Coals in the north of the region generally have low to medium ash and low sulphur contents, whereas those in the south have medium to high ash and sulphur contents.[172]

It is estimated that there about 2 billion tonnes of coal in the ground in the Waikato region[173], out of estimated national in-ground resources of all coals of over 15 billion tonnes. 80 per cent of those are South Island lignites.[174]

Figure 64: Coal fields in the Waikato region[175]

[167] Waikato Regional Energy Forum (2009, p. 47).
[168] Waikato Regional Energy Forum (2009, p. 47).
[169] Switchme (2012) All New Zealand power companies.
[170] Waikato Regional Energy Forum (2009, p. 47).
[171] Ministry of Economic Development (2011d) Coal resources: Waikato region.
[172] Ministry of Economic Development (2011d) Coal resources: Waikato region.
[173] Ministry of Economic Development (2011d) Coal resources: Waikato region.
[174] Ministry of Economic Development (2012a) Coal Resources.
[175] Ministry of Economic Development (2011d) Coal resources: Waikato region.



Coal has been mined in the Waikato region since the late 1840s. By the 1950s, production was over 1 million tonnes a year, and now stands at over 2 million tonnes a year.

The coal output of the Waikato region represented more than 38 per cent of New Zealand's total output in 2010[177], and about 70 per cent of the coal produced for domestic consumption.[178] Major New Zealand coal fields are illustrated in figure 65.

Figure 65: Coal production by field[176]

Most production is by opencast mining at the Rotowaro mine, which produces 1.0-1.3 million tonnes a year. Approximately 5 million tonnes of recoverable coal remains. Approximately 70 per cent of Rotowaro's coal is trucked to the Huntly West Mine site and either transported by overland conveyor to Genesis Energy's Huntly Power Station or stockpiled for future use. About 25 per cent of the coal mined at Rotowaro is railed directly to New Zealand Steel's mill at Glenbrook, near Auckland. A small proportion of annual production is bagged for household use, although Solid Energy New Zealand Ltd is progressively withdrawing from supplying the coal home heating market.[179]

The Huntly East Mine produces approximately 400,000 tonnes of coal and is the last remaining underground mine in the North Island.[180] As at 2007, approximately 1 million tonnes of recoverable coal were available for extraction in the licensed area and there was a further 7 million tonnes of accessible coal in nearby areas. Approximately 95 per cent of the coal produced at Huntly East Mine is railed directly to New Zealand Steel's mill at Glenbrook.[181]

Huntly sub-bituminous coal is also sought after by lime manufacturers, meat works, timber processing plants, and light industrial and horticultural businesses.[182]

A significant part of the remaining resource is more than 300 metres deep, but there are also extensive resources at opencastable depth. The latter include coal beneath the Huntly township, and the largest unworked block of opencastable coal left in the North Island, at Ohinewai in the Waikare Coalfield.[183]

Solid Energy New Zealand Ltd is investigating a technology that could allow New Zealand to recover coal from deep, difficult-to-mine coal deposits without digging it from the ground. Underground Coal Gasification (UCG) uses a chemical reaction to convert coal into a gas hundreds of metres underground, then bring the gas to the surface through a pipe.[184]

[176] Ministry of Economic Development (2012c, p. 34).
[177] Ministry of Economic Development (2011e) Facts and figures.
[178] Ministry of Economic Development (2011d) Coal resources: Waikato region.
[179] Solid Energy New Zealand Ltd (2011b, p. 1-2).
[180] Ministry of Economic Development (2011d) Coal resources: Waikato region.
[181] Solid Energy New Zealand Ltd (2007, p. 1).
[182] Solid Energy New Zealand Ltd (2011b, p. 2).
[183] Ministry of Economic Development (2011d) Coal resources: Waikato region.
[184] Solid Energy New Zealand Ltd (2010, p. 1).

Solid Energy New Zealand Ltd has also been investigating recovering naturally occurring methane gas from deep, difficult-to-mine coal seams as a source of industrial energy in the Waikato region since 2005. Initial coal seam gas (CSG) trials in the Waikato extracted high quality gas – 98 per cent methane – which has been used to generate electricity for the national grid. Although these trials delivered significant knowledge about the technology, they were undertaken within a confined area. Solid Energy New Zealand Ltd has since been granted resource consents by WRC to take the next step to carry out CSG production testing.[185]

4.3.3 Gas

The supply of natural gas in New Zealand is produced in the Taranaki region from 11 fields – with production dominated since the late 1970s by the Maui field.[186]

Waikato is a major consumer of reticulated natural gas, as well as an important corridor for the gas pipeline from Taranaki to other regions.

There are over 2500 km of high-pressure transmission pipelines across the North Island, as shown in figure 66. These are predominantly owned by Vector (which acquired the Natural Gas Corporation), and the Maui pipeline extending from South Taranaki to Huntly is owned by Maui Development Ltd. More than half the distribution pipeline and service connections are in Waikato.[187]

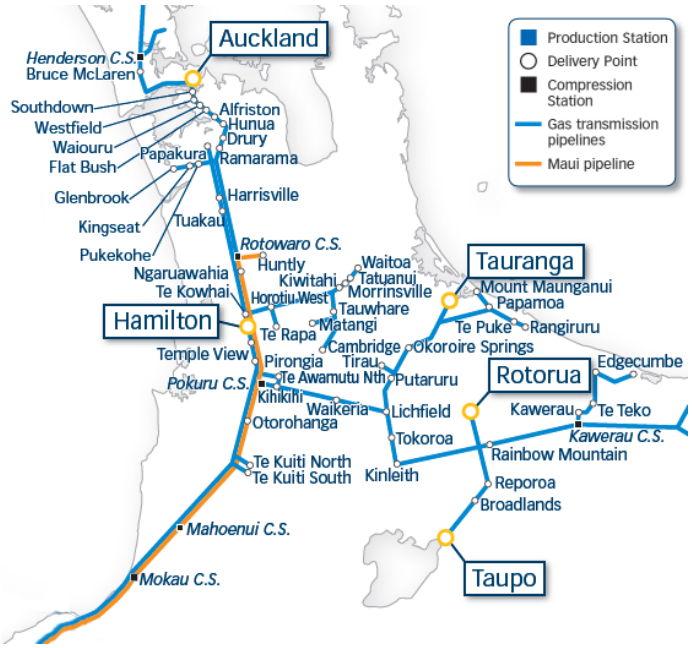


Figure 66: Map of gas pipelines[188]

One of the largest users of this gas is the Huntly Power Station. The original 1000 MW Huntly Power Station was built as a dual-fired plant, capable of operating on both coal and gas. However, with the decline of the Maui gas field after 2003, Genesis Energy switched the power station to run mainly on coal. Overall gas consumption at the Huntly plants was boosted with the addition of the 48 MW open-cycle gas turbine generator, plus the August 2007 opening of the new 400 MW combined cycle gas-fired plant (Unit 5), which uses gas from new gas fields such as Kupe and Pohukura.[189]

Apart from Huntly, gas is also used in dual-fuel operations (along with coal) at a cogeneration plant, operated by Contact Energy at Fonterra's Te Rapa dairy factory. Apart from electricity generation, gas is used in a range of industries from fertiliser production through to the dairy industry.[190]

Disruption to gas supply in 2011 highlighted both the dependence of several industrial users in the Waikato region on this resource and the vulnerability of the gas pipeline.

[185] Solid Energy New Zealand Ltd (2011a, p. 1).
[186] Waikato Regional Energy Forum (2009, p. 93).
[187] Waikato Regional Energy Forum (2009, p. 90).
[188] Vector Ltd (2009) Transmission pipeline map.
[189] Waikato Regional Energy Forum (2009, p. 91).
[190] Waikato Regional Energy Forum (2009, p. 92).

4.3.4 Oil

Waikato does not produce oil, but it relies on it as a fuel for transport and industry. Although regional data are not available, New Zealand's oil demand has grown steadily since the mid 1980s. In 2010, New Zealand consumed 147,000 barrels per day, which represented an increase of 12.2 per cent since 2000.[191] Oil currently provides over half of New Zealand's consumer energy demand, and almost 98 per cent of our transport fuel.[192]

New Zealand's oil is extracted from 18 fields in the Taranaki region and almost all of it is exported. Imported crude oil is processed at Marsden Point Oil Refinery, which produces 75 per cent of the fuel consumed in New Zealand each year.

A pipeline from Marsden Point to Auckland carries 40 per cent of total fuel volumes, with the remainder transported by two ships to a network of ten coastal terminals. The largest storage facility is at Wiri in South Auckland: 33 per cent of New Zealand's fuel consumption passes through each year.[193]

The National Infrastructure Plan (2011) states that oil infrastructure has been highly reliable, with no significant supply interruptions to date. However, some storage terminals may be near the end of their useful life and some investment and rationalisation in these areas can be expected over the next ten years.[194] Oil supply, on the other hand, is altogether less certain.

World oil production is dominated by a relatively small number of countries. Major oil exporting countries production volumes are reducing, or at least slowing as large and 'easy' oil reservoirs are drained, leaving smaller and more difficult fields for production.

However the developed world's demand for energy is unabated. Concurrently, demand for oil in emerging economies such as China, India and Brazil is rising. Rising economies such as China and India have put increasing demands on global oil reserves as they continue to grow. This development and higher standards of living in such populated and increasingly urbanised countries raises national oil consumption levels through increases in demand which ultimately leads to increased pressure on oil reserves.[195]

According to the International Energy Agency (2010), production from known oil and gas reserves will fall by approximately 40-60 per cent by 2030. The largest oil producing countries in the world are now beginning to see the pinnacle of oil extraction in their regions. As reserves decline and with demand continuing to rise, prices will escalate as the resource becomes more and more sought after.[196]

The International Energy Agency anticipated in 2010 that world oil production from known sources would go into permanent decline because the production rate from new fields is smaller than the depletion rate. Remaining oil reservoirs of significance lie now in areas of political instability and difficult to access areas such as polar and offshore regions. This adds risk to oil supply, increasing the vulnerability of importing countries and increased costs at the consumer level from raised cost of extraction.[197]

[191] BP (2011, p. 9).
[192] Ministry of Economic Development (2010, p. 9).
[193] New Zealand Government (2011g, p. 34).
[194] New Zealand Government (2011g, p. 34).
[195] International Energy Agency (2010, p. 5).
[196] WWF (2011, p. 14).
[197] Krumdieck et al (2011, p. 8).

4.4 Water

4.4.1 Introduction

According to the National Infrastructure Plan (2011), water infrastructure can be discussed under two different groups of assets:

- Urban water infrastructure: This network provides safe and potable water, manages wastewater and stormwater, services business and residential water needs and treats trade and industrial waste.
- Productive water infrastructure: This asset group includes infrastructure required for productive activities – such as irrigation, hydro-generation, agro-processing, rural domestic supply and stock water. Investment in these assets is at a crossroad, particularly in relation to large infrastructure projects, as investors look for increased certainty (including security in relation to water allocation) and better clarity on the role of the government.[198]

Figure 67 outlines the sources and infrastructure associated with urban water and productive water.

The latest available information about urban water infrastructure has been obtained from territorial authorities, which own and maintain this infrastructure.

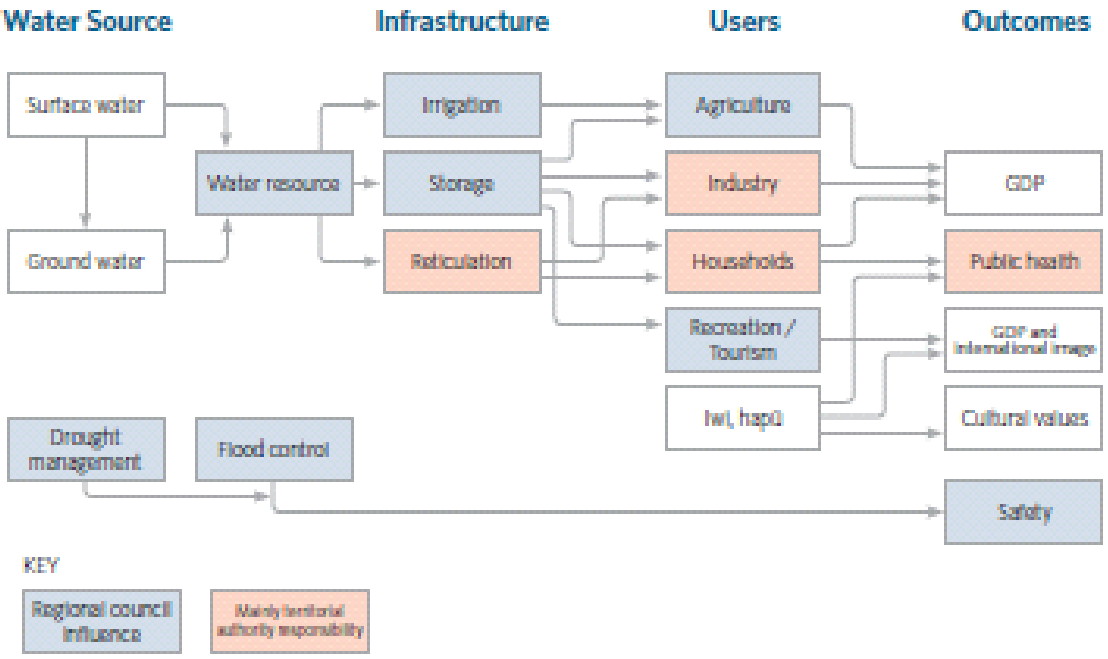


Figure 67: Water: from sources to outcomes[199]

4.4.2 Urban water infrastructure

Hamilton City Council

Water supply assets include one treatment plant, eight reservoirs and 1079 km of water reticulation network.[200] The depreciated replacement cost of these assets is $237,589,000.[201]

Stormwater assets include approximately 620km of pipes, 90km of open channels and 11,800 catchpits. The majority of Hamilton city's public stormwater network was installed in the period from 1960-2000. Most pipelines have anticipated service lives

[198] New Zealand Government (2011d, p. 39).
[199] New Zealand Government (2011d, p. 45).
[200] Harty (2010, p. 11).
[201] Hamilton City Council (2009, p. 233).

between 75 and 100 years.[202] The depreciated replacement cost of these assets is $263,435,000.[203]

Wastewater assets include approximately 780km of pipeline, 127 pump stations and the wastewater treatment plant. The plant was constructed in 1971 and upgraded in 2001 and 2010 and is in good condition. The majority of Hamilton city's wastewater pipe network (including pump stations) was installed from 1960-1980, with the majority of anticipated service lives between 75 and 100 years.[204] The depreciated replacement cost of these assets is $229,154,000.[205]

Hauraki District Council

Water is treated and reticulated to eight public water supply systems.[206] From 2009-2019 the Hauraki District Council has a capital works programme for water supplies which totals $41 million, the majority of which will be spent in the period 2009/10 to 2013/14.[207] There will be a significant financial impact for Hauraki District Council due to the capital required to meet new drinking water standards under the Health (Drinking Water) Amendment Act in October 2007, and this impact will be in addition to the capital works required to provide for other drivers (demand and renewal requirements).[208] Capital provision is also made for the significant upgrading and replacement programme for main water supply pipelines needed to connect the larger treatment plants with the areas presently served by small water takes, as well as replacement of mains to meet serviceability and security of supply requirements.[209]

Stormwater assets include 40.9km of open drains, 79.9km of reticulation, 840 manholes and two pump stations.[210] Minor improvements and renewals are programmed from 2009-2019.

Wastewater assets include seven treatment plants and 43 pump stations.[211] Hauraki District Council has completed a major programme of consent renewals and upgrading of four wastewater treatment plants. These upgrades ensure that wastewater systems are able to withstand increased demands over 10 years.[212]

Land drainage assets include 668km of drains, 96km of stopbanks, 10 sluice gates, 120 floodgates, 5 pump stations, numerous access culverts and fences and three mobile flood pumps.[213] These drainage systems are nearly fully developed and are on a programme of maintenance and renewal.[214]

Matamata-Piako District Council

Water supply assets include 29.24km of reticulation as part of eight schemes. Major projects planned from 2009-19 include district wide watermain replacements.[215]

Stormwater assets include over 126km of piped and open drains in the district's urban areas.[216]

Wastewater systems are in place in Matamata, Morrinsville, Te Aroha, Waihou and Tahuna. The current 10-year renewal programme is mainly age based.[217]

[202] Hamilton City Council (2009, p. 234).
[203] Hamilton City Council (2009, p. 233).
[204] Hamilton City Council (2009, p. 234).
[205] Hamilton City Council (2009, p. 233).
[206] Hauraki District Council (2009, p. 182).
[207] Hauraki District Council (2009, p. 41).
[208] Hauraki District Council (2009, p. 43).
[209] Hauraki District Council (2009, p. 186).
[210] Hauraki District Council (2009, p. 202).
[211] Hauraki District Council (2009, p. 190).
[212] Hauraki District Council (2009, p. 192).
[213] Hauraki District Council (2009, p. 195).
[214] Hauraki District Council (2009, p. 198).
[215] Matamata-Piako District Council (2009, p. 137).
[216] Matamata-Piako District Council (2011, p. 49).

Ōtorohanga District Council

Water assets include two treatment plants, one bore, four reservoirs, four rural supply schemes and 42km of mains.[218] Significant upgrading of water treatment plants was planned for compliance with drinking water standards by July 2012.[219] There has been an active programme of water main renewals and council's water supplies are currently well maintained and in sound condition.[220]

Stormwater assets include around 7km of piped mains, 5km of open drains and four pump-stations.[221] Ōtorohanga District Council's wastewater assets are currently well maintained and believed to be in sound condition.[222]

Wastewater assets include around 31km of pipelines, 12 pump stations and an oxidation pond/wetland wastewater treatment facility.[223] Ōtorohanga District Council's wastewater assets are currently well maintained and believed to be in sound condition but an upgrade of the Ōtorohanga wastewater treatment process may be required for renewal of Ōtorohanga District Council's discharge consent.[224]

Rotorua District Council

Water supply assets include nine sources, 16 pump stations, 22 reservoirs, 24,000 connections and 688km of pipe work.[225]

Stormwater assets include 450m of lined channel, 87.9km of open channels, 742m of overland flowpaths, 230.4km of piped networks, two pump stations and three flood detention dams. Stormwater pipes are mostly less than 50 years old.[226] The asset management plan has a comprehensive renewal programme to maintain the service over its full lifecycle.[227]

Wastewater assets include one central wastewater treatment plant, one composting plant, one land effluent disposal system, 68 pumping stations, 7,270 manholes, 418km of sewer gravity and rising mains, 20,300 lateral connections.[228]

South Waikato District Council

Water supply assets include four urban and two rural water supply networks, totalling over 200km of pipeline and six treatment plants. The network has an estimated replacement value of $42 million. A considerable amount is being spent on upgrading the network because of an aging pipe network and new national water standards.[229]

There are stormwater systems in the four main centres with planned replacements managed under the asset management plan.

The wastewater treatment plants at Putaruru and Tokoroa are to be upgraded within the next 10 years to provide an improved treatment standard. Planned replacements of older or weaker pipes or connections will be carried out according to the wastewater asset management plan predictive model and routine inspections of the system.[230]

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[217] Matamata-Piako District Council (2009, p. 131).
[218] Otorohanga District Council (2011c) Water supply.
[219] Otorohanga District Council (2009, p. 55).
[220] Otorohanga District Council (2009, p. 56).
[221] Otorohanga District Council (2011a) Storm water.
[222] Otorohanga District Council (2009, p. 63).
[223] Otorohanga District Council (2011b) Waste water.
[224] Otorohanga District Council (2009, p. 60).
[225] Rotorua District Council (2009, p. 263).
[226] Rotorua District Council (2009, p. 223).
[227] Rotorua District Council (2009, p. 225).
[228] Rotorua District Council (2009, p. 244).
[229] South Waikato District Council (2009, p. 144).
[230] South Waikato District Council (2009, p. 145).

Taupō District Council

Water supply assets include 570km of pipes, 1,572 water meters, 3,946 valves, 1,780 fire hydrants, 14 bores, 301 backflow preventers, 43 flow meters, 35 pump stations, 65 reservoirs with total reservoir storage capacity of 32,415m^3, 35 buildings, and 18,912 registered connections. These assets are estimated to be valued at $53 million.

In excess of $16 million was identified in the 2009-19 Long Term Council Community Plan for renewal/replacement of Taupō District Council's existing infrastructure and a further $25 million (approximately) was allocated for upgrades required for the existing community and in order to cater for population growth, including a new water treatment plant to enable compliance with the Drinking Water Standards for New Zealand 2005.[231]

Stormwater assets include 206km of pipes, 4,077 catch pits, 450 inlets/outlets, 2,929 manholes, 33 soakholes and four pump stations.[232]

Wastewater assets include 350km of pipes, 6,651 manholes, 98 pump stations, 12 treatment plants and 13 treated effluent disposal sites, 26 buildings and 16,538 registered connections.[233] A programme of improvements has been built between late 2009 and 2012. Further upgrades are planned between 2012 and 2020.

Thames-Coromandel District Council

Water supply assets include nine systems, with each comprising water sources (surface takes and groundwater bores), treatment, storage, reticulation network and pump stations (in some instances).[234] The majority of the reticulation pipework was built from 1950 onwards and the depreciated replacement cost in 2008 was $39,654,853.[235]

Stormwater assets consist of 231km of stormwater pipes, almost 8,300 manholes and assorted minor drainage structures.[236] Most of the current pipework was built from 1950 onwards and the depreciated replacement cost in 2008 was $74,498,017.[237]

Wastewater assets include 367km of pipes and just over 4,500 manholes. The majority of the reticulation pipework was built from 1970 onwards[238] and the depreciated replacement cost in 2008 was $66,392,618.[239]

Waikato District Council

Water supply assets include five water treatment plants, a bore supply and a spring/bore supply. The district also has 21 reservoirs and 593km of reticulation network. Waikato District Council's water treatment and supply infrastructure is currently valued at $52 million. The 2009 Long Term Council Community Plan identifies a further $43 million of expenditure to be invested in maintenance, renewal and upgrade of the infrastructure over the 2009–2019 period.[240]

Stormwater assets include 72km of pipes, 1556 manholes, 20 urban flood protection assets and 678km of rural stormwater drains. The depreciated replacement cost of these assets is $33,399,505.[241]

[231] Anderson (2010, p. 13).
[232] Taupo District Council (2009, p. 189).
[233] Taupo District Council (2009, p. 197)
[234] Thames-Coromandel District Council (2009c, p. 23).
[235] Thames-Coromandel District Council (2009c, p. 28).
[236] Thames-Coromandel District Council (2009a, p. 17).
[237] Thames-Coromandel District Council (2009a, p. 18).
[238] Thames-Coromandel District Council (2009b, p. 29).
[239] Thames-Coromandel District Council (2009b, p. 30).
[240] Bax (2010, p. 9).
[241] Waikato District Council (2009, p. 141).

Wastewater assets include 191km of pipes, 2,789 manholes, 9 treatment plants and 79 pumping stations. The depreciated replacement cost of these assets is $51,320,801.[242]

Waipa District Council

Water supply assets include seven treatment plants, 10 booster stations, 13 Reservoirs, two bores, four pipe bridges and 502km of reticulation.[243] The current replacement value of this infrastructure is $119.581 million and Waipa District Council has earmarked $53.6 million in investment in the infrastructure for the ten year period up to the 2018/19 financial year.[244]

Stormwater assets consist of 123km of pipes, 2,212 manholes and other related structures such as open drains, streams, swales, soak systems and retention structures.[245] Assets range from new to 80 years of age, with the majority of the reticulation schemes in Cambridge and Te Awamutu being constructed of reinforced concrete in the 1970–1980 period. Based on pipe age, material and some field inspections, most of the pipes in the network are in "fair condition" with some pipes in "poor to very poor condition". A renewal programme to maintain the condition of the stormwater assets is included in the 2009-19 Long Term Council Community Plan.[246]

Waipa District Council provides a reticulated wastewater service to 10,749 connected properties in the townships of Cambridge, Karapiro, Te Awamutu and Kihikihi. The sewer mains have been identified as nearing the end of their operational life and renewal of these is required to reduce the risk of groundwater entering the system and causing sewer overflows in winter. Expenditure on sewer main renewals for the 10 years of the 2009-19 Long Term Council Community Plan is $15.2 million.[247]

The wastewater treatment plant performance, as a whole, is also being reviewed and a major upgrade ($15.2 million) of the plant is scheduled for years three and four of the 2009-19 Long Term Council Community Plan. Approximately 30 per cent of this upgrade can be attributed to meeting future growth requirements, including Cambridge North, St Kilda and Titanium Park. The plant will be designed to service a population equivalent to 30,000 people (this is a mix of residential, commercial and industrial).[248]

Waitomo District Council

Public water supply schemes are provided by the Waitomo District Council at Te Kuiti, Benneydale, Piopio and Mokau.[249]

Stormwater assets, located mainly in the townships of Te Kuiti and Piopio, consist of a disposal network made up of open drains and some piped reticulation with associated structures. In rural areas the stormwater disposal infrastructure is mostly made up of components such as kerb and channel or drainage culverts associated with stormwater control on the local roads network.[250]

Wastewater assets include sewerage disposal schemes at Te Kuiti, Benneydale and Te Waitere with a new scheme under construction for Piopio.[251]

[242] Waikato District Council (2009, p. 147).
[243] Waipa District Council (2009, p. 172).
[244] Shaw (2010, p. 6).
[245] Waipa District Council (2009, p. 161).
[246] Waipa District Council (2009, p. 162).
[247] Waipa District Council (2009, p. 184).
[248] Waipa District Council (2009, p. 184).
[249] Waitomo District Council (2011) Water supply.
[250] Waitomo District Council (2011) Stormwater.
[251] Waitomo District Council (2011) Sewerage disposal.

4.4.3 Productive water infrastructure

Irrigation

From 1910 to 1990 the government constructed a total of 49 irrigation schemes nationally, including three in the Waikato region.[252] The government sold the schemes from 1990 onwards. Table 6 summarises the schemes.

Table 6: Irrigation scheme valuations and results of sale process[253]

Scheme	Date of Scheme Approval	Date of First Supply	Number of Irrigators	Irrigable Area (ha.)	Currently Irrigated Area	Purchase Price ($)
Glenbrook	1986	1987	20	141	28	10,000
Te Kauwhata	1984	1985	56	433	218	7m
Pukerimu	1985	1986	29	651	90	

The Te Kauwhata scheme is currently run by the Te Kauwhata Water Association, which has extended the scheme to meet the needs of other water users in north Waikato.[254]

In the Waikato region, irrigation is mostly undertaken by individual irrigators taking surface or ground water directly, with associated on-farm infrastructure.

The Government's Irrigation Acceleration Fund invited proposals in September 2011 and provides $35 million over five years to support the development of proposals to the 'investment ready' prospectus stage. The fund will support regional scale rural water infrastructure proposals that address:

- regional rural water infrastructure
- community irrigation schemes, and
- strategic water management studies.

The Government will contribute up to 50 per cent through the fund to successful proposals.[255]

Flood protection and control

It was estimated in 2009 that more than $2.126 billion of total economic output[256] was generated in areas covered by the Lower Waikato, Piako River and Waihou Valley flood protection schemes maintained by WRC in the region.[257] The majority of productive dairy land in the Waikato region lies within the direct benefit area and the schemes provide a direct protection benefit to 305,000 hectares. Taking into account the wider effects of this activity (for example, the transporting and processing of agricultural output) gives an indication of the value of economic activity that is protected by the schemes. Land use of the direct benefit areas is shown in figure 68.

[252] Farley (1994, p. 9).
[253] Farley (1994, p. 13).
[254] Te Kauwhata Water Association Inc (2007) Our history.
[255] New Zealand Government (2011f) Proposals invited for irrigation fund.
[256] Value added, which is calculated by subtracting the cost of inputs from the total output, was $796 million.
[257] River & Catchment Services Group, GHD Ltd (2011a, p. 28) and River & Catchment Services Group, GHD Ltd (2011b, p. 25).

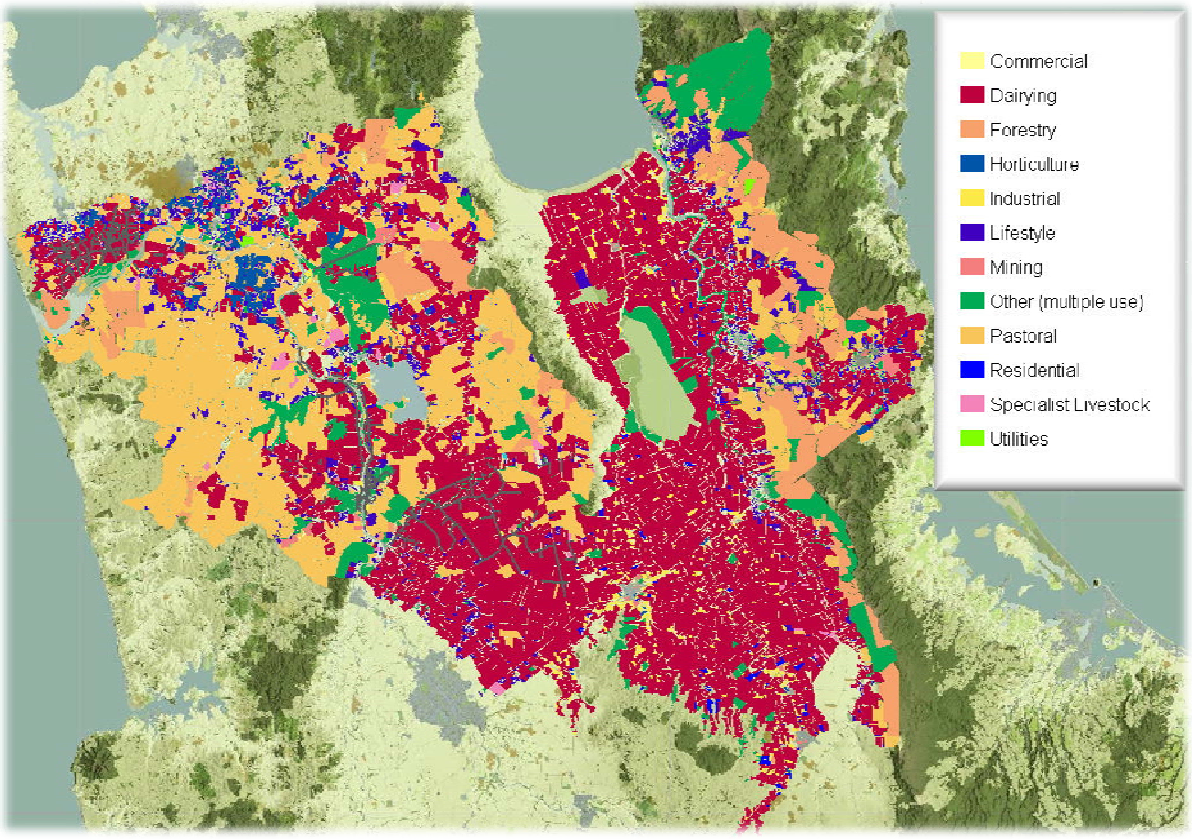

Figure 68: Flood protection direct benefit area and land use

The most significant flood protection and river management activities occur within two zones – the Lower Waikato and Waihou Piako. The features of these schemes are summarised in table 7.

Table 7: Summary of features of Waikato region flood protection and control schemes

	Lower Waikato	Waihou Piako
Flood protection provided to	41,000 ha	250,000 ha
Value of flood assets (RV)	$108 million	$221 million
Annual expenditure (flood/river only)	$3.7 million (3.4% of asset value)	$6.6 million (3% of asset value)
Annual capital spend Annual depreciation	$1.3 million $1 million	$1.9 million $2.5 million
Assets	Stopbanks 250 km Floodgates 253 Pump stations 66 Channels/streams 250 km Pumps 120	Stopbanks 343km Floodgates 134 Pump stations 52 Channels/Streams 986km

Although the direct beneficiaries of the schemes are landowners in the flood plains, it is also worthwhile noting that SH 1, 2, 25, 26 and 27 all go through the floodplains of the Lower Waikato and Waihou Piako catchments. Sections of SH 2 and 25 are currently below high tide level. The flood protection works ensure that these roads remain open and viable in their present form and location.

In the Waihou and Piako zones, service level reviews were completed in 2011. The outcomes of these surveys represent substantial progress in the quality of the information available, supported by WRC's asset management system.

The surveys identified that there is a need to carry out substantial capital programmes in coming years in order to maintain the agreed service levels. This will ensure that the schemes perform to their design. The following flood capital works have been identified and proposed to be undertaken:

- Piako: Works of $3.26 million over a 7 year period;
- Waihou: Works of $2.45 million over a 5 year period; and
- Lower Waikato: Works of $3.6 million over a 10 year period.

4.5 Telecommunications

This sector includes:

- the Southern Cross Cable, an undersea cable of three fibre pairs by which New Zealand receives data from the world
- a nationwide copper cable network
- national fibre-based backhaul networks for intercity connectivity
- television and radio signals delivered across radio spectrum, and
- three cellular mobile networks.[258]

Detailed information about these networks at the regional level is not available.

The National Infrastructure Plan (2011) notes that future demand for communications technology outstrips current communications infrastructure. New Zealand's copper network cannot be upgraded to provide the speed and capacity consumers will expect in the medium term, and investment in wireless, while strong, cannot provide a complete alternative in the short-term.[259]

While there has been some investment in fibre networks in major urban centres in New Zealand, it is clear that the market has not been ready, or may not have adequate incentives, to build the infrastructure required to deliver fibre on scale quickly. Furthermore, fibre may have not been initially deployed to those users that will provide productivity gains (e.g. schools, hospitals) as they may not always be the most commercially attractive targets for private investment. Finally, there is a significant gap between broadband availability, services, speed and quality in urban and rural areas.[260]

These issues constrain opportunity for communications technology to contribute to the economy through improvements in efficiency (e.g. through the use of communications in health and education and for business transactions) and through the creation of new markets (such as film production). In addition, improvements to communication options in rural areas could lead to improvements in productivity.[261]

The Government is currently implementing the Ultra-Fast Broadband (UFB) initiative and Rural Broadband Initiative (RBI). The UFB initiative will see fibre-optic cable made available to 75 per cent of New Zealanders over the next ten years, with an emphasis on businesses, schools, health services and greenfield developments in the initial six years. The government is investing up to $1.5 billion in this network. RBI will provide much improved broadband connectivity to rural schools, health providers, businesses, farms and households, and will be funded by industry through the proposed Telecommunications Development Levy.[262]

Some areas of the region will not be covered by the government's RBI rollout, however, which could prevent those people and communities from taking advantage of the health, education and business benefits of the new technology.

[258] New Zealand Government (2011d, p. 31).
[259] New Zealand Government (2011d, p. 29).
[260] New Zealand Government (2011d, p. 29).
[261] New Zealand Government (2011d, p. 29).
[262] New Zealand Government (2011d, p. 30).

Crown Fibre Holdings Ltd reached agreement with UltraFast Fibre Ltd to roll out broadband in Hamilton, from Sylvester and Horsham Downs in the north, Glenview, Riverlea and Peacocke in the south, Brymer and Dinsdale in the west to Silverdale in the east, as shown in figure 69. Roll-out plans are updated on the company's website with new maps as they become available.

UltraFast Fibre Ltd will also roll out UFB in Tokoroa (from Paraonui & Parkdale in the north, to Aotea, Strathmore and Amisfield in the south, Figure 70), Cambridge and Te Awamutu (largely within town boundaries, Figures 72 and 73)[263] and[264]. The indicative timeframe is for a five year build programme starting in Hamilton in 2011, followed by Tokoroa.[265]

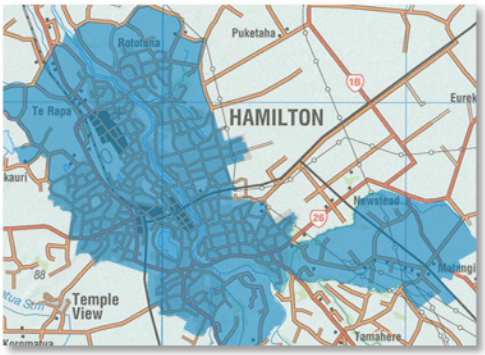

Figure 69: UFB in Hamilton[267]

Crown Fibre Holdings Ltd reached agreement with Chorus to deploy UFB in Taupō, largely within the town boundaries and out to Acacia Bay, as shown in figure 71. Fibre will be rolled out to the door of more than 620 business premises, some 12 schools, over 70 medical and other healthcare services and up to 40 other premises of mixed use.

Deployment in Taupō started in August 2011. All health premises and schools will be covered by December 2015, with ninety per cent of businesses complete by then too. Remaining homes and businesses will be covered by March 2019.[266]

Figure 70: UFB in Tokoroa[268]

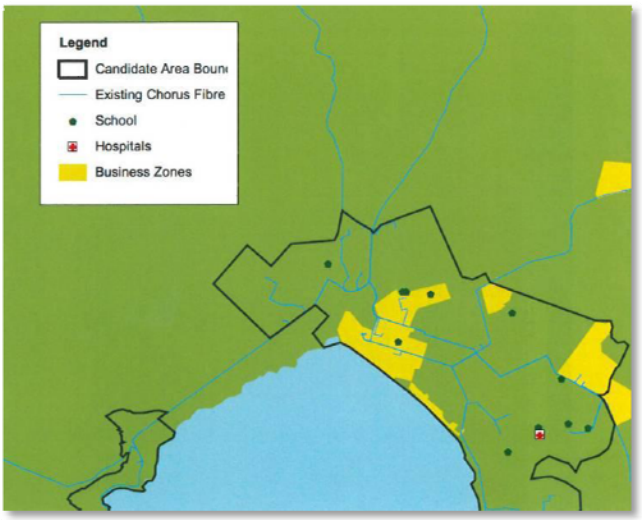

Figure 71: Chorus broadband zones for Taupō[269]

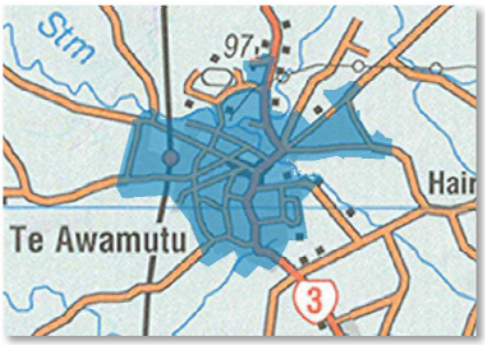

Figure 72: UFB in Te Awamutu[270]

[263] Crown Fibre Holdings Ltd (2010, p. 2).
[264] Crown Fibre Holdings Ltd (2010, p. 3).
[265] Crown Fibre Holdings Ltd (2010, p. 4).
[266] Crown Fibre Holdings Ltd (2011, p. 10).
[267] Crown Fibre Holdings Ltd (2010, p. 1).
[268] Crown Fibre Holdings Ltd (2010, p. 4).
[269] Crown Fibre Holdings Ltd (2011, p. 10).

RBI has been implemented by the Government to address the specific broadband infrastructure needs of rural New Zealand. RBI focuses on the 16 per cent of the population living in areas that experience no or very poor broadband services. About half of these households currently only have access to dial-up speeds.

Chorus and Vodafone began the roll out of the rural broadband infrastructure in mid 2011. It will bring high speed broadband to 252,000 customers and 86 per cent of rural houses and businesses will have access to broadband peak speeds of at least 5 megabits per second (Mbps)[271]. About 20 per cent of rural homes and businesses have access to 5Mbps at present.

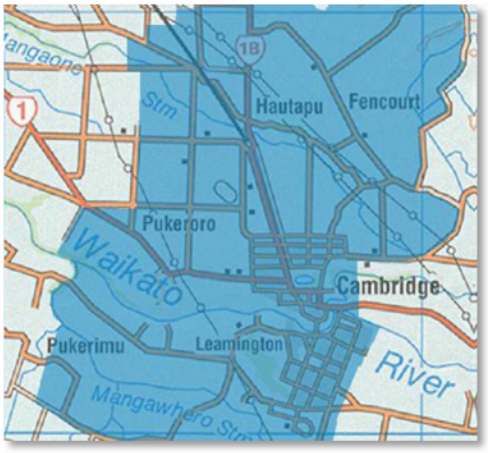

Figure 73: UFB in Cambridge[272]

Chorus is also extending its existing fibre network by approximately 3,100 kilometres, with some homes on route being provided with the opportunity of fibre to the premise at urban prices and there will be an additional 6,200 square kilometres of mobile coverage.

Most rural schools are going to have access to ultra-fast broadband speeds of 100Mbps with 1035 rural schools connecting directly to fibre networks, and 57 schools having point to point wireless connections capable of speeds of 10Mbps or more.[273] The roll-out of RBI is expected to take five years, as illustrated by Table 8.

Table 8: Rural Broadband Initiative roll-out schedule[274]

Year	Education	Health	Public Libraries	Number of new cell sites to receive RBI fibre	Fibre to the node[275] 986 cabinets 5Mbps coverage
1	71,300 pupils in 520 schools	5 hospitals 5 health centres		21	+17,400 lines 27%
2	48,000 pupils in 331 schools	27 hospitals 5 health centres	63	45	+30,200 lines 37%
3	23,900 pupils in 170 schools	11 hospitals	120	52	+25,000 lines
4	3,150 pupils in 70 schools			34	
5	22 pupils in 1 school			2	+12,500 lines 57%
Total	146,350 pupils in 1092 schools	43 hospitals 10 health centres	183 libraries	154 cell sites	104,700 lines 57%

[270] Crown Fibre Holdings Ltd (2010, p. 2).
[271] A megabit per second is a unit of data transfer rate equal to 1 million bits per second. Bit rate or data transfer rate is the average number of bits per unit time passing between equipment in a data transmission system. A bit (a contraction of binary digit) is the basic capacity of information in computing and telecommunications.
[272] Crown Fibre Holdings Ltd (2010, p. 2).
[273] Ministry of Economic Development (2012b) FAQs.
[274] Ministry of Economic Development (2012d) Roll-out schedule.
[275] Fibre to the node extends the reach of exchanges. Thousands of mini-exchanges or cabinets are installed in towns and suburbs, which are then linked to the local exchange with fibre optic cable.

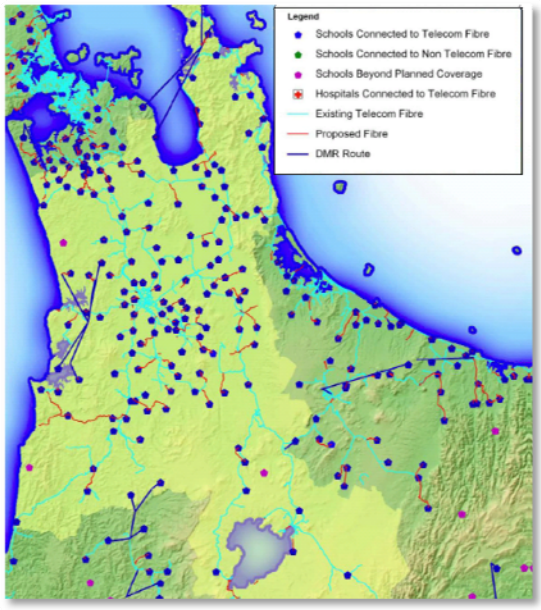

Figure 74: Proposed fibre routes and school connections[276]

Chorus is delivering fibre to 700 rural schools (93 per cent), including a number in the Waikato region as shown in figure 74. It is also upgrading the local broadband network by extending fibre optic cables further into rural communities, upgrading local telephone exchanges with new broadband equipment and installing or upgrading 1,000 fibre-fed roadside cabinets. Approximately 40,000 rural homes and businesses will have access to fixed line broadband services for the first time. Expected final coverage in the Waikato region is shown in figures 75-77. Chorus is also delivering fibre to the new Vodafone mobile sites that will deliver wireless broadband to rural communities.[277]

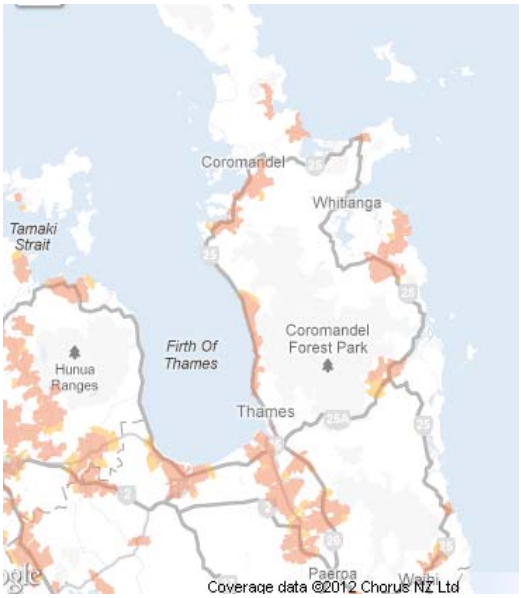

Figure 75: RBI broadband in the Coromandel Peninsula[278]

[276] Chorus (undated) waikato_schools.
[277] Chorus (2012b) Rural broadband initiative.
[278] Chorus (2012a) Our network upgrade map.

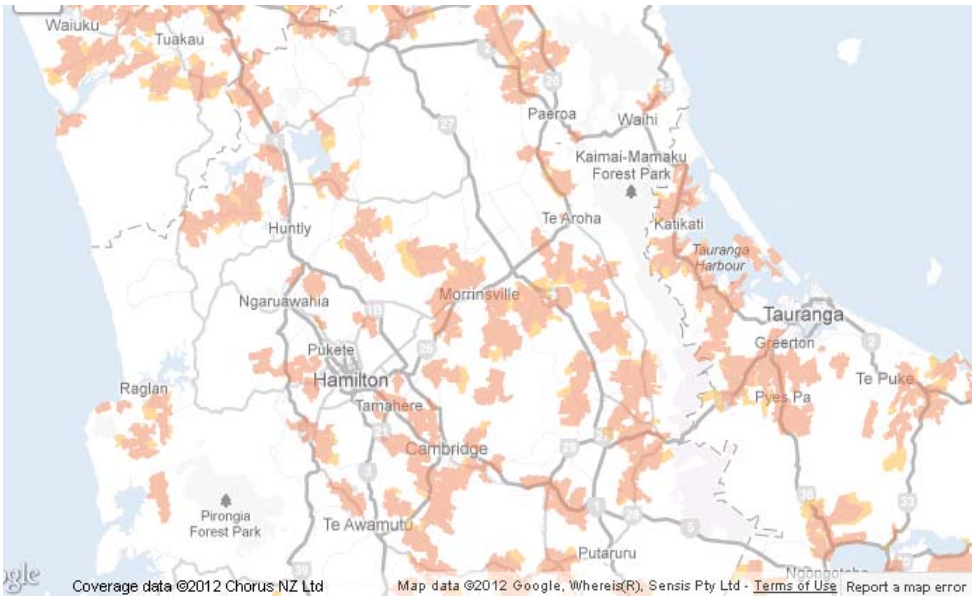

Figure 76: RBI broadband in the central Waikato region[279]

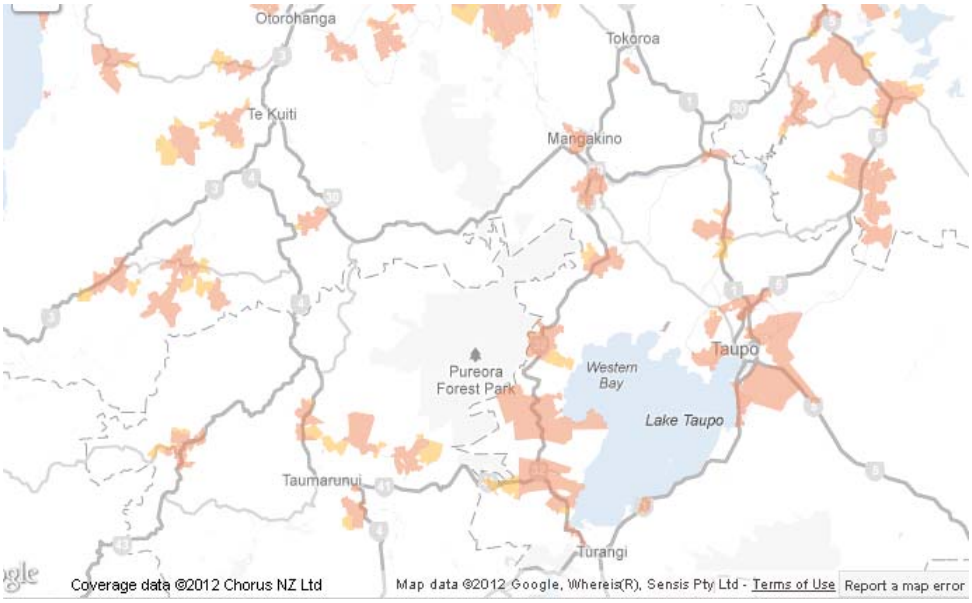

Figure 77: RBI broadband in the southern Waikato region[280]

Vodafone will deliver RBI using wireless broadband technology (on the 900 megahertz spectrum) to provide general broadband connectivity to households and businesses in rural areas. The network will bring minimum peak broadband speeds of 5 Mbps to remote communities and households. Vodafone is upgrading its existing rural network and building 154 new cell sites to provide the necessary coverage and capacity.[281] Vodafone's expected final RBI coverage in the Waikato region is illustrated by figures 78-80.

[279] Chorus (2012a) Our network upgrade map.
[280] Chorus (2012a) Our network upgrade map.
[281] Vodafone (2012b) Vodafone's role in delivering RBI.

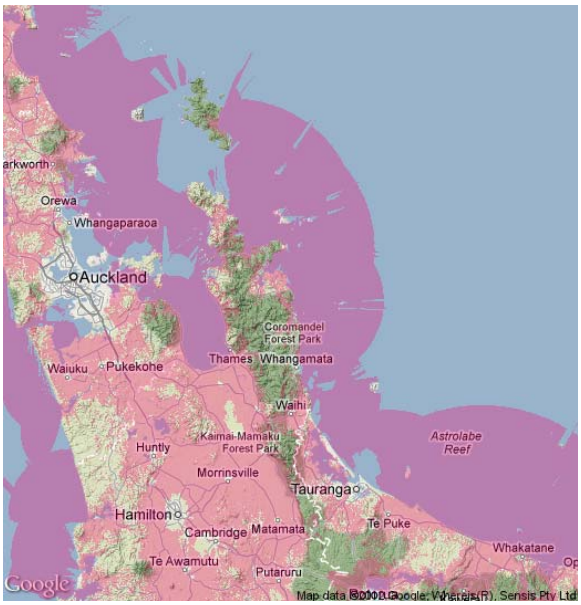

Figure 78: Wireless broadband in the Coromandel Peninsula[282]

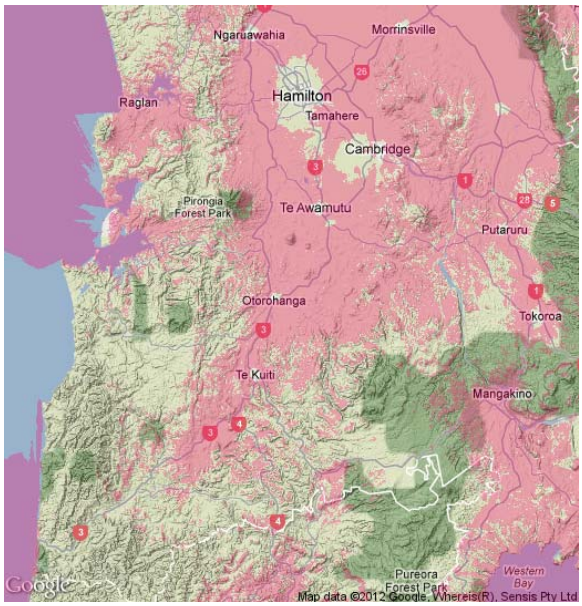

Figure 79: Wireless broadband in the central Waikato region[283]

Wireless broadband is seen by the government as an appropriate technology to deploy in areas of low population density like rural New Zealand. Wireless allows more access to the Internet from different places, because fixed infrastructure is not required. International best practice for rural communities is to deliver broadband over wireless networks. Ireland, Germany, the United States of America and Australia are all intending to go this way. Wireless broadband means rural families can stay connected at home and on the farm, reducing geographical and social isolation.

Wireless is also future-proofed. It means next generation mobile technologies, such as 4G, can be rolled out to rural users.[284]

New broadband and mobile coverage in rural New Zealand is expected to enable a major boost to rural productivity with data, SMS and machine-to-machine communication available (e.g. for soil, moisture, effluent or livestock management and monitoring).[285]

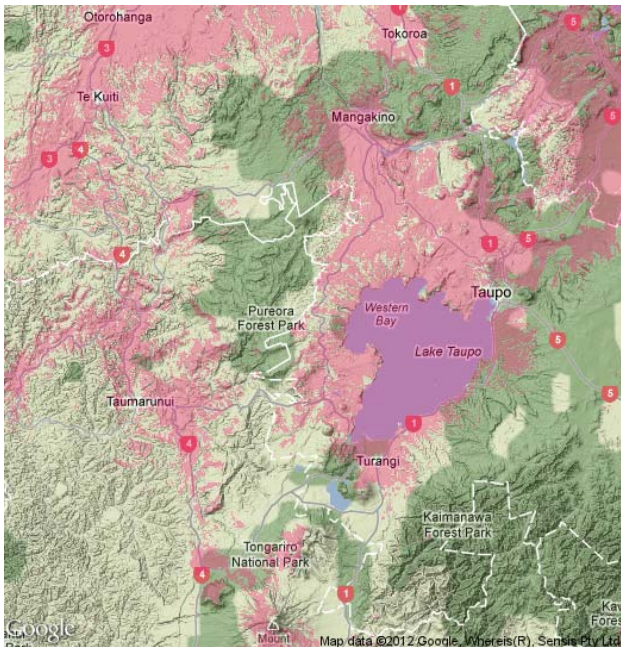

Figure 80: Wireless broadband in the southern Waikato region[286]

The switchover to digital television will free up radio spectrum in the 700 megahertz band for new uses, most likely 4G mobile broadband services[287]. The Ministry of Economic Development released a discussion document in August 2011 on frequency and planning allocation issues for the band. Given the increasing demand for data and spectrum it is likely that consideration of 5G[288] will not be far behind.[289]

[282] Vodafone (2012a) Rural broadband initiative coverage.
[283] Vodafone (2012a) Rural broadband initiative coverage.
[284] Payne V (2011, p. 2).
[285] Payne V (2011, p. 3).
[286] Vodafone (2012a) Rural broadband initiative coverage.
[287] The fourth generation of cell phone mobile communications standards. A 4G system provides mobile ultra-broadband Internet access, for example to laptops with USB wireless modems, to smartphones, and to other mobile devices.
[288] A name used in some research papers and projects to denote the next major phase of mobile telecommunications standards beyond the 4G/IMT-Advanced standards effective since 2011.
[289] New Zealand Government (2011d, p. 30).

5 People

5.1 Summary

This chapter describes the demographics of the people and communities of the region and the characteristics of the labour force.

The availability of suitable labour is a significant foundation of the competitiveness of a region. This includes the formal skills and qualifications of people in the region – people are the source of new ideas and drive innovation. The supply of labour depends on the choices and decisions about where individuals get the best return for their labour and whether an area is suitable for their lifestyle.[290]

Waikato has relatively low and uneven population growth and density. The region has a relatively high population of young Māori. Population ageing, which is a common issue in developed countries internationally, is more pronounced in the country as a whole but is uneven across the region.

The educational attainment of Waikato school leavers is below the national average and is worst in smaller, more remote communities. The literacy and numeracy of workers is also lower than the national level. This is reflected in the occupational structure. Local labour market areas are identified on the basis of people's travel from their homes to work. Over time, the number of local labour market areas is decreasing and the land area of each is growing larger, particularly around Hamilton city, as people travel longer distances to work, mostly by private vehicle. There is little inter-regional commuting and people travel a longer distance to work than those in other regions.

5.2 Demographics

5.2.1 Population

The Waikato region experienced slightly lower growth than New Zealand as a whole from 1991 to 2006 and there is wide variation in growth rates between the districts. The fastest growing district was Franklin (using the previous boundary), followed by Hamilton city. The South Waikato and Waitomo district populations declined from 1991 to 2006, by 14 per cent and 4 per cent respectively.

The changes to territorial authority and regional council boundaries stemming from the Local Government (Auckland Council) Act 2009 resulted in a large increase in the Waikato district population in 2011, as the former Franklin district was divided between the Auckland and Waikato regions.

[290] Auckland Council (2011, p. 28).

Table 9: Census night population count

				2011 (est)	% Change
	1996	**2001**	**2006**		**2001-06**
New Zealand	**3618303**	**3737277**	**4027947**	**4405200**	**8%**
Waikato Region	**350208**	**357021**	**382707**	**413100**	**7%**
Territorial authorities					
Franklin District	12426	12996	16524		27%
Thames-Coromandel District	24822	25176	25938	27020	3%
Hauraki District	17319	16764	17193	18750	3%
Waikato District	39138	39852	43959	64650	10%
Matamata-Piako District	29661	29469	30483	31960	3%
Hamilton City	108429	114921	129249	145280	12%
Waipa District	38856	40293	42501	46100	5%
Ōtorohanga District	9660	9279	9075	9330	-2%
South Waikato District	25011	23469	22641	22840	-4%
Waitomo District	9672	9294	9357	9550	1%
Taupō District	31746	32157	32178	33810	0%
Rotorua District	3468	3351	3609	3820	8%

The Waikato urban area with the largest population is Hamilton city. It grew by 11.2 per cent from 2001 to 2006, while Waikato district grew by 10 per cent, as shown in table 9.

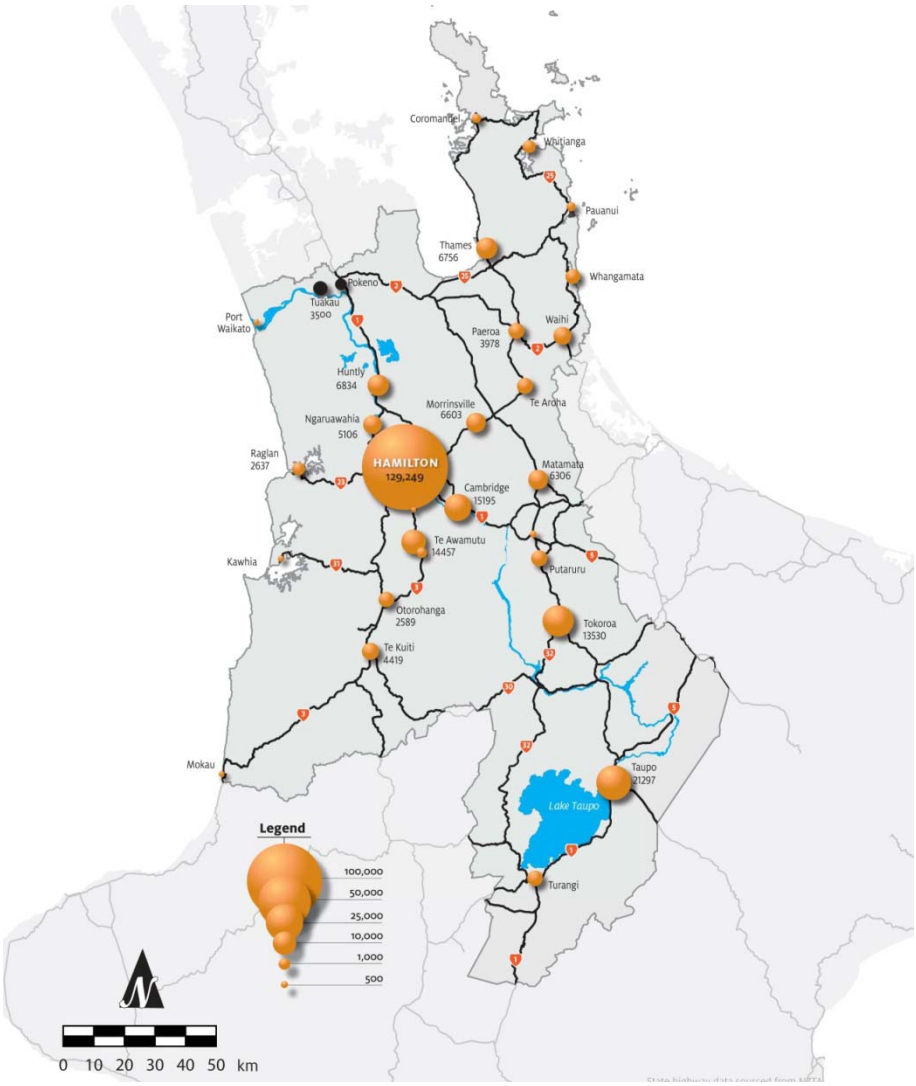

Figure 81: Urban population in the Waikato region[291]

The population in the region is most densely clustered around the Hamilton urban area, as shown in figure 81, with some area units containing more than 2000 residents per square kilometre. There are small pockets of high density around other town centres but the rest of the region is relatively sparsely populated with less than 10 residents per square kilometre, as shown in figure 82.

[291] Waikato Regional Council (2011k, p. 49).

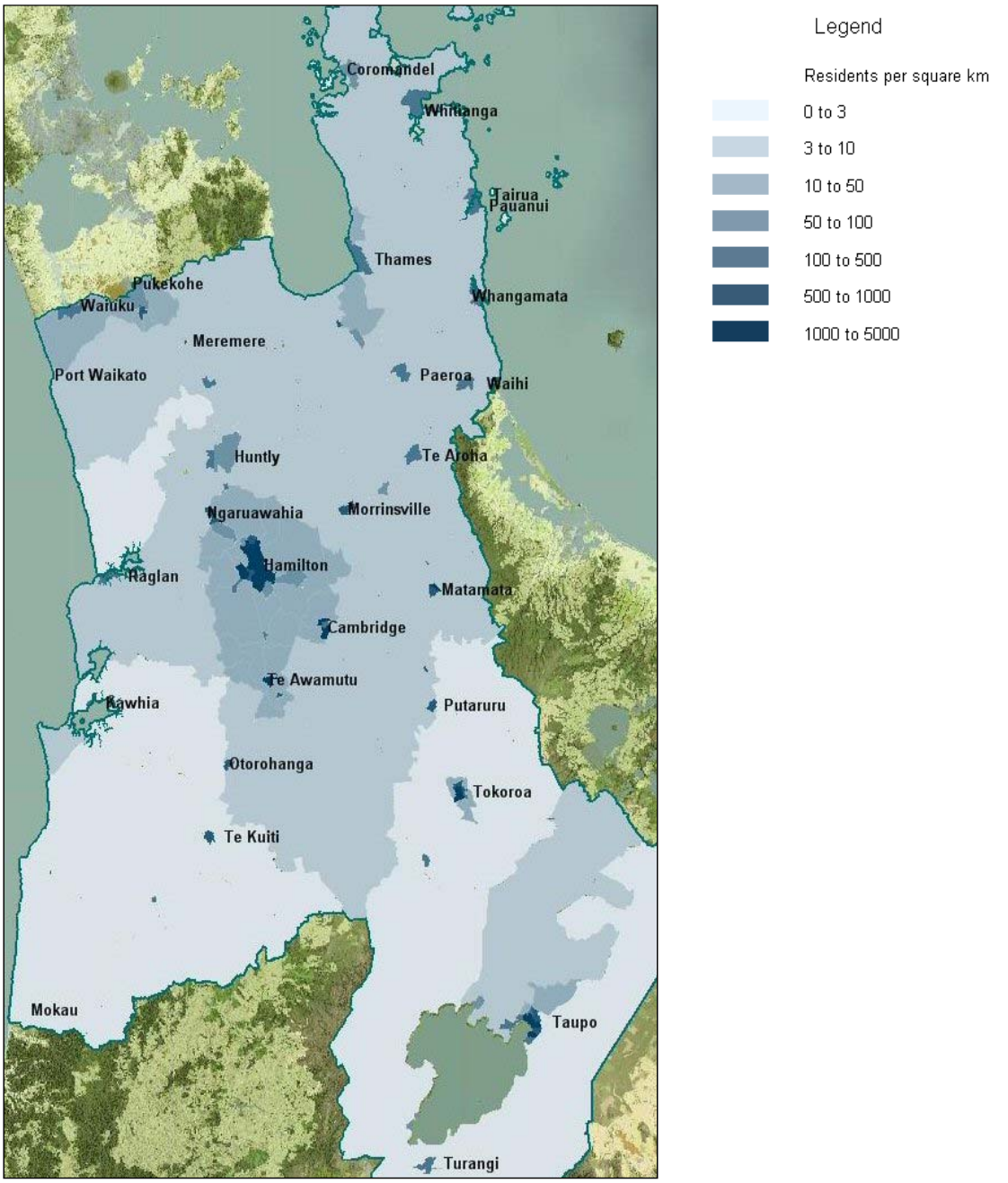

Figure 82: Population density

5.2.2 Ethnicity

Waikato has a higher proportion of residents who identify themselves as Māori, 21 per cent compared with 15 per cent for the national population, as illustrated in figure 83. Pacific and Asian ethnic groups are under-represented compared with the national population. Waitomo district has the highest proportion of Māori residents, 40 per cent of the total population. The region's Māori population is youthful, with 46 per cent of Māori being less than 20 years old, and 67 per cent being less than 35 years old.

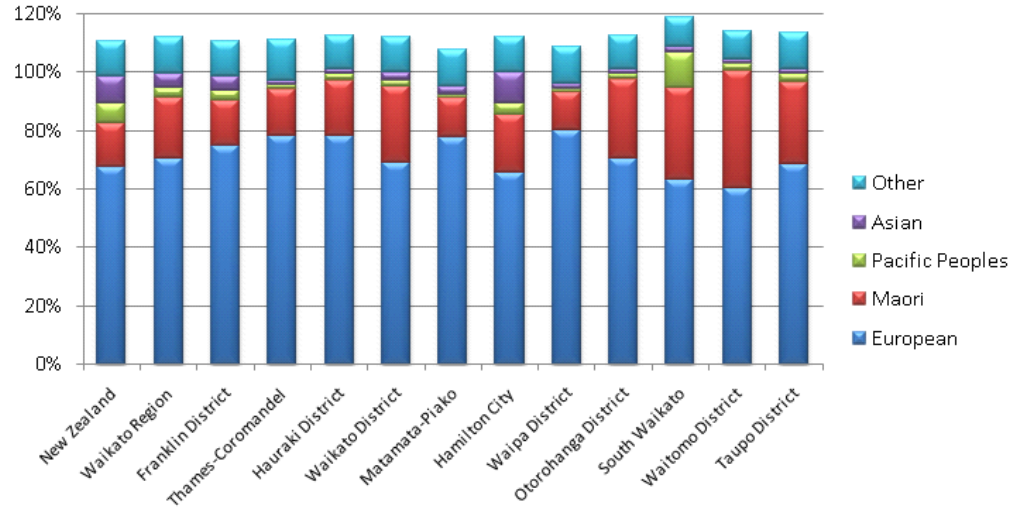

Figure 83: Percentage in ethnic group[292]

5.2.3 Ageing

The region's general population is ageing, with a bulge of people in the 35 to 55 year age group. About half (51 per cent) of the people living in our region are aged 35 years and older. This feature is less pronounced in Hamilton, as illustrated in figure 84.

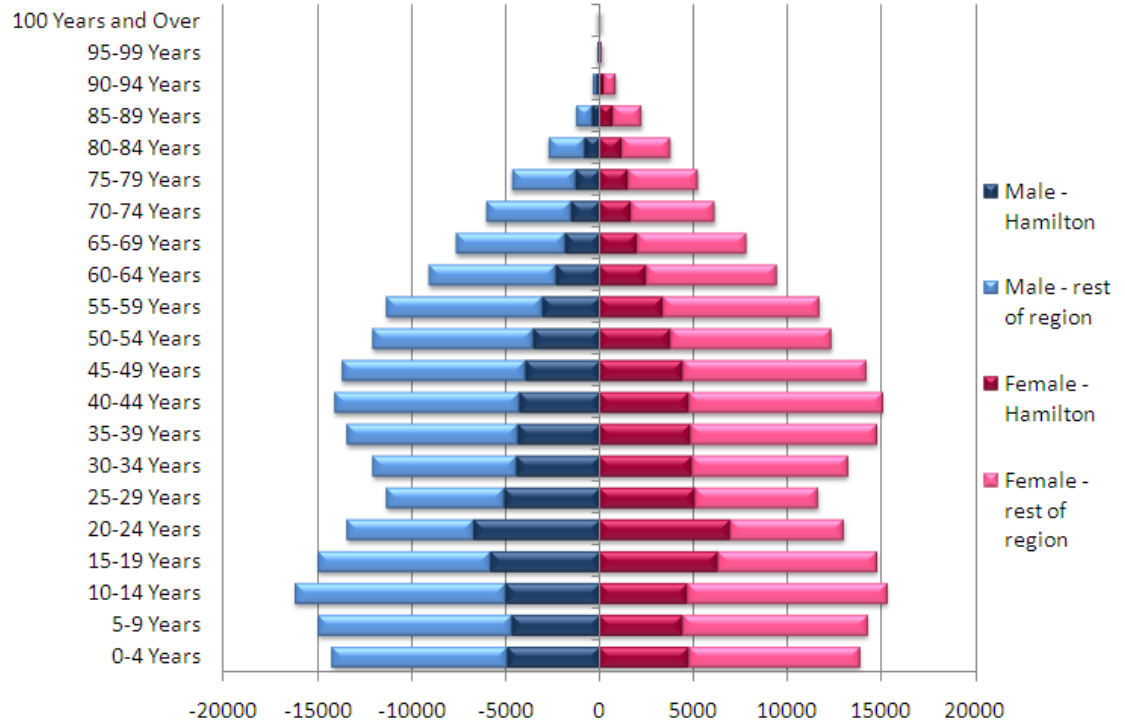

Figure 84: Age and gender cohorts for Hamilton city and rest of Waikato region

The median age is lower than most other regions, with the exception of Auckland, Wellington and Gisborne. The Waikato birthrate is higher than average, and the net migration rate is around the national average. Only Auckland and Wellington are expected to have more people aged less than 65 in 2026, as shown in figure 85.

[292] The totals are greater than 100 per cent because people can identify with more than one ethnicity.

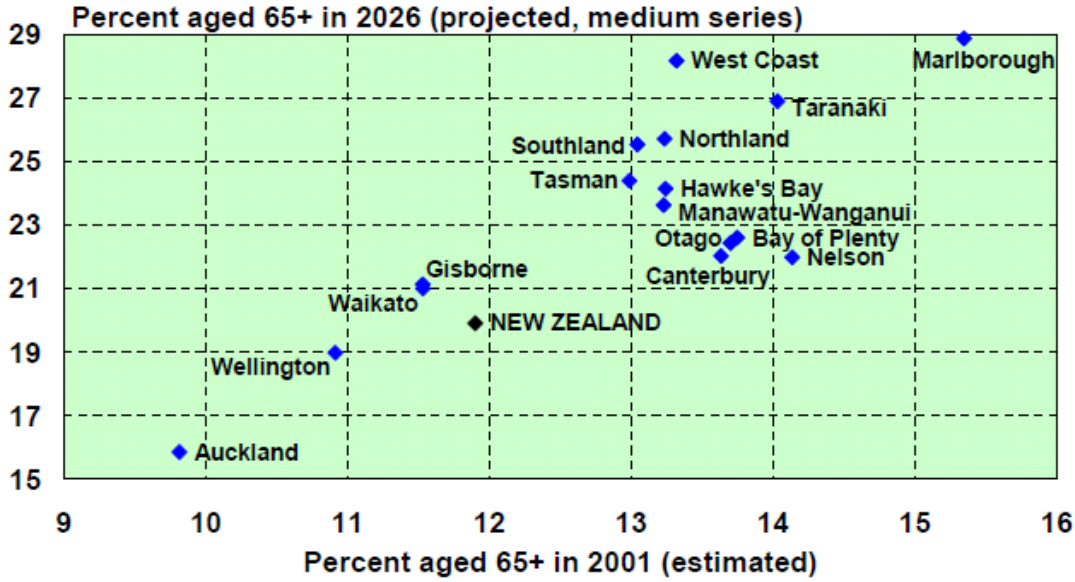

Figure 85: Proportion of population aged 65+ by region[293]

This phenomenon is also not experienced uniformly across the region, with Hamilton city expected to be the New Zealand territorial authority with the youngest median age and Ōtorohanga district the ninth youngest. On the other hand, Thames-Coromandel and Hauraki districts are expected to be among the ten territorial authorities with the highest median age in 2026, as shown in figures 86 and 87.

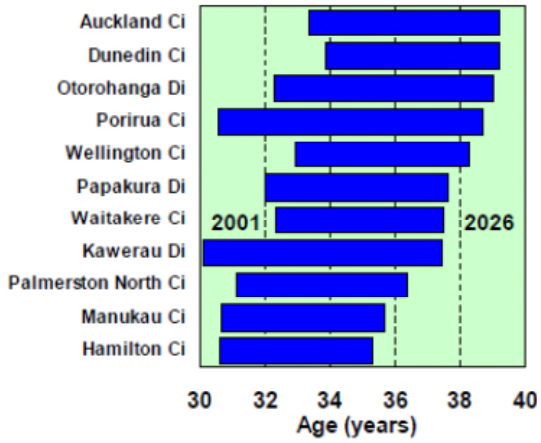

Figure 86: Youngest median age in 2026[294]

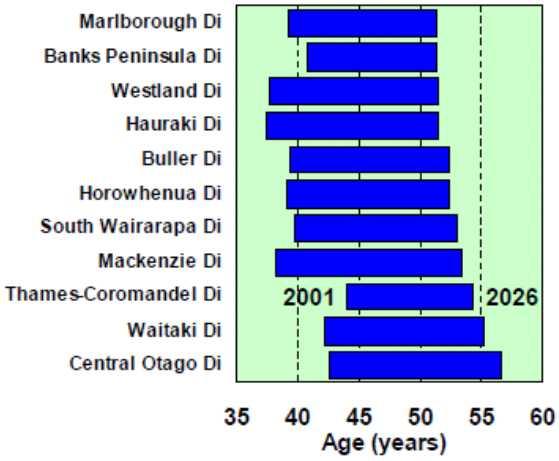

Figure 87: Oldest median age in 2026[295]

5.3 Labour

5.3.1 Educational attainment

The educational attainment of Waikato school leavers is below the national average, with only 74 per cent attaining a formal qualification such as New Zealand Qualifications Authority level one or school certificate compared with a national average of 78 per cent, as shown in figure 88.

[293] Statistics New Zealand (2006, p. 16).
[294] Statistics New Zealand (2006, p. 17).
[295] Statistics New Zealand (2006, p. 17).

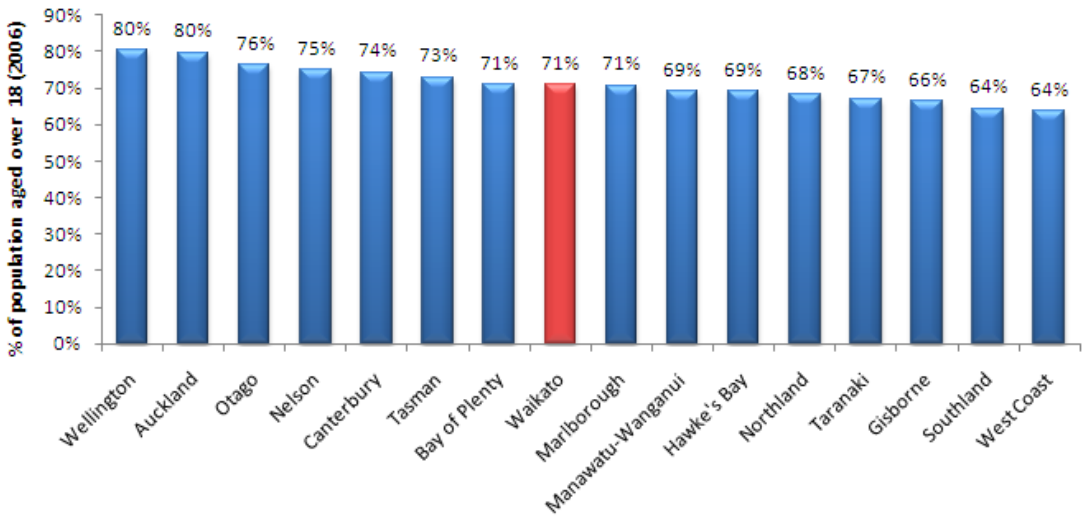

Figure 88: Proportion of population age 18+ with a formal qualification (2006 Census)

As at the 2006 census there were 76,000 Waikato residents (29 per cent of the population aged over 15) with no formal education qualification, as shown in figure 89. This is higher than the national average of 25 per cent. Tertiary educated residents are also under-represented in the region, with 21 per cent of residents over 15 years old having a diploma or higher compared with 25 per cent in New Zealand as a whole. Larger cities tend to have more highly educated populations. 2 per cent of Waikato residents have postgraduate degrees compared with 2.7 per cent of New Zealanders.

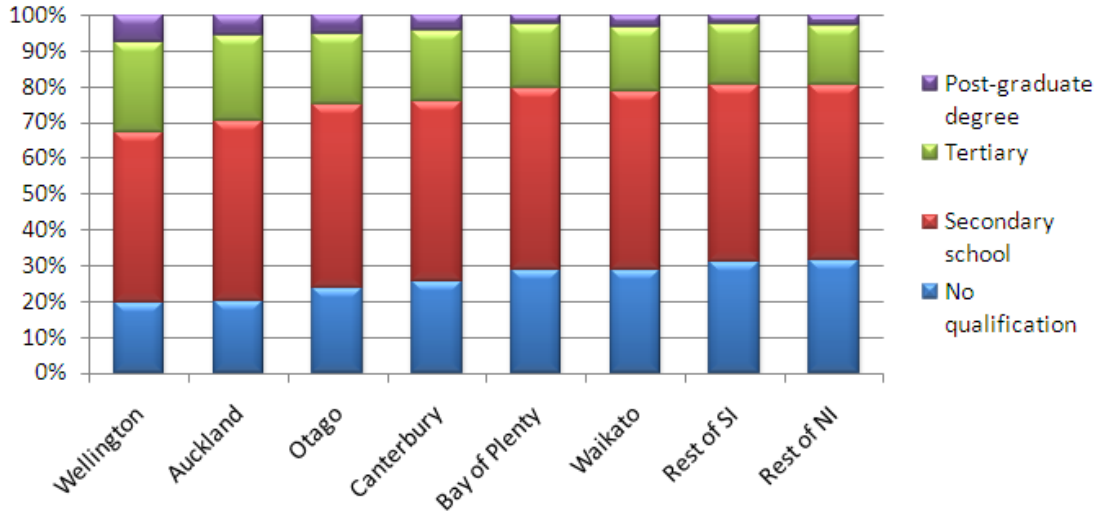

Figure 89: Highest qualification by region (2006 Census)

People aged 25 to 50 are much more likely to have a formal education qualification than people older than 50, as shown in figure 90. However, there is a large proportion (26 per cent) of Waikato residents aged 19 to 25 with no qualification. The proportion of Waikato residents with no qualification is higher in all age groups than the national average.

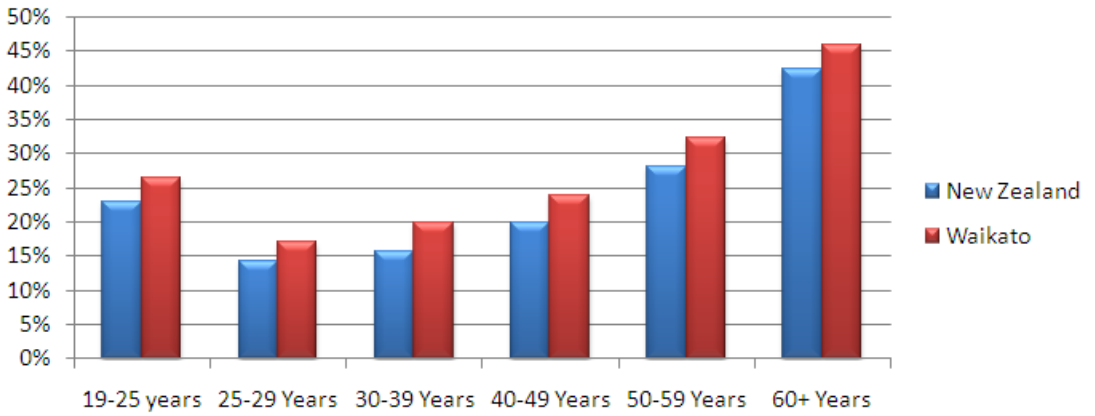

Figure 90: Percentage of age groups with no qualification (2006 Census)

The proportion of each age group with a tertiary qualification (including level 5-6 diploma, degree, or post-graduate qualification) is presented in figure 91. People aged 25-29 are most likely to have a tertiary qualification and the proportion declines with age.

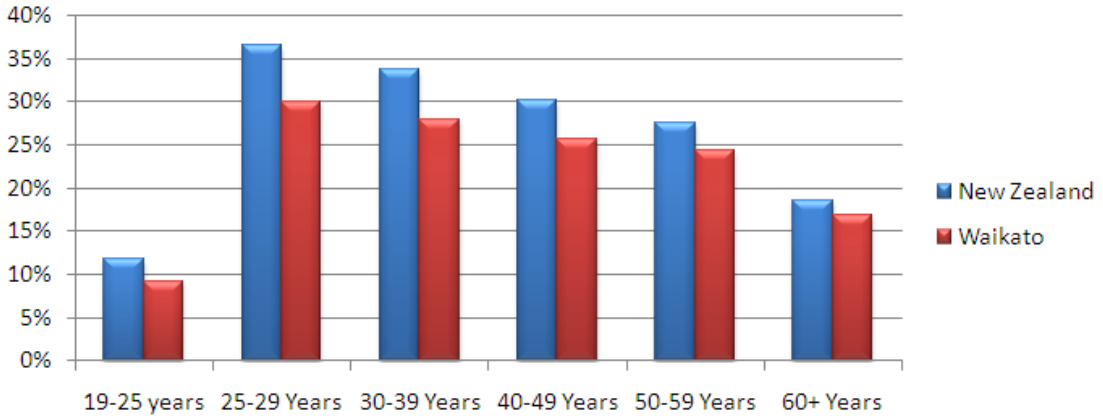

Figure 91: Percentage of age groups with tertiary qualification (2006 Census)

Educational attainment is closely related to higher literacy and numeracy skills, which are important components of a skilled labour force. Other factors correlated with literacy and numeracy skills are having English as a first language, and using a computer at work[296]. The percentage of people in Waikato with higher prose literacy was 52 per cent in 2010. This was lower than the national average of 58 per cent. The proportion of Waikato region residents with higher numeracy ability was also lower than the national average, 45 per cent compared with 51 per cent. Wellington region scored the highest on both literacy and numeracy, 69 per cent and 61 per cent respectively.

Waitomo, South Waikato and Hauraki districts had the highest proportion with no qualifications, although secondary school qualification rates were fairly consistent across the region. Hamilton city had the highest proportion with tertiary and post-graduate qualifications, as shown in figure 92.

[296] Ministry of Education (2010, p. 10).

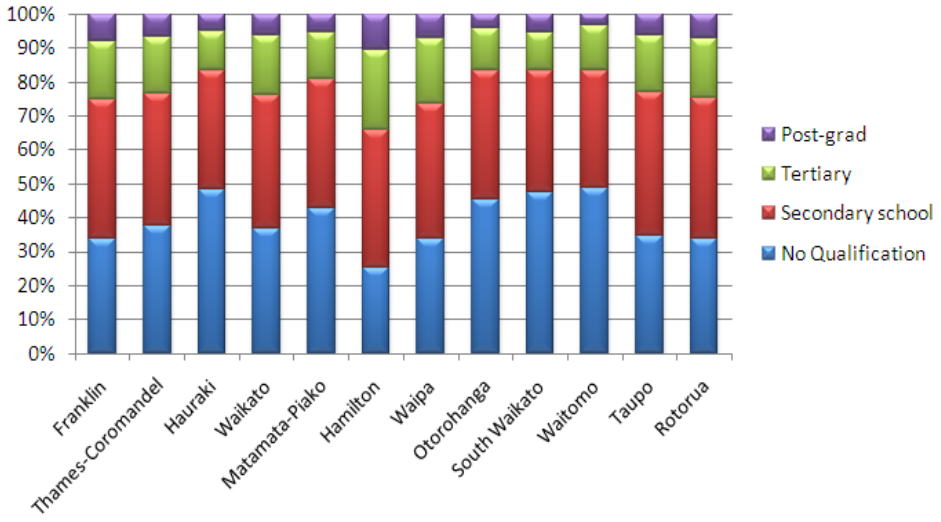

Figure 92: Highest qualification proportions by territorial authority (2006 Census)

5.3.2 Occupations

Figure 93 shows the occupation structure of the Waikato region labour force compared with the whole of New Zealand. The notable differences are that there is a higher proportion of managers in the Waikato region, 22 per cent compared with 17 per cent for the national average, but a lower proportion of professionals.

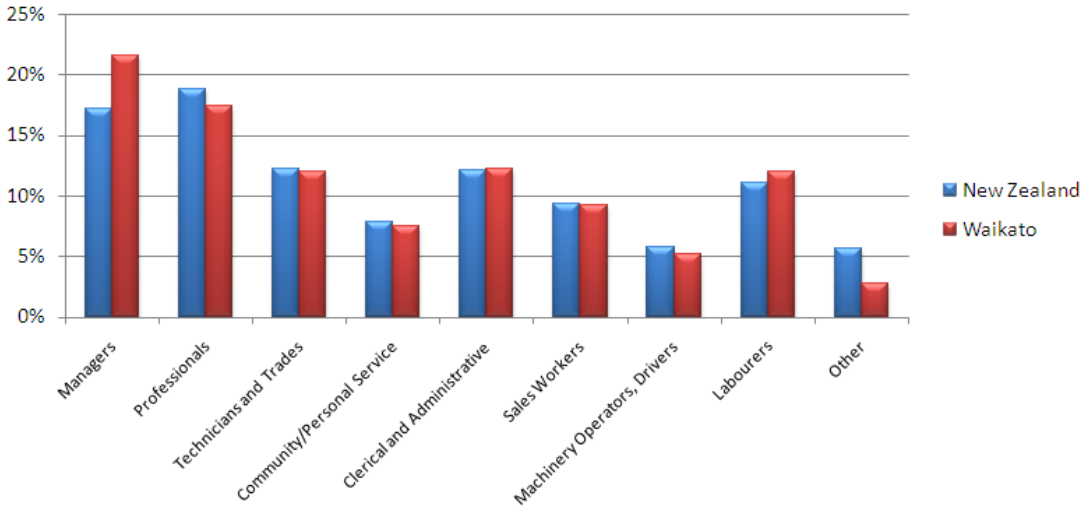

Figure 93: Occupations of Waikato and New Zealand residents (2006 Census)

As one might expect, the occupation structure is asymmetrical among territorial authorities within the region. The larger, more urban centres have higher proportions of professionals and service workers while the greater number of rural districts have higher proportions of agriculture and fisheries workers. The region as a whole, therefore, has a fairly balanced occupation structure, as shown in figure 94.

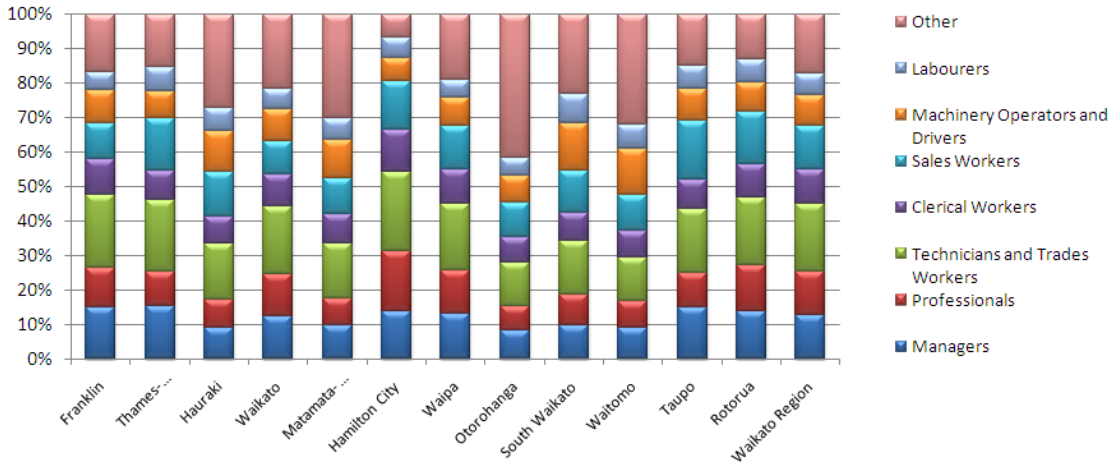

Figure 94: Proportion of territorial authority labour force in occupation (2006 Census)

5.3.3 Labour market areas

A University of Waikato research report for the Department of Labour identified and mapped functional labour market areas within the Waikato region on the basis of travel-to-work data and provided a detailed statistical portrait of the regional labour markets and their recent histories. It noted that territorial authority boundaries are less than ideal for this type of analysis because they do not necessarily reflect the relationships between workers and their jobs.[297]

The report noted that commute areas often follow the contour of the landscape, and the region's terrain and physical features can lead to the seclusion of labour market areas and contribute to their insularity, or can facilitate the potential for integration and interdependence with other areas.[298]

In 1991, the Waikato region had 31 distinct labour market areas. The Kaimai Range in the east of the region provided an effective geographical border with the Bay of Plenty region, but in the north, the South Auckland and Glenbrook labour market areas extended into the Waikato region, and in the south the Taupō labour market area included parts of the Bay of Plenty and Hawkes Bay regions.[299]

The number of labour market areas in the Waikato region declined markedly from 1991 to 2006, from 31 to just 14, as shown in figures 95 and 96. Each of the remaining labour market areas was located around a relatively large urban area or significant industry. By 2006, it was clear that the Hamilton city labour market dominated the region, covering the largest land area, and subsuming the former Te Akau, Whitikahu, and Waerenga labour market areas in the north and the Cambridge and Te Awamutu labour market areas in the south.[300]

[297] Barrett et al (2009, p. 1).
[298] Barrett et al (2009, p. 9).
[299] Barrett et al (2009, p. 11).
[300] Barrett et al (2009, p. 13).

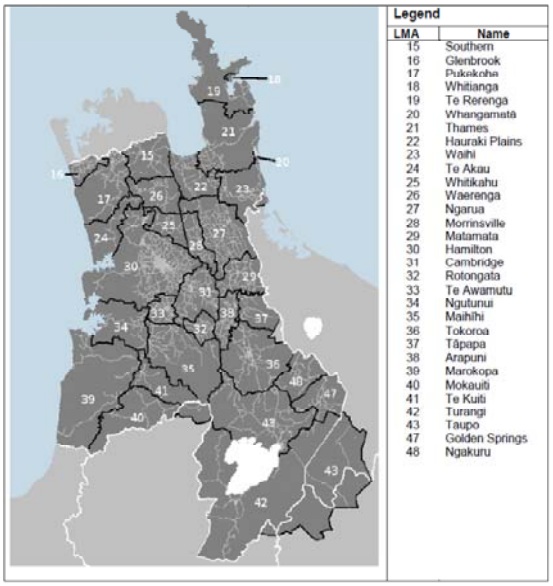

Figure 95: Labour market areas in the Waikato, 1991[301]

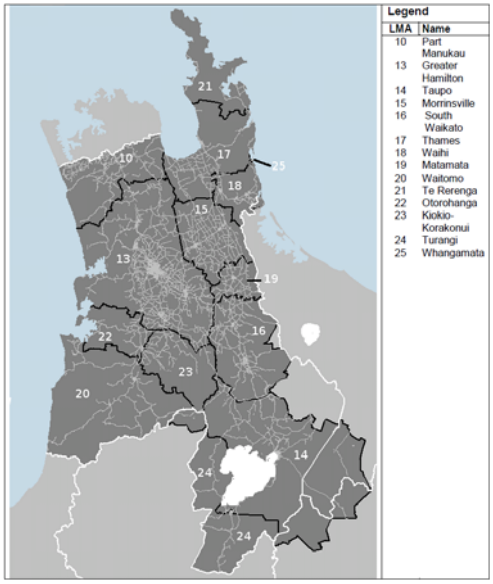

Figure 96: Labour market areas in the Waikato, 2006[302]

The labour market areas can be read as indicators of the real cost of commuting, which in turn depends on the road and transport infrastructure within the region, relative house prices between different areas, differences in the rates of job creation and job separation between urban and rural areas, and a lack of mobility among homeowners.[303]

5.3.4 Commuting patterns

The average journey to work in the region was a distance of 7.6 kilometres on census day, March 2006. The national average commute distance was 7.5 kilometres. The majority (88 per cent) of Waikato region commutes were in private vehicles, higher than the national average of 83 per cent[304]. This is illustrated in figure 97.

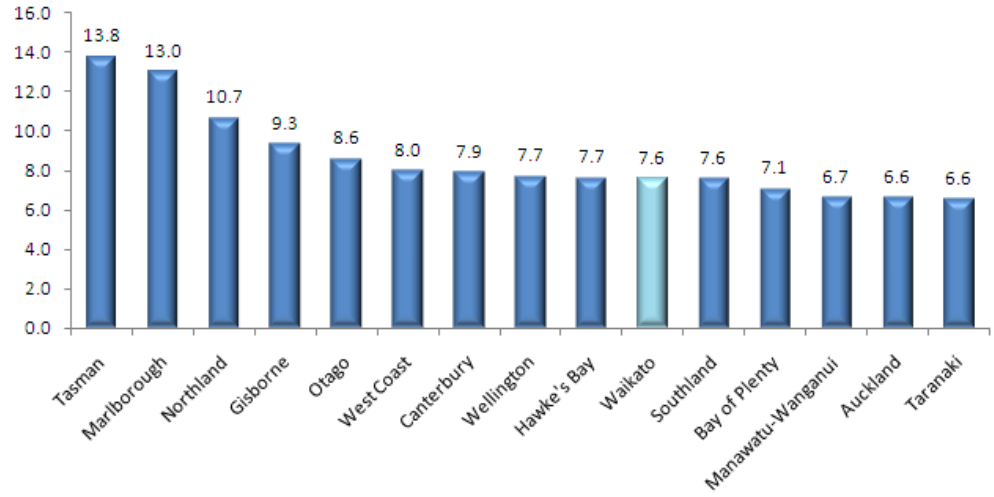

Figure 97: Average distance travelled to work by region (2006 census)

Most commuter journeys are local in scale. Ninety-eight per cent of journeys that started in Waikato stayed within the region. Eighty-eight per cent stayed within the same district, and 82 per cent within the same town. Twenty-six per cent of people remained within the same area-unit (suburb) when commuting to work.

[301] Barrett et al (2009, p. 10).
[302] Barrett et al (2009, p. 12).
[303] Barrett et al (2009, p. 13).
[304] Data sourced from the Statistics New Zealand Commuterview 2006.

Residents of cities and rural hubs tend to work in the same town that they live in, while people in satellite towns or rural areas are a lot more likely to commute. Ninety-nine per cent of Hamilton city commuters stay within Hamilton, compared with 42 per cent of Waiuku commuters, as illustrated in figure 98.

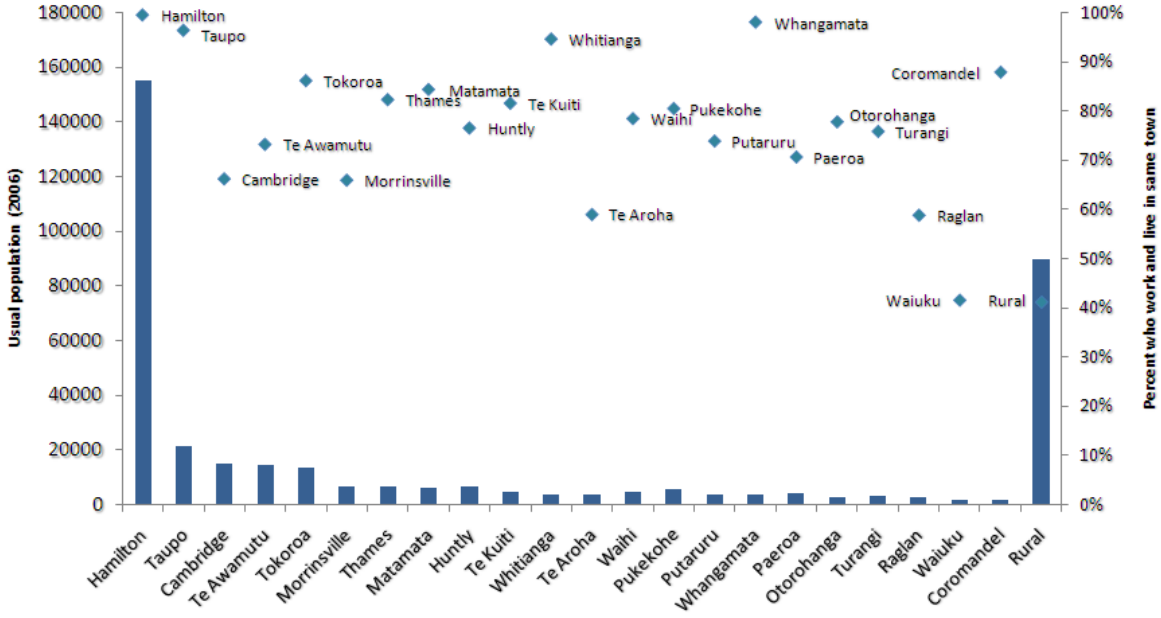

Figure 98: Town population and proportion who work in town (2006 Census)

Commuter flows between urban and rural areas are illustrated in figure 99. The sizes of the blue circles represent relative populations of Waikato urban areas; red circles are urban areas outside the region. The arrows point to the destination of commuter journeys to work. The green arrows show flows from rural areas and the orientation of the arrow is indicative of the largest flows only; some rural commuters come from different directions.

There is an apparent divide between the Auckland and Hamilton labour markets in the Waikato district, with northern residents commuting to Auckland and the rest commuting to Hamilton or Huntly. There may be commuters from Hamilton to Auckland but the numbers are small enough that they have been confidentialised by Statistics New Zealand.

There are no significant flows between the Waikato and Bay of Plenty regional labour markets, aside from some residents in the rural part of Rotorua district who commute to Rotorua city. Taupō and Turangi are also relatively isolated from the rest of the region.

This reflects analysis undertaken for the Ministry of Economic Development, which indicates that from a labour market perspective Auckland, Hamilton and Tauranga cities possess relatively insular economies, with a very low level of commuting between the three cities. Patterns observed for business travel between the three cities were also low and indicated relatively little face-to-face business activity taking place between the three cities. The analysis found that for both commuting and business travel, the low flows are at least in part a reflection of the considerable travel times and distances between the three cities.[305]

[305] Paling et al (2011, p. 8).

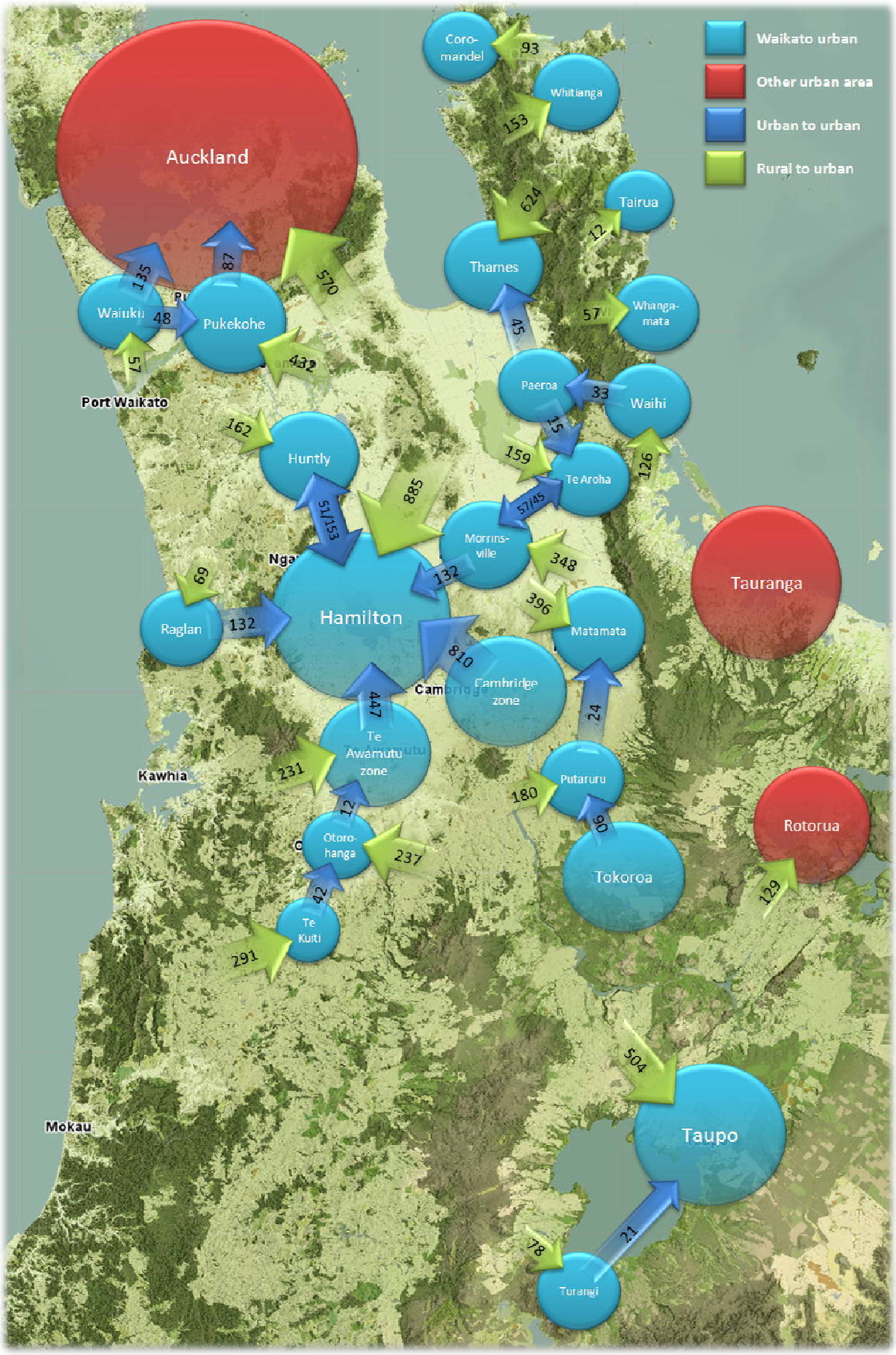

Figure 99: Commuting patterns (2006 Census)

6 Natural resources

6.1 Summary

The Waikato region is endowed with extensive natural resources which provide the foundations for the regional economy. Understanding the current state of these resources, potential constraints and values is important for understanding how the economy could grow in the future. For example, according to the theory of comparative advantage, a region's endowment of land can have important implications for its potential growth performance and industrial structure.[306] The industrial structure in the Waikato region reflects its endowment of land and it appears that there is plentiful supply of available industrial land in many territorial authority areas. This could provide an opportunity to meet constraints in other parts of the upper North Island.

The region includes a wide variety of landscapes from alpine to swampy lowlands, with large tracts of highly productive farm and forestry land. Water resources include Lake Taupō, the Waikato River (New Zealand's longest) and several other major river systems, and significant wetlands. Hydro, geothermal and other emerging energy resources make Waikato critical to New Zealand's energy production – particularly given its location adjacent to Auckland (discussed in detail in chapter 4.3.1).

Only 28 per cent of the region remains in native vegetation and this is fragmented into thousands of patches, mostly in the hill country. Indigenous forests, scrub and wetlands on the extensive lowlands have been almost completely removed or drained over time, leaving few intact coast-to-mountain habitat sequences within the region.[307]

Waikato contains some of New Zealand's most important ecosystems, including 70 per cent of New Zealand's geothermal vegetation by area and the largest extent of karst (limestone) in the country. Three of New Zealand's six internationally significant wetlands (recognised under the Ramsar convention) are in the region.[308]

These ecosystems provide many goods and services which underpin the region's economy. These include food, wood, water, medicines and services including flood control, pest control, nutrient recycling, regulation of climate, and experiences that might include recreation, aesthetic pleasures, other amenity and spiritual values.

Cole and Patterson estimated that ecosystem services for Waikato were almost equivalent to the annual GDP for the region in 1999. The highest valued ecosystem services in their study were nutrient cycling, regulation of water, and the provision of food, water and raw materials.[309]

6.2 Climate

The Waikato region, centred around 38 degrees south, is exposed to prevailing west and southwest winds from the Tasman Sea. These bring mild, humid conditions. Although no location is more than 80 kilometres from the sea, sheltered and elevated inland places experience extremes of hot and cold.[310] Maximum daily temperatures range from 21 to 26°C in summer and 10 to 14°C in winter.[311]

The region tends to have warm, humid summers and mild winters. It experiences an average annual rainfall of 1250 mm, as illustrated in figure 100, which is generally considered adequate for agricultural production.

[306] New Zealand Institute of Economic Research (2004, p. 27).
[307] Waikato Regional Council (2010, p. 68).
[308] Waikato Regional Council (2010, p. 68).
[309] Patterson and Cole (1998, p. ii).
[310] Waikato Regional Council (2010, p. 14).
[311] Nancy Swarbrick (2011) 'Waikato region - Landscape and climate' Te Ara - the Encyclopedia of New Zealand.

Three areas of the Waikato region have high rainfall. The Coromandel Peninsula experiences consistent annual rainfall over 3000 mm and sometimes in excess of 4500 mm, the Waitomo/Kaawhia area is exposed to moist winds from both the south and north west, and the alpine area of the Tongariro National Park experiences high rainfall and very cold temperatures.[312]

The lower Waikato lowlands and the Hauraki Plains are sheltered to the east by the Kaimai and Coromandel Ranges and to the south by the central North Island plateau. These areas experience the least rainfall but many frosts and fogs. Similarly, Taupō and the Reporoa Valley receive less than average rainfall, as they are sheltered by the Hauhungaroa Range and the Paeroa Range respectively.[313]

Figure 100: Average annual rainfall in the Waikato region[314]

Climate scientists estimate that Waikato's temperature could be up to 3° Celsius warmer over the next 70-100 years. This compares to a temperature increase in New Zealand during last century of about 0.7° Celsius.[315]

Waikato could be up to 20 per cent wetter with more varied rainfall patterns and flooding could become up to four times as frequent by 2070.[316]

6.3 Land

Waikato is the fourth largest region in New Zealand, covering 25,000 square kilometres. It stretches from the Hunua Ranges and Port Waikato in the north down to the Kaimai Range and Mt Ruapehu in the south, and from Mokau on the west coast across to the Coromandel Peninsula in the east.[317]

[312] Waikato Regional Council (2010, p. 14).
[313] Waikato Regional Council (2010, p. 14).
[314] Waikato Regional Council (2010, p. 14).
[315] Ministry for the Environment (2008) How might climate change affect my region? Climate change in Waikato.
[316] Ministry for the Environment (2008) How might climate change affect my region? Climate change in Waikato.
[317] Waikato Regional Council (2010, p. 14).

The region is made up of distinct landforms generally found within four areas: the Taupō Volcanic Zone, Waikato Lowlands and Hauraki Plains, Western and Central Hill Country and the Eastern Ranges.

The *Taupō Volcanic Zone* extends as far south as the top of Mount Ruapehu and includes pumice lands and geothermal features. Land use in the area includes beef, cattle and sheep stock grazing, dairying, plantation and conservation forestry.

The *Waikato Lowlands and Hauraki Plains*, in the central part of the region, include large areas of wetland, peat soils and the Hinuera Formation. Much of the lowlands and Hauraki Plains have been drained for pastoral farming. Land in this area is typically used for urban and rural settlement, surrounded by farmed lowlands that support dairying, horticulture and cropping. Significant areas of wetlands, for example, the Whangamarino Wetland and Kopouatai Peat Dome, still remain.

The *Western Hill Country* extends along the length of the Waikato's west coast. It contains an extensive cave and karst system which is valued for the recreational and tourism opportunities it provides. The internationally renowned Waitomo Caves lies within this system.

Large tracts of indigenous forest south of Kāwhia are important for soil and water conservation and stock grazing is the main land use in the *Central Hill Country*, along with areas of plantation and conservation forestry.

The *Eastern Ranges (Kaimai and Coromandel)* are largely volcanic. The Coromandel Peninsula consists of thick volcanic rocks on top of a much older group of sedimentary rocks – greywacke sandstone and argillite mudstone. Precious metals are found in the Hauraki Epithermal Zone, considered to be the most highly prospective area of precious metal in New Zealand. The bush-clad ranges, coastline and estuaries support a multitude of recreational and tourist activities.[318]

In the Waikato region, livestock and cropping farming, dairy cattle farming and forestry and logging are the main productive land uses.[319] Native forests and wetlands cover 28 per cent of the region.[320] Figure 101 shows the main land uses.

[318] Waikato Regional Council (2010, p. 16).
[319] Market Economics Ltd (2006b, p. v).
[320] Waikato Regional Council (2011f) Land use in the Waikato.

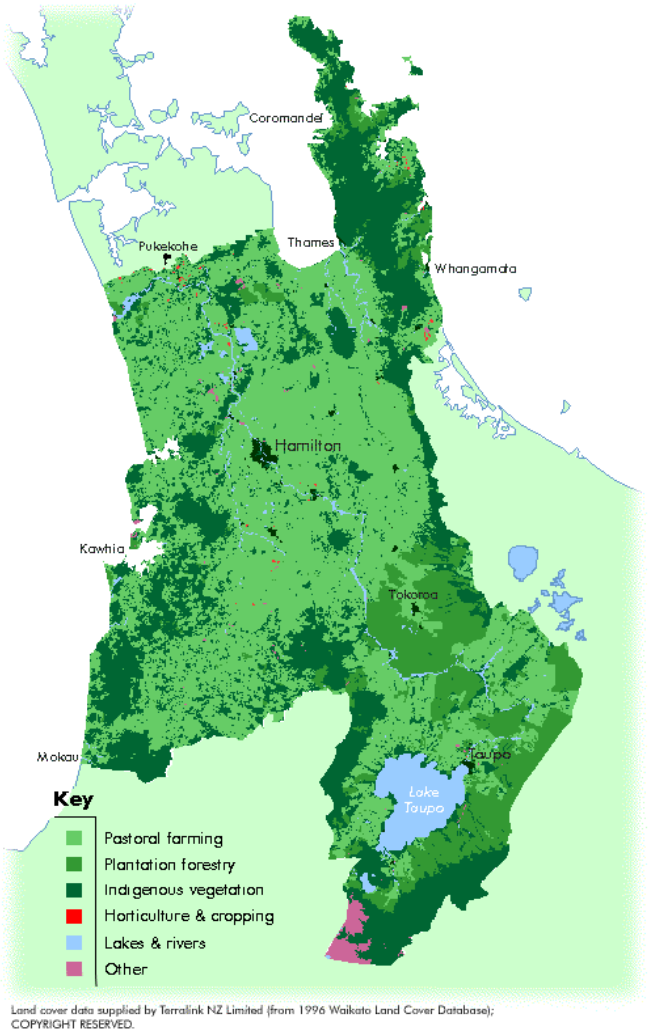

Figure 101: Land uses in the Waikato region[321]

6.3.1 Business land

The Future Proof Business Land Review found that there was vacant zoned land capacity of 966 hectares in the Hamilton, Waipa and Waikato territorial authority areas in 2010. This included 856 hectares of industrial land, 98 hectares of commercial land and 12 hectares of retail land.[322] Approximately 70 per cent of the industrial and commercial land is situated to the north of the Hamilton central business district. [323] Vacant industrial zoned land is situated within approximately 20 locations across the subregion over a wide geographic area from Te Kauwhata in the north to Te Awamutu in the south. The Business Land Review estimated that, based on assumptions about Future Proof population projections and economic trends, the subregion would require some 805 hectares of industrial land to 2061. On that basis, the Business Land Review considered that the subregion currently contains sufficient industrial land capacity for at least the next 25 years[324] and this quantum of land was allocated for "strategic industrial nodes" in the Proposed Waikato Regional Policy Statement. The figure of 805 hectares was challenged through the hearing process, particularly on the basis that the allocation predated the Ruakura inland port proposal and therefore did not take into account the potential for Ruakura to create additional demand for industrial land. At the time of writing, decisions have not been released on the Regional Policy Statement so the allocation is not yet resolved.

The Taupō Urban Commercial and Industrial Structure Plan is a planning document that provides a vision for future planning of the Taupō town centre and new industrial

[321] Waikato Regional Council (2011h) Regional land use.
[322] Latitude Planning Services Ltd (2010, p. 12).
[323] Latitude Planning Services Ltd (2010, p. 14).
[324] Latitude Planning Services Ltd (2010, p. 15).

areas. The Structure Plan identifies land on the eastern side of Taupō town as appropriate for future industrial development. The study areas were generally identified for urban expansion in the Taupō Urban Structure Plan (2004), and confirmed in Taupō District 2050, the district wide growth management strategy (2006). The Structure Plan reviewed this earlier work, and carried out a land constraints exercise which then identified gross developable areas. These gross developable areas will be rezoned to Industrial Environment. In doing so, the northern land has been further identified as Industrial Environment (Heavy), and land shown in the Structure Plan as sensitive, has been identified as Industrial Environment (Sensitive). The gross developable areas have been identified through an economic report as generally being sufficient in land area to cater for the next 20 years of projected demand for this type of land.

The draft Coromandel Peninsula Local Area Blueprints identified areas for the expansion of business land. These are being considered for incorporation into the Thames Coromandel District Plan review. The Kopu to Thames Structure Plan provides a further 50 hectares of industrial zoning, including land on the eastern side of State Highways 25 and 26, with the type of industrial activity to be identified through the District Plan review. The Structure Plan will be implemented as part of the District Plan review.

In June 2012 territorial authorities in the Waikato region identified 1512.6 hectares of industrial land in lots of greater than 50 hectares or more each, which are either available currently or are emerging. Much of this land is partially or fully serviced with non-transport infrastructure. This indicates plentiful supply of available industrial land in many territorial authority areas, which could provide an opportunity to meet constraints in other parts of the upper North Island.

6.4 Soil

Many of the region's soils are highly productive, and a fundamental resource for the economy. Soil quality is a value judgement about how suitable a soil is for a particular use and its potential to continue providing services into the future. The most versatile soils in Waikato are found between Hamilton and Cambridge, and around Matamata and Reporoa. However, as seen in figure 102, some of our most versatile soils are being used for urban development, particularly around Hamilton and Cambridge.[325]

Subdivision of rural land has been on the rise but is expected to plateau as a result of a Waikato District Council Plan Change. In the five year period to 2006, the amount of rural land subdivided into properties of four hectares or less was more than the total amount for the preceding 10 years. Thirty to 40 per cent of subdivision was on land with the highest productive capabilities, and 75 per cent had a 'high productive capability for pastoral use'.[326]

WRC's land fragmentation indicator suggests that Waikato district has a high proportion of subdivision on versatile soils but the Rural Plan Change, formally known as Plan Change 14 (PC14), is intended to stem this.

[325] Waikato Regional Council (2011a) All about soil.
[326] Waikato Regional Council (2010, p. 95).

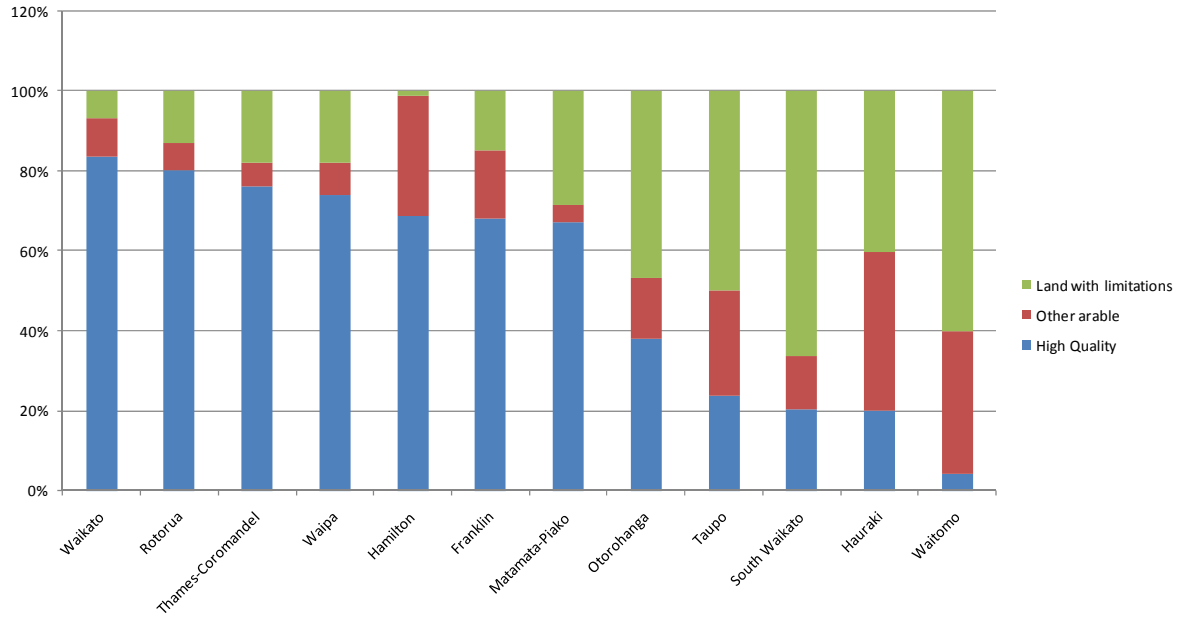

Figure 102: Land fragmentation by land class for Waikato territorial authorities[327]

Dairy farming is intensifying in the region. The average stocking rate rose from 2.7 cows per hectare in 1996/97 to 3.02 cows per hectare in 2008/09. The area under dairying increased from 1998-2007. Per hectare production has also increased, partly due to increasing use of brought in feed which, as an additional source of nutrient, further intensifies pressures on the land.[328]

Two properties indicate the physical status of soil. Bulk density is a measure of soil compaction, i.e. the mass of soil in a defined volume. Total porosity is a measure of the holes or voids in the soil mass. Voids are important to allow air to penetrate the soil, but also to give the soil an open structure to enable it to retain water. The larger pores or macropores are of particular importance for infiltration and drainage, but are easily lost when soil is compacted. The physical characteristics and the susceptibility to compaction are much influenced by soil mineralogy and amounts of sand, silt and clay.[329]

Provisional targets for soil quality indicators in New Zealand were set by Landcare Research in 2003 and republished with minor editorial changes in 2008. Targets were reviewed and updated as part of an Envirolink tools programme in 2012. There had been some improvement in meeting soil compaction targets by pasture by 2009, however, compaction is increasing in horticulture and cropping soils. Excessive nitrogen and phosphorus on pastoral soils increased markedly between 1996 and 2009.[330]

6.5 Minerals

Waikato is the most important minerals producing region in New Zealand. Within the region there are important mineral exploration and development operations including, aggregates, gold and coal. Coal is a significant resource in the Waikato region and is discussed in chapter 4.3.2.

Economic aggregate and industrial mineral resources (including limestone, sands and gravels) can be found throughout the region. These resources include volcanic rocks such as basalt or andesite, greywacke, limestone and sands and gravels. The

[327] Note 1: Land Use Capability (LUC) classes 1, 2 and 3 have been used in the calculation. However, the Waikato District Council definition for High Quality Soils is LUC class 1, 2 and 3e (where moderately or well drained). Therefore, the proportion for High Quality Soils will be slightly overstated and the "Other arable" slightly understated. Note 2: Data are preliminary only. Note 3: High quality – LUC classes 1, 2 and 3. Other arable – LUC class 4. Land with limitations – LUC classes 5, 6, 7 and 8.
[328] Waikato Regional Council (2010, p. 95).
[329] Landcare Research (2012, About SINDI).
[330] Waikato Regional Council (2010, p. 95).

aggregate resources are put to a wide variety of uses but by far the most significant use is as roading material. In 2006 the Waikato region produced almost seven million tonnes of aggregate and industrial minerals. In addition to being necessary for the maintenance of the region's infrastructure, approximately 3.2 million tonnes was "exported", mainly to the Auckland region. Some activities associated with the extraction of aggregate such as quarrying can, by their nature, conflict with other neighbouring land use activities such as rural residential land uses and demand for Waikato aggregates is expected to increase significantly in the coming years as Auckland's available aggregate supply decreases or is made more difficult to exploit due to competition from other land uses.[331]

Precious metals such as gold or silver are found in the Hauraki epithermal zone which has the only producing epithermal goldfield in New Zealand. The Martha Mine open pit and Favona Underground mines in the town of Waihi, produced 108,000 ounces of gold and 522,129 ounces of silver in 2010.[332]

WRC's proposed Regional Policy Statement 2010 Policy 6.7 states that it will seek to work with territorial authorities, iwi authorities, relevant industry and other agencies to identify and map the location of significant mineral resources. This mapping will be made available to territorial authorities. Preliminary mapping is shown in figure 103.

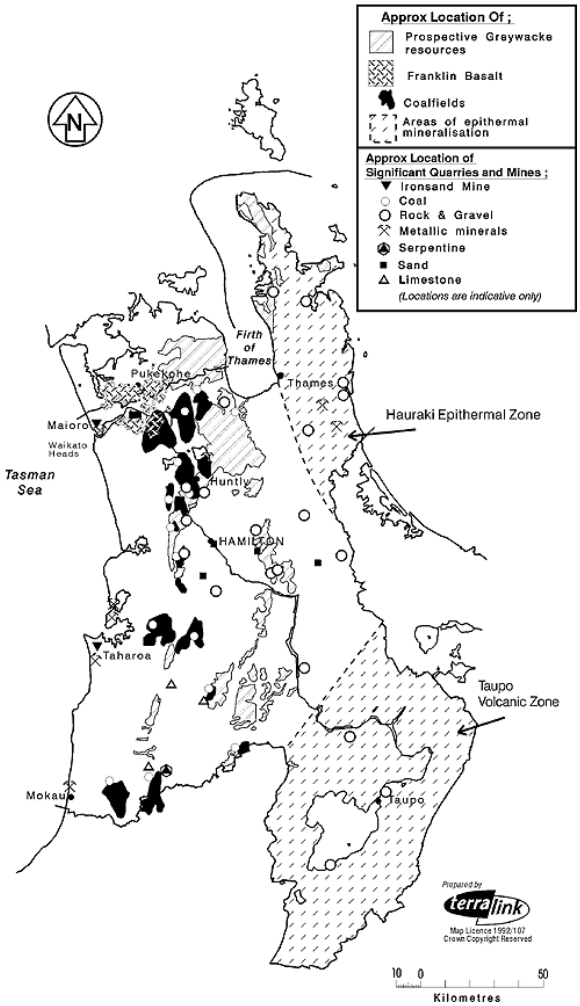

Figure 103: Indicative map of mineral deposits in the Waikato region[333]

[331] Paling et al (2008, p. 61-63).
[332] Newmont Mining Corporation (2012, The Asia Pacific region).
[333] Waikato Regional Council (2000, p. 179).

6.6 Water

Freshwater is important for the region's economic, social, cultural and environmental wellbeing. The freshwater resource, including ground water, is used in many ways. Uses include:

- domestic, industrial and community water supply and irrigation;
- electricity generation;
- absorbing contaminants; and
- recreation such as swimming, duck shooting, boating, fishing or simply enjoying being near the water.

Māori have strong cultural, traditional and historic links with our wetlands and inland waterways. These freshwater resources are spiritually significant and closely linked to the identities of the tangata whenua (people of the land).[334]

The region contains five major rivers, including the Waikato River, New Zealand's longest river and sixth largest by mean annual discharge.

6.6.1 Allocation

Water is already over-allocated in some catchments. It was noted by WRC in 2010 that 510 groundwater takes consumed 430,000 cubic metres per day and 570 surface water consents consumed 1.36 million cubic metres per day.

The Waikato, Waihou and Piako rivers have the highest allocation levels. Every drop of water in the Waikato River is utilised at least seven times before flowing out to sea. This includes hydro power generation, cooling of Huntly thermal power station and the Wairakei geothermal power station.

The continued increase in demand for fresh water for irrigation and municipal uses is the main pressure on allocation of the region's fresh water. More droughts, predicted for the east of the region, will intensify this pressure. Future population growth in the Coromandel will place further pressure on the Peninsula's small streams. The Waikato River will most likely meet increases in demand from Auckland city for water.[335]

Figure 104 shows the amount of the primary allocable flow allocated as at May 2012.

[334] Waikato Regional Council (2011i) Rivers.
[335] Waikato Regional Council (2010, p. 80).

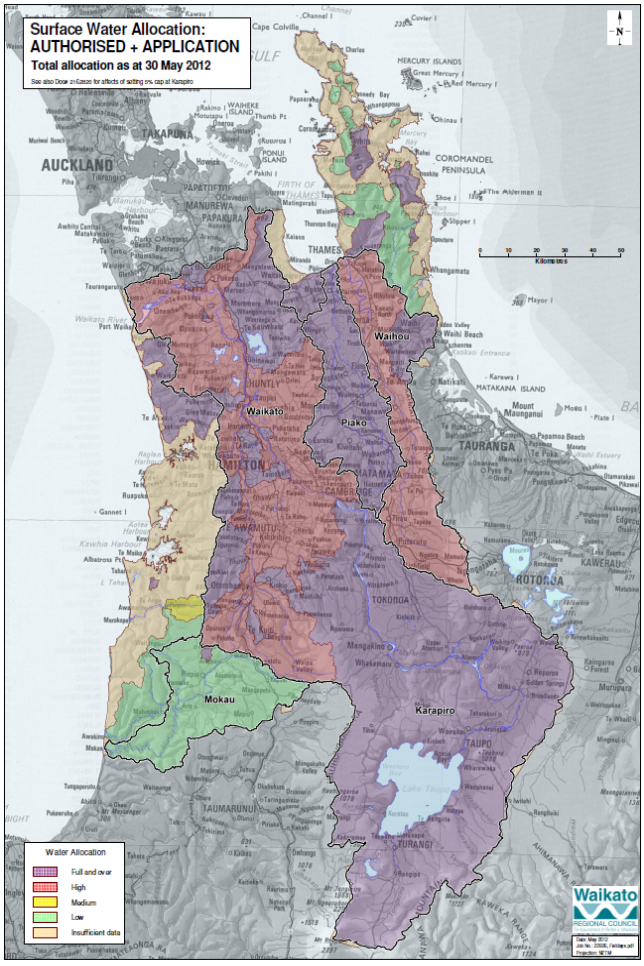

Figure 104: Surface water allocation: authorised + application total allocation as at 30 May 2012

Waikato Regional Plan Variation 6 has been prepared to deal with the increasing demand and competition for water in the region for irrigation, domestic or community supplies, industry and stock water supplies. Variation 6 establishes a policy framework for managing the increasing demand and competition for water and ensures that water is available to meet the reasonable needs of individuals and communities and for animal drinking water, as well as for renewable energy generation and the cooling of Huntly Power Station, in-stream requirements during water shortages and droughts. It also ensures that decisions on water allocation take account of the contaminant assimilative capacity of water bodies.

6.6.2 Current use

A consent is required to take water above 15 cubic metres per day generally and Table 10 shows how many water take consents were current as at July 2012. The largest use by volume is hydroelectric generation. However, this water is non-consumptive and is not removed from the waterway. Flood control is the second largest use but since these would only be excised in a flood situation this does not limit availability of water for other users. The largest consumptive use is irrigation, with a consented irrigated area of 20,000 hectares. The second largest use is for municipal supply.

Table 10: Current water take authorisations as at July 2012[336]

	Current take consents		Daily take limit (m^3)	
Water use	**Ground water**	**Surface water**	**Ground water**	**Surface water**
Electricity generation	21	39	636,700	6,714,048
Flood control/fire fighting	2	8	1,000	1,345,460
Irrigation	175	227	148,426	670,428
Domestic & Municipal	143	98	69,888	607,895
Industry	42	22	65,026	302,287
Quarry/mining	51	49	124,215	251,347
Agriculture non-irrigation	101	38	14,158	30,407
Ecological	1	4	326	14,286
Recreation	25	12	6,436	10,761
Construction	8	19	313	3,316
Other	3	1	2,263	4,000
Grand Total	**572**	**517**	**1,068,751**	**9,954,234**

In addition to current consents, there are an additional 281 applications which have not yet been granted or commenced. If granted, these authorisations will allow the take of an additional 42,000 cubic metres of groundwater and 1,276,000 cubic metres of surface water per day, largely for irrigation and municipal supply.

6.7 Coast/Marine

The Waikato region coastline stretches for about 1,150 km, ranging from the white sands of the eastern Coromandel to the rugged west coast from Port Waikato to Mokau, with its distinctive black sands and windswept shoreline. Overall, 35.6 per cent of harbours and open coast are in public ownership and nine per cent of the coastline is used for roads.

The total coastal marine area (coast to 12 nautical mile[337] limit) of the Waikato region is just over 1,010,000 hectares. The main commercial activities are fishing, tourism, transport and aquaculture. Changes to the Regional Coastal Plan have provided for farming of new species, such as hapūku and kingfish and created a new 300 hectare zone for fish farming. Commercial fishing of finfish, shellfish, crab and lobster are also undertaken in the region's coastal marine area.[338]

Recreational fishing is a popular activity in the region and mussel farms are often used by recreational fishers. Other boating activities such as power boating, sailing and kayaking are popular particularly on the Coromandel Peninsula. The region contains some of the world's best surf breaks and Raglan and Whangamata both have an international reputation.

6.8 Air

Ambient air quality in the Waikato region is generally good but the main air quality issue in some urban areas is PM_{10} (particles less than 10 microns in diameter). These particles are not visible to the human eye and are small enough to be able to be absorbed into people's airways.[339]

[336] Data sourced from the Waikato Regional Council Resource Use Authorisations Management System (RUAMS) 2012.
[337] 22.224 kilometres approximately.
[338] Waikato Regional Council (2010, p. 78).
[339] Banks (2011, p. 7).

PM_{10} has a wide range of negative effects on human health and these are well established across a range of research disciplines. PM_{10} is emitted from a wide range of diffuse sources, including domestic fires (the primary contributor within the Waikato region), vehicle emissions, outdoor burning and industrial activities.

Poor air quality has a negative impact on public health (including restricted activity days and premature death in some individuals). As a consequence, there are associated social and economic impacts, and the costs of these are borne by individuals as well as at local, regional and national levels.

There are four airsheds (Tokoroa, Taupō, Te Kuiti and Putaruru) in the region with PM_{10} exceedances that are of concern. Tokoroa is the key airshed to address within the region to improve air quality. In order to ensure that Tokoroa is compliant within the Resource Management (National Environmental Standards Relating to Certain Air Pollutants, Dioxins and other Toxics) Regulations 2004 timeframes, a significant investment of effort and resources is required. This is not only because of the high number of PM_{10} exceedances, but also because the majority of the population lives in highly deprived areas.[340]

The Resource Management (National Environmental Standards Relating to Certain Air Pollutants, Dioxins and other Toxics) Regulations 2004 were amended in 2011 and require offsets from new industries with significant PM_{10} discharges in polluted airsheds from September 2012. This means that new industries will only be permitted to discharge PM_{10} if they reduce emissions from elsewhere so that overall emissions in the airshed stay the same (or improve).

6.9 Natural hazards

Plate tectonics make New Zealand prone to natural hazards. The Waikato Civil Defence Emergency Management Group Plan identifies the following natural hazards for the region:

- Earthquake. The area between Taupō and Rotorua is the most vulnerable in the region. High risk of these occurring over millennia.
- Volcanic. Various sources within and outside the region. High risk of these events occurring over decades to centuries.
- Tsunami. These could affect both the east and west coasts. Very high risk of tsunami occurring over centuries.
- River flooding. The most frequent and widespread hazard. Moderate risk of major flooding occurring over centuries.
- Severe storms. These tend to impact Thames Valley and low-lying areas the most. High risk of these occurring over decades.
- Drought. Hauraki Plains, lower Waikato Basin, Thames-Coromandel District and Pukekohe areas typically the most affected. Moderate risk of severe drought over decades.
- Landslides. Hipaua landslide at the south-western edge of Lake Taupō and debris flow hazards along the western side of the Coromandel and Kaimai Ranges are significant hazards. Moderate risk of large scale landslide over centuries.[341]

[340] Banks (2011, p. 1).
[341] Waikato Civil Defence Emergency Management Group (2011, p. 15).

7 Institutions

7.1 Summary

Central and local government institutions are part of the fundamental framework of the regional business environment. They set the rules of the game through regulation and can contribute overtly to growth through active support for firms and sectors. The Treasury notes that regulation can be used to pursue economic, social and environmental goals from which the community derives benefit. High quality regulation is important for productivity and economic growth. The challenge is to ensure that regulations deliver their objectives at least economic cost, thereby contributing the maximum net benefit to society.[342] It might be expected that, in the longer run, regions that invest significant amounts in economic development should benefit from higher growth, provided that expenditure is appropriately allocated.[343]

Although New Zealand is considered one of the easiest countries in the world to do business, the authors of this economic profile did not find any publications reviewing the cost, interpretation or application of central or local government regulation in Waikato, including its consistency across territorial authorities. At the time of publishing this economic profile, work was being undertaken by councils through the Waikato Local Government Forum to contribute to a better understanding of this.

Research for Local Government New Zealand by Business and Economic Research Ltd suggests that local government makes a broad contribution to economic growth. Many of the region's territorial authorities support business development, through both strategy for their areas and the delivery of services.

7.2 National

Central government is responsible for setting economic policy through departments such as the Ministry of Business, innovation and Employment, managing public finances through the Treasury and Inland Revenue Department and managing monetary policy and money supply through the Reserve Bank.

The World Bank's *Doing Business 2012* report ranked New Zealand third in the world for ease of doing business, first for ease of starting a business and first in the world for protecting investors.[344] The 2011 Index of Economic Freedom, compiled by The Heritage Foundation and the *Wall Street Journal*, ranked New Zealand as the fourth freest economy in the world and as number one for business freedom.[345]

New Zealand was the first developed country to enter into a free trade agreement with the People's Republic of China. It also has free trade agreements with many other nations, including Singapore, Thailand, the Association of Southeast Asian Nations-Australia, and Malaysia. Australia and New Zealand have one of the most open economic and trade relationships between any two countries, effectively giving exporters duty-free access to 27 million people approximately.

7.3 Regional

In addition to WRC, the Waikato region has 11 territorial authorities (one city, Hamilton, and 10 districts), three of which lie across the regional boundary (Rotorua, Taupō and Waitomo districts).

Regional councils are primarily concerned with environmental resource management, flood control, air and water quality, pest control, and in specific cases public transport,

[342] The Treasury (2011a) Regulation.
[343] New Zealand Institute of Economic Research (2004, p. 31).
[344] World Bank Group (2011) Ranking of economies – doing business.
[345] Heritage Foundation (2011) Top ten of 2011.

regional parks and bulk water supply. In addition to their economic contribution generally, some regional councils also contribute to economic development specifically, by providing economic information and coordinating the development and implementation of regional economic strategies for example.

Territorial authorities are responsible for a wide range of local services including roads, water reticulation, sewerage and refuse collection, libraries, parks, recreation services, local regulations, community and economic development, and town planning.

The administrative boundaries in the Waikato region are depicted in figure 105.

Figure 105: Map of territorial authorities in the Waikato region[346]

Regional councils and territorial authorities have been designed to be largely complementary rather than hierarchical, however in relation to environmental management, district plans must give effect to regional councils' regional policy statements.

[346] Waikato Regional Council (2011g) Our region's boundaries.

The final report of the Government's Quality Regulation Review in 2007 noted concerns with the implementation of regulation by both local government, including the inconsistent interpretation and application across regions and districts (where inconsistencies were not justified by regional or local differences).[347] This issue is being considered by the Productivity Commission's inquiry into local government regulation. The Commission's inquiry work will feed into the Government's wider local government review, *Better Local Government*.

7.4 Contribution to economic growth

Business and Economic Research Ltd prepared for Local Government New Zealand in 2010 a Framework that identifies the contribution local government makes to economic growth in New Zealand, with reference to the Government's Economic Growth Agenda at that time.

The Framework suggests that local government's contribution is not limited to activities delineated as "economic development" such as the set up of development agencies and their associated activities, but includes areas such as leadership, spatial planning and infrastructure, implementation and delivery of regulation, the provision of core services and social and community support and amenities. Underpinning the Priority Areas are cross-cutting principles that guide the activity undertaken. These are sustainability, place shaping, and Māori.[348]

Local government's contribution to economic growth and development can be encompassed within six priority areas:

- Leadership (incorporating partnership and facilitation): setting, supporting and driving a vision for economic growth.
- Spatial planning and infrastructure: ensuring that the physical and built environment is conducive to economic growth.
- Regulation: create a quality regulatory environment to make it easier for businesses to grow, invest and create jobs encouraging economic growth.
- Services: effective coordination and delivery of key council activities that support the effective functioning of local communities.
- Business and industry development: facilitating investment, industry and employment growth; and implementing measures that support a conducive business environment.
- Social and community: an environment that supports wellbeing and enables communities to participate; contribute to economic growth. [349]

All local authorities deliver services that contribute to the regulation, services and social and community priority areas. Local Authority Shared Services Ltd is jointly owned by all of the local authorities in the Waikato region as a vehicle to develop shared services.

Several councils have been involved with a number of activities in the spatial planning and infrastructure priority area, such as:

- Upper North Island Strategic Alliance Agreement: the purpose is to establish a long-term collaboration[350] for responding to and managing a range of inter-regional and inter-metropolitan issues.
- FutureProof: a joint project set up by partner councils[351] to consider how the Hamilton, Waipa, Waikato sub-region should develop into the future.

[347] New Zealand Government (2007, p. 4).
[348] Business and Economic Research Ltd (2010, p. 5).
[349] Business and Economic Research Ltd (2010, p. 18).
[350] Between the Auckland Council, Bay of Plenty Regional Council, Northland Regional Council, Waikato Regional Council, Hamilton City Council, Tauranga City Council and Whangarei District Council.
[351] Hamilton City Council, Waipa District Council, Waikato District Council, Waikato Regional Council.

- Coromandel Peninsula Blueprint: a joint initiative between four project partners[352] to achieve integrated planning on the Coromandel Peninsula.
- Shore Futures Project[353]: the purpose of the project is to provide an overall framework within which to address demographic and development challenges facing communities within the Kawhia and Aotea catchments.
- Joint Hauraki Gulf Marine Plan: Auckland Council and WRC are working together to scope options to develop with other partners a joint marine plan for the Hauraki Gulf Marine Park area.

Most territorial authorities in the Waikato region have directed resources towards leadership and business and industry development specifically, although one has not (Matamata-Piako) in response to community consultation. WRC services in this area include the provision of information about the regional economy and facilitation. Strategy is developed and services delivered within each territorial authority area. Economic strategy and business and industry development activities are not planned or delivered regionally currently.

There are also four Regional Tourism Organisations in the Waikato region, one of which (Hamilton and Waikato Tourism) provides services across seven territorial authority areas.

Table 11 below summarises how these activities are delivered.

Table 11: Local government economic development activities in the Waikato region

Local authority	Strategy	Delivery
Hamilton City Council	Strategy and Research Unit Events and Economic Development Group	Council business units External organisations (e.g. SODA Inc, Waikato Innovation Park, Hamilton and Waikato Tourism)
Hauraki District Council	Strategic planning and economic development staff	Economic Development Officer Destination Coromandel (RTO)
Matamata-Piako District Council	-	- Visitor Information Centres Hamilton and Waikato Tourism
Ōtorohanga District Council	-	Ōtorohanga District Development Board Hamilton and Waikato Tourism

[352] Thames-Coromandel District Council, Waikato Regional Council , Department of Conservation, Hauraki Whaanui.
[353] The Shore Futures Project team comprises staff representatives from Waikato Regional Council, Otorohanga, Waikato and Waitomo district councils, Federated Farmers and the Department of Conservation. The project team are also working with tangata whenua and other interest groups and agencies such as the Ministry of Fisheries (now part of the Ministry for Primary Industries) and the Historic Places Trust.

Local authority	Strategy	Delivery
Rotorua District Council	Rotorua District Council Rotorua Tourism Committee (standing committee of Rotorua District Council)	Rotorua Economic Development Council Controlled Organisation; Rotorua District Council through the Economic & Regulatory Services Group including - Destination Rotorua Marketing; Events & Venues; Economic Projects, Planning services.
South Waikato District Council	Community Development Group (Economic Development Coordinator)	South Waikato Economic Development Trust (Council Controlled Organisation) and Council Community Development staff Hamilton and Waikato Tourism
Taupō District Council	Enterprise Great Lake Taupō with support from Taupō District Council Business Development team	Enterprise Great Lake Taupō with support from Taupō District Council Business Development team Destination Great Lake Taupō
Thames-Coromandel District Council	Economic Development and Communications Manager	Thames-Coromandel District Council Visitor Information Centres Destination Coromandel
Waikato District Council	Waikato District Council	Waikato District Council Hamilton and Waikato Tourism
Waipa District Council	Business Development Facilitator	Business Development Facilitator Hamilton and Waikato Tourism
Waitomo District Council	Community Development Manager	District Economic Development Board to be established in 2012-13 Hamilton and Waikato Tourism
Waikato Regional Council	-	-

A number of territorial authorities have also produced economic development strategies over the past three years. Some of these are active, while others are being reviewed currently. Some territorial authorities are in the process of developing new strategies and the current position is presented in table 12.

Table 12: Local government economic development strategies in the Waikato region

Local authority	Strategy	Vision	Goals	Key drivers	Key sectors
Hamilton	Under review currently	TBC	TBC	TBC	TBC
Hauraki	*Hauraki District Council's Economic Development Strategy (2009)*	A district that encourages vibrant communities, provides a great lifestyle and fosters a positive climate for balanced, sustainable development.	• Build the profile of the district's economic potential within and outside the district • Encourage stable and growing employment opportunities • Build and maintain adequate infrastructure and community facilities to maintain growth • Encourage and facilitate development proposals, especially those that promote opportunities for Hauraki • Preserve and sustain the environment and resources within the district, particularly the unique features of Hauraki	• Pastoral farming • Hard rock extraction (gold, aggregate) • Tourism • Service industries servicing the above three • Service industries servicing the population • Horticulture • A limited manufacturing base • Aquaculture (currently a real potential economic growth area)	• Dairy farming • Minerals • Tourism • Manufacturing • Services
Matamata-Piako	-				
Ōtorohanga	-		The aims of the Ōtorohanga District Development Board are to: • promote and market Ōtorohanga as a desirable place to live, invest, do business or visit; • operate information centres		

Local authority	Strategy	Vision	Goals	Key drivers	Key sectors
Rotorua	Rotorua Sustainable Economic Growth Strategy (2011)	Rotorua – Living the dream – World class in every way	Strategic direction for Rotorua: Leader in: • forestry and wood processing • tourism • geothermal • agriculture. Recognised as: • preferred lifestyle destination • attractive and easy place to invest and do business • enabling regulatory environment.	Focus on building on the globally competitive comparative advantages of the region. Focus on the four primary drivers of the Rotorua economy: • forestry and wood processing • tourism • geothermal • agriculture. Focus on the role of Rotorua District Council and the Council Controlled Organisation as the main influencer of economic development related outcomes in Rotorua. Central business district & lakefront revitalisation	• Forestry and wood processing • Tourism • Geothermal • Agriculture • Education

Local authority	Strategy	Vision	Goals	Key drivers	Key sectors
South Waikato	The Economic Spirit (2006, being updated and refined currently)	A dynamic thriving district built on the unique qualities of its people, industries and natural strengths	• Stimulate employment growth • Support existing businesses • Develop capacity in all resources • Developing a positive image • Reducing barriers to economic development • Attracting new investments and Industries		• Farming • Engineering • Water • Renewable • Transit Hub • Tourism • Forestry
Taupō	Strategy (2012)	Add value to our natural resources to create a smarter future together	• The local economy is becoming more resilient • Employment opportunities are growing	A resilient district economy is less subject to boom and bust effects. Jobs are a primary indicator of economic activity. Utilising our natural resources. Encouraging people to innovate, partner and collaborate.	• Geothermal • Forestry • Tourism • Agriculture & Aquaculture
Thames-Coromandel	To be completed by the end of 2012	TBC	TBC	• Review of the district plan • Economic development strategy • Organisational restructure	• Tourism • Aquaculture

Local authority	Strategy	Vision	Goals	Key drivers	Key sectors
Waikato District	Waikato Economic Development Roadmap (2012)		Themes: • Connected Waikato – improving connections between business and alignment amongst councils and government agencies • Welcoming Waikato – a business-friendly council and plan-prepared for development • Distinctive Waikato – image building and place making • Built for Business Waikato – removing infrastructure constraints and opening up new opportunities	Economic climate, what businesses are telling Waikato District Council they want, the need to compete.	Primary production, energy extraction/generation and transmission
Waipa	In development				
Waitomo	Community Development Strategy (2010, the District Economic Development Board Strategy is expected to be developed and approved by Waitomo District Council in 2013-14)		• Develop, support and promote business-related activities. • Grow the economy. • Recognise that economic, social, cultural and environmental outcomes must be mutually reinforcing. • Maintain a high quality environment. • Recognise the importance of tourism, primary production and utilisation of the landscape and culture.		• Tourism • Primary production
Waikato Region	-				

8 Iwi

8.1 Summary

Iwi that have rohe in the region are re-emerging both as part of the governance framework and also as an economic force in their own right. The transfer of assets from Treaty settlements has, in part, transformed Māori participation in the economy and iwi have employed a number of corporate structures to undertake economic development activities. Comprehensive information about economic development activities undertaken by these types of organisations was not available at the time of writing.

8.2 Tangata whenua

A significant proportion of the Māori population in the Waikato region can trace their ancestry to the early Māori navigators who sailed the Tainui and Te Arawa ocean voyaging waka from Hawaiiki (early Polynesian settlements across the Pacific) during the period of New Zealand history that is generally referred to as the “great migration” a significant event that is believed to taken place around 1350 AD marking the arrival of a magnificent fleet of Māori sailing canoes sailed to the shores of Aotearoa.

Pre-European settlements were widely distributed, located near food, rivers and the coast. As the population grew, pressures on resources increased tribal territoriality. Fortified villages on defensible landmarks, such as headlands or river terraces, dominated settlement.

The term tangata whenua or people of the land acknowledges the special relationship Māori have with their environment. Pepeha or aphorisms used by iwi and hapū include references to significant landscapes, waterways, ancestor and ancestral dwellings. Pepeha are useful in describing tribal rohe and ancestral connections, but also serve to emphasise the area of responsibility each tribe has as kaitiaki to maintain and protect taonga or treasures for future generations.

It is common for Māori to exchange such tribal sayings during formal and semi-formal introductions, making specific references to:

- their mountain
- the lands adjacent to the mountain
- their river and its flow
- the coastline, or for inland tribes, often a large lake.

The following iwi have tribal areas (rohe) within the Waikato region:

- Tūwharetoa
- Te Arawa
- Ngati Tahu - Ngati Whaoa
- Ngati Kearoa - Ngati Tuara
- Tuhourangi - Ngati Wahiao
- Raukawa
- Ngati Maniapoto
- Waikato
- Hauraki.

Figure 106 illustrates the iwi rohe within the Waikato region.

Figure 106: Iwi of the Waikato region[354]

8.3 Treaty of Waitangi settlements

Treaty settlements between the Crown and iwi establish co-governance of the Waikato River catchment between WRC and the iwi in the catchment. The proposed Regional Policy Statement 2010 acknowledges this, with the incorporation of a distinct iwi dimension to the document. Of particular note is the inclusion of the Vision and Strategy/Te Ture Whaimana, the key direction-setting document for the protection of the Waikato River. These settlements, which focus on cultural redress, have also included the provision of resources for iwi capacity-building in relation to their co-governance and co-management functions.

Changes in Māori participation in the economy have also occurred in recent years due in part to the transfer of assets from Treaty settlements. Iwi have employed a number of corporate structures to undertake economic development activities (such as trust boards, land trusts, companies and joint ventures). For example:

- The Waikato Raupatu Lands Trust Annual Report for the year ended 31 March 2011 states that it holds total assets worth $775 million[355]. Its commercial arm, Tainui Group Holdings Ltd (which undertakes commercial property development, among other things), achieved a net profit of $39.9 million on total assets worth $694 million in the year ended March 2012.[356]
- In May 2010, Mighty River Power and the Tauhara North No. 2 Trust were granted resource consent for the construction and operation of a geothermal power station on the Ngatamariki geothermal steam field.
- The Tuaropaki Trust is made up of seven Mokai hapū that affiliate to both Ngati Tuwharetoa and Ngati Raukawa. Its activities include temperature controlled horticulture, geothermal power generation, sustainable farming and broadband internet. The Trust is also one of the Māori trusts and incorporations that back Miraka Ltd, a new dairy processor.

[354] Waikato Regional Council (2010, p. 27).
[355] Waikato Raupatu Lands Trust (2011, p. 21).
[356] Tainui Group Holdings Ltd (2012, p. 2).

Comprehensive information about economic development activities undertaken by these types of organisations was not available at the time of writing.

Table 13 summarises the progress of financial/commercial Treaty settlements involving iwi in the Waikato region. Apart from iwi-specific settlements, Waikato iwi have also been part of settlements involving broader groups, such as fisheries and commercial aquaculture. In these cases, each iwi's share of the total settlement is usually on a proportion of population basis. In these cases, the table gives total settlement values (rather than the share of each iwi). Settlement values are expressed in terms of dollars at the time of settlement.

Table 13: Financial/commercial Treaty settlements involving iwi in the Waikato region

Settlement progress	Waikato iwi involved	Settlement summary	Total settlement value
Treaty of Waitangi (Fisheries Claims) Settlement Act 1992/ Māori Fisheries Act 2004	Hauraki[357] Ngāti Tuwharetoa Raukawa Waikato Tainui Tuhourangi Ngati Tahu - Ngati Whaoa Plus all other iwi outside Waikato Regional Council boundary listed in Māori Fisheries Act 2004 Schedule 4	Full and final settlement of Māori commercial fishing claims under the Treaty of Waitangi. 50 per cent share in Sealord Products. Sealord Products to hold 22 per cent of the total quota under the Quota Management System (QMS). 20 per cent of all new species brought into the QMS. Administered on behalf of iwi by Te Ohu Kaimoana Trust.	Current value of Māori fishing assets is approximately $700 million composed of quota, cash and shares in Aotearoa Fisheries Ltd (each iwi share of cash and shares in this company is based on iwi population). Iwi shares in fishing quota are based on a mix of iwi population and coastline length in each fisheries quota management area.[358]
Waikato Raupatu Claims Settlement Act 1995	Waikato Tainui	Redress for raupatu (confiscation). Combination of cash and land accompanied by a formal apology.	$170 million[359]

[357] A collective consisting of 12 iwi: Ngāi Tai (Hauraki), Ngāti Hako, Ngāti Hei, Ngāti Maru (Hauraki), Ngāti Paoa, Ngāti Porou ki Harataunga ki Mataora, Ngāti Pūkenga ki Waiau, Ngāti Rāhiri Tumutumu, Ngāti Tamaterā, Ngāti Tara Tokanui, Ngāti Whanaunga, Patukirikiri.
[358] Information supplied by Ministry of Agriculture and Forestry, now part of the Ministry for Primary Industries.
[359] Deed of settlement (1995, p. 37).

Settlement progress	Waikato iwi involved	Settlement summary	Total settlement value
Māori Commercial Aquaculture Claims Settlement Act 2004	Hauraki Ngāti Tūwharetoa Raukawa Waikato Tainui Tuhourangi Ngati Tahu - Ngati Whaoa Plus all other iwi outside Waikato Regional Council boundary listed in Māori Fisheries Act 2004 Schedule 4	Full and final settlement of commercial sea, or coastal aquaculture claims in the coastal marine area since 1992. Relevant areas of interest are Coromandel, Aotea and Kawhia Harbour. Pre-commencement Obligation: 20 per cent of 'existing' aquaculture space in the coastal marine area, issued on or after 21 September 1992 on a region-by-region basis. New Space Obligation: 20 per cent of all new aquaculture space identified in the coastal marine area to be transferred to iwi, via the Māori Commercial Aquaculture Settlement Trust.	 $21 million (Coromandel) Unquantified (ongoing obligation)[360]
Te Arawa Lakes Settlement Act 2006	Tuhourangi - Ngati Wahiao Ngati Tahu - Ngati Whaoa Ngati Kearoa - Ngati Tuara	Final settlement of all historical claims relating to 14 lakes.	$2.7 million (plus $7.3 million to capitalise the annuity Te Arawa received from the Crown and address any remaining annuity issues).[361]

[360] Information supplied by Ministry of Agriculture and Forestry, now part of the Ministry for Primary Industries.
[361] Office of Treaty Settlements (2011d) Te Arawa lakes – summary.

Settlement progress	Waikato iwi involved	Settlement summary	Total settlement value
Central North Island Forests Land Collective Settlement Act 2008	Tuhourangi - Ngati Wahiao Ngati Tahu - Ngati Whaoa Ngati Kearoa - Ngati Tuara Te Arawa affiliate group includes these iwi and another eight. Central North Island Iwi Collective includes the Te Arawa affiliate group and seven other iwi. Raukawa	All of 176,000 ha of the Central North Island licensed Crown forest land, and the associated accumulated rentals and ongoing rentals will be vested in a Trust Holding Company, CNI Iwi Holdings Ltd. The Collective's proportion of these assets will be 86.7 per cent by value, and the Crown's proportion will be 13.3 per cent by value. Other commercial redress (right of first refusal etc).	The Collective's share of the Crown forest land is valued at $196 million.[362] Total annual rentals from the Crown licences are currently about $15 million a year.[363]
Affiliate Te Arawa Iwi and Hapū Claims Settlement Act 2008	Tuhourangi Ngati Wahiao Ngati Tahu - Ngati Whaoa Ngati Kearoa - Ngati Tuara	Final settlement of all historical claims of the Iwi and Hapū represented by Te Pumautanga o Te Arawa resulting from acts or omissions by the Crown prior to 21 September 1992.	This settlement was transferred into a share of the Central North Island Forests Land Collective Settlement.[364]

[362] The eight Collective iwi have agreed to allocate its share of the land amongst themselves on the basis of mana whenua, and in accordance with their agreed process and guided by the principles of tikanga Māori. It is understood that the allocation process is in progress.
[363] Office of Treaty Settlements (2011b) Central North Island forests iwi collective deed of settlement.
[364] Office of Treaty Settlements (2011a) Affiliate Te Arawa iwi and hapu deed of settlement – summary.

Settlement progress	Waikato iwi involved	Settlement summary	Total settlement value
Deed of Settlement (conditional upon settlement legislation coming into force)	Raukawa	Full and final settlement of all Raukawa historical Treaty of Waitangi claims against the Crown.	Financial redress: $50 million cash compensation less the on-account amount from CNI Settlement, $533,000 payment, pou whenua fund $50,000, $3 million cultural fund, $8 million to engage in river related initiatives such as joint initiatives with Mighty River Power. Interest commencing 28 January 2011 to the day prior to settlement date. Commercial redress provides Raukawa with an option to purchase Crown property in different circumstances depending on the type ofredress.[365]
Iwi-specific Agreement In Principle equivalents	Hauraki		

[365] Office of Treaty Settlements (2012) Raukawa deed of settlement.

9 Business and industry

9.1 Summary

Business demographics provide some indication of entrepreneurial activity, and also some indication of how well new firms survive in the region.[366] Levels of employment, comparison of this nationally, labour productivity and contribution to exports are measures of the size and value of particular sectors. Sectors that perform well against these indicators, are of scale and/or growing and are consistent with the foundations and drivers of the regional economy could be selected as priorities for development.

Waikato is a region of small businesses in a country of small businesses. There appear to be low levels of new firm development and there are relatively few large firms. The largest contributions to GRP and employment in 2007[367] were from construction and real estate, business services, wholesale and retail trade and health and education, which cater for domestic demand primarily. A higher proportion of the regional labour force is employed in dairy cattle farming, dairy product manufacturing and forestry and logging than the national average for these sectors. Average Waikato labour productivity was higher than for New Zealand because the agriculture, electricity gas and water, construction, wholesale trade and business services sectors in Waikato have higher labour productivity than the national average.

The authors found no studies that review the performance, opportunities and barriers to growth facing firms in Waikato and consider that this information would be useful to guide business and industry development activities in the region. Interviews of firms in several sectors have been completed on WRC's behalf as an initial step in addressing this gap.

9.2 Demographics

Two-thirds of businesses in New Zealand are owner-operated and have no other employees. Waikato businesses share this characteristic, as shown in figure 107.

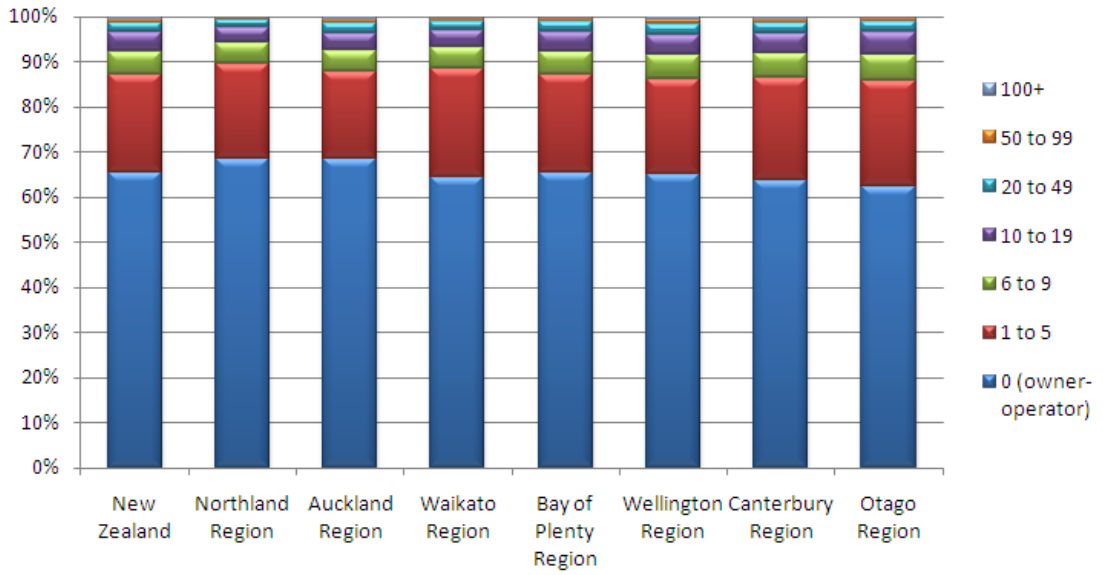

Figure 107: Proportion of geographic units in size group, by region (2011)

The region had the third largest number of small and medium-sized enterprises (enterprises with 19 or fewer employees) in New Zealand in 2011, behind Auckland and Canterbury but ahead of Wellington as shown in figure 108.

[366] New Zealand Institute of Economic Research (2004, p. 30).
[367] This is the most recent year for which this regional economic data is available.

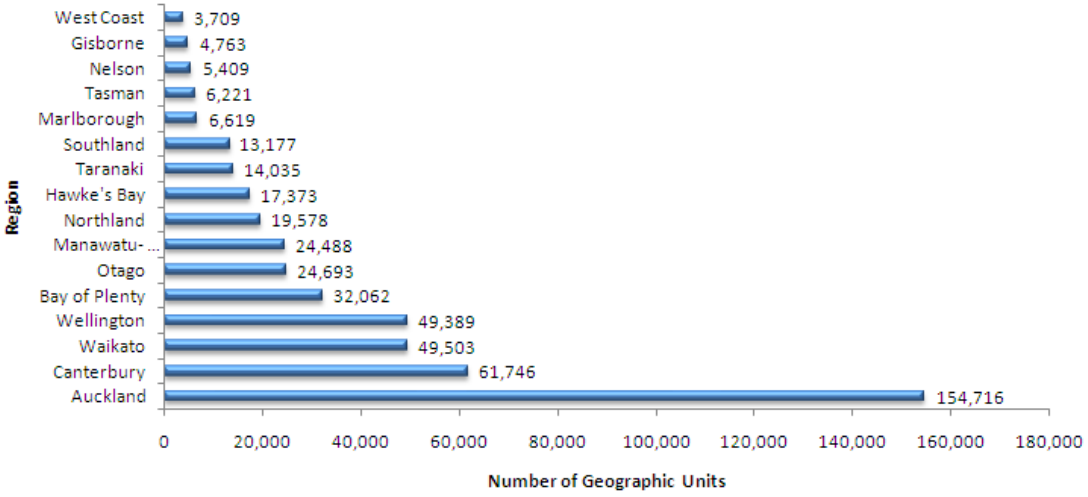

Figure 108: Geographic units with 0-19 employees by regional council area (2011)

There is very little variation between the different regions and territorial authorities. South Waikato district has the lowest proportion of owner-operator businesses (58 per cent). Only 0.5 per cent of New Zealand business geographic units have more than a hundred employees, and the Waikato region is slightly lower at 0.4 per cent, as reflected in table 14.

Table 14: Industry geographic units by size and TA (2011)

	Number of employees						
Area	0	1 to 5	6 to 9	10 to 19	20 to 49	50 to 99	100+
New Zealand	330045	110701	25927	20990	11563	3543	2425
Waikato Region	32863	12216	2457	1967	991	295	190
Thames-Coromandel	2709	977	230	130	48	13	8
Hauraki District	1692	663	88	76	31	11	5
Waikato District	5853	1681	216	191	89	26	11
Matamata-Piako District	3387	1397	182	159	64	23	13
Hamilton City	7670	3116	894	742	436	140	116
Waipa District	4671	1523	270	222	116	23	15
Ōtorohanga District	1244	482	56	45	11	6	1
South Waikato District	1344	653	133	91	55	21	6
Waitomo District	1025	391	76	53	26	9	5
Taupō District	2778	1112	285	243	111	19	11

The areas with lower proportions of small and medium-sized enterprise employment tend to be the larger metropolitan areas, where larger businesses are more likely to be located. The Waikato region's proportion of small and medium-sized enterprise employment is similar to the Bay of Plenty – it has more large firms than many smaller regions but has fewer large firms than Auckland, Wellington and Canterbury, as illustrated by figure 109.

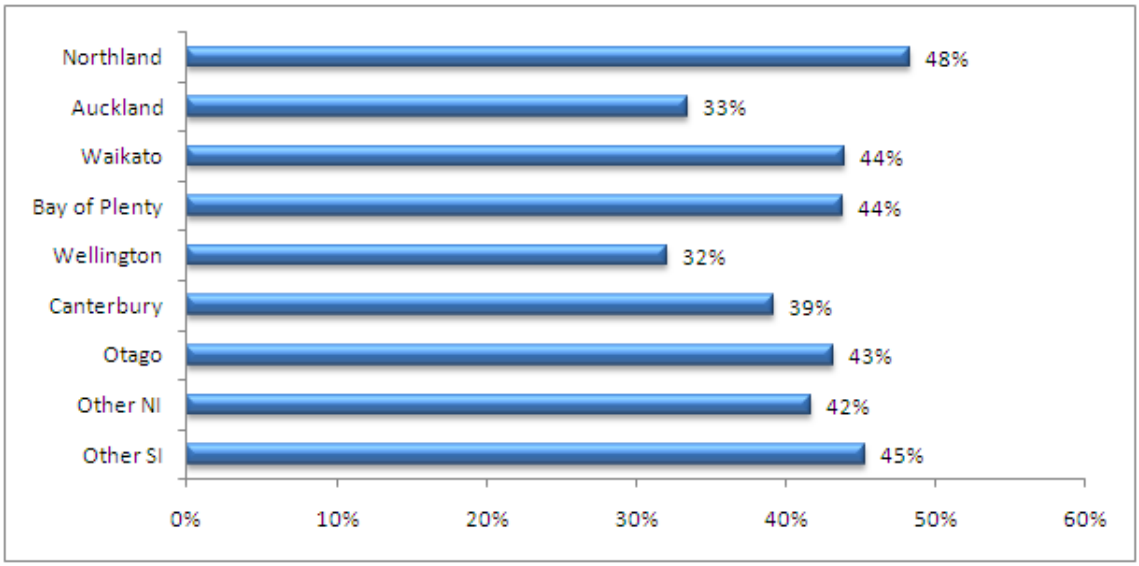

Figure 109: Proportion of employment in geographic units with 0-19 employees (2011)

The overall business density[368] in New Zealand as at 2011 was 136 enterprises per 1000 active working age population. New Zealand has had the highest business density each year since 2003 compared to all other countries recorded.[369] Small and medium-sized enterprises accounted for 161 enterprises per 1000 active working age population. Business density in the Waikato region was approximately 166 enterprises per 1000 active working age population and because it correlates closely with the percentage of small businesses in the region, its position relative to other regions is similar to that measure, as shown in figure 110.

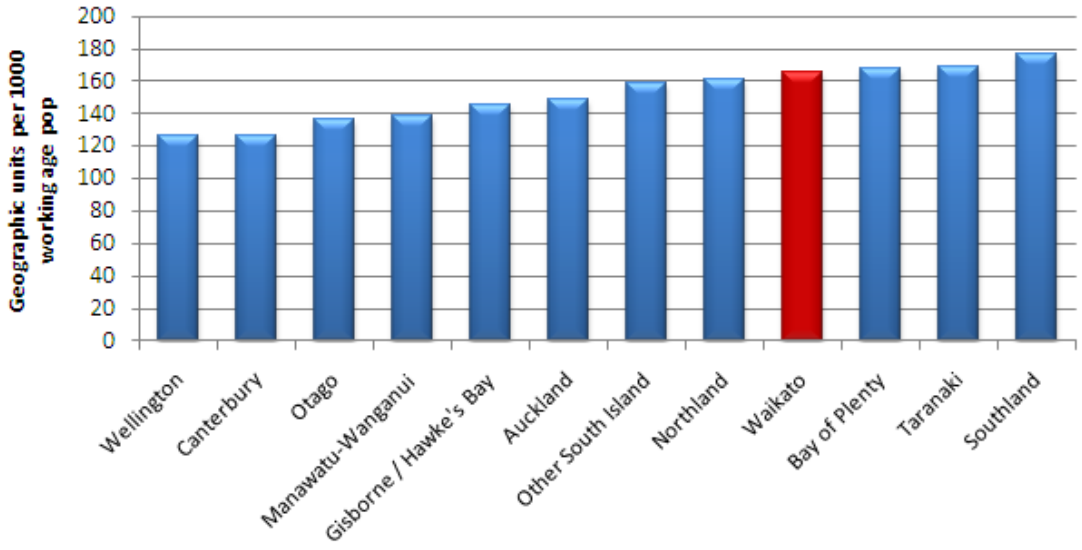

Figure 110: Business density by region – geographic units per 1,000 working (2011)

The larger centres generally have the highest percentages of new enterprises compared to existing enterprises, but the Waikato region's position is more similar to smaller regions, as shown in figure 111.

[368] Business density means the number of firms (measured as geographic units) per 1,000 working age population.
[369] Ministry of Economic Development (2011h, p. 29).

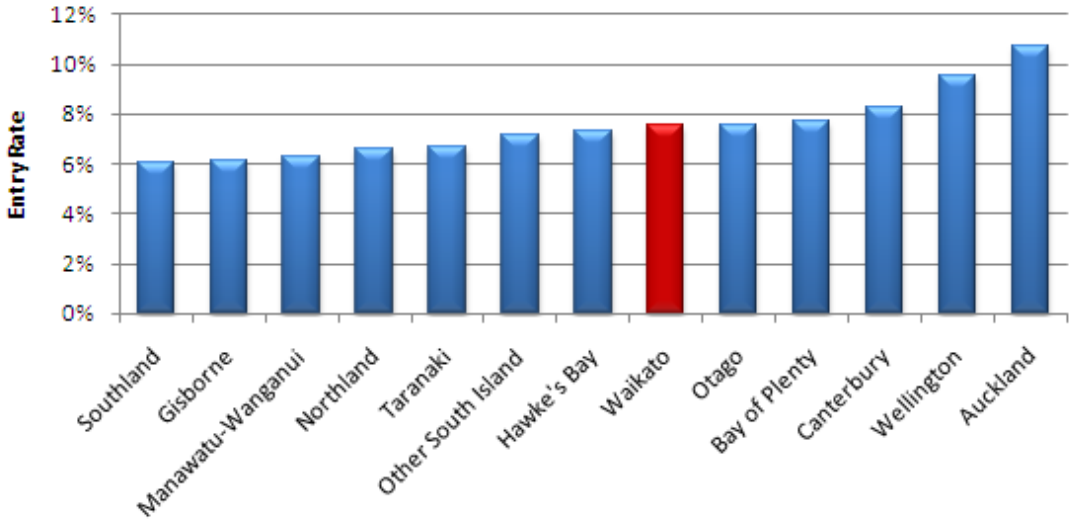

Figure 111: Entry rate (percentage of new firms to existing firms) (2011)[370]

Larger regions also tend to have a larger proportion of firms 5 years old or younger. Again, Waikato more closely resembles smaller regions, as shown in figure 112.

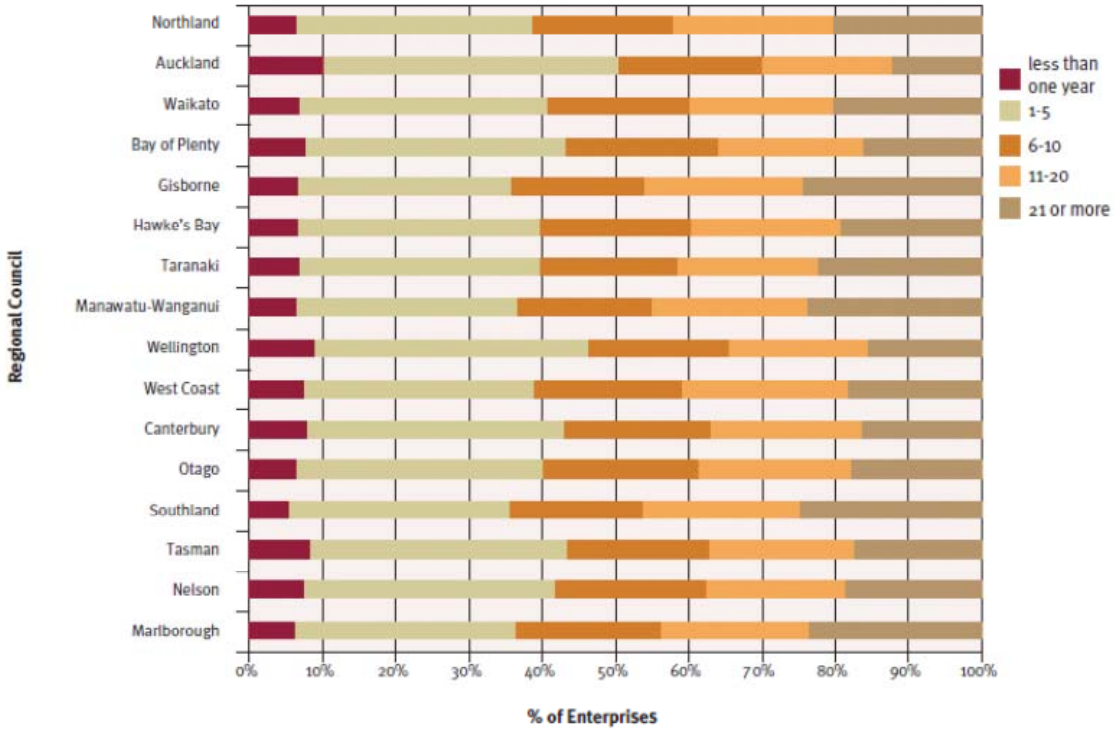

Figure 112: Distribution of enterprise age by regional council (February 2010)[371]

9.3 Location quotients

Location quotient is a measure of how employment in the region compares with the national average. If a higher proportion of the regional labour force is employed in a particular industry than the national proportion employed in that industry the location quotient will be greater than one. Conversely, if employment in an industry is under-represented in the region it will have a quotient less than one.

Using a 48-sector aggregation, the sectors with the highest location quotients in the Waikato region are dairy cattle farming (3.27), dairy product manufacturing (3.24) and forestry and logging (2.86). These sectors are also significant contributors to GRP and

[370] Data sourced from the Statistics New Zealand Business Demography tables 2011.
[371] Ministry of Economic Development (2011h, p. 31).

exports. The sectors with the lowest quotients are beverage, malt and tobacco manufacturing (0.2), textile and apparel manufacturing (0.34) and water and rail transport (0.38), as presented in table 15.

Table 15: Waikato location quotients in 2010 for 48 industry sectors

Industry Sector	Location Quotient
Dairy cattle farming	3.27
Dairy product manufacturing	3.24
Forestry & logging	2.86
Other farming	2.60
Mining & quarrying	2.42
Electricity	1.81
Wood product manufacturing	1.51
Meat & meat product manufacturing	1.30
Local government	1.29
Basic metal manufacturing	1.24
Rubber & plastic manufacturing	1.22
Sheet metal manufacturing	1.17
Services to agriculture	1.16
Construction	1.16
Livestock & cropping farming	1.14
Road transport	1.13
Cultural & recreational services	1.11
Personal & other services	1.09
Paper & paper product manufacturing	1.08
Transport equipment manufacturing	1.07
Education	1.07
Horticulture & fruit growing	1.03
Retail trade	1.03
Health & community services	1.01
Water supply	1.01
Hospitality	1.00
Machinery & equipment manufacturing	0.99
Real estate	0.90
Non-metallic manufacturing	0.88
Business services	0.84
Fishing	0.83
Wholesale trade	0.76
Central government	0.73
Finance	0.63
Petroleum & chemical manufacturing	0.61
Communication services	0.60
Furniture & other manufacturing	0.54
Other food manufacturing	0.53
services to finance & investment	0.52
Printing & publishing	0.47

Gas supply	0.44
Air transport, services to trans & storage	0.44
Insurance	0.42
Water & rail transport	0.38
Textile & apparel manufacturing	0.34
Beverage, malt & tobacco manufacturing	0.20

9.4 Productivity

Labour productivity measures the value of output produced per worker; usually either per year or per hour worked. Labour productivity is an important measure because when combined with the number of hours worked per capita, it determines GDP per capita. New Zealand performs in the middle of the OECD countries for annual hours worked per employee but is well behind in labour productivity. Higher labour productivity would directly lift economic prosperity. Labour productivity can be raised by lifting the value of goods and services produced or by lifting efficiency to increase the volume of goods and services per hour worked.

9.4.1 New Zealand's labour productivity performance

From 1990 to 2010 labour productivity increased steadily in New Zealand but the increase has been greater in other OECD countries, including Australia. So despite the improving trend, the gap is widening between New Zealand and other OECD countries, as shown in figure 113. New Zealand's labour productivity is in the bottom third among OECD countries. Since 1990, New Zealand has not achieved a rank higher than 20th in the OECD. Luxembourg is the highest ranked OECD country with its workers producing $66 more per hour than New Zealand workers, meaning they are about 2.3 times more productive than New Zealand workers.[372]

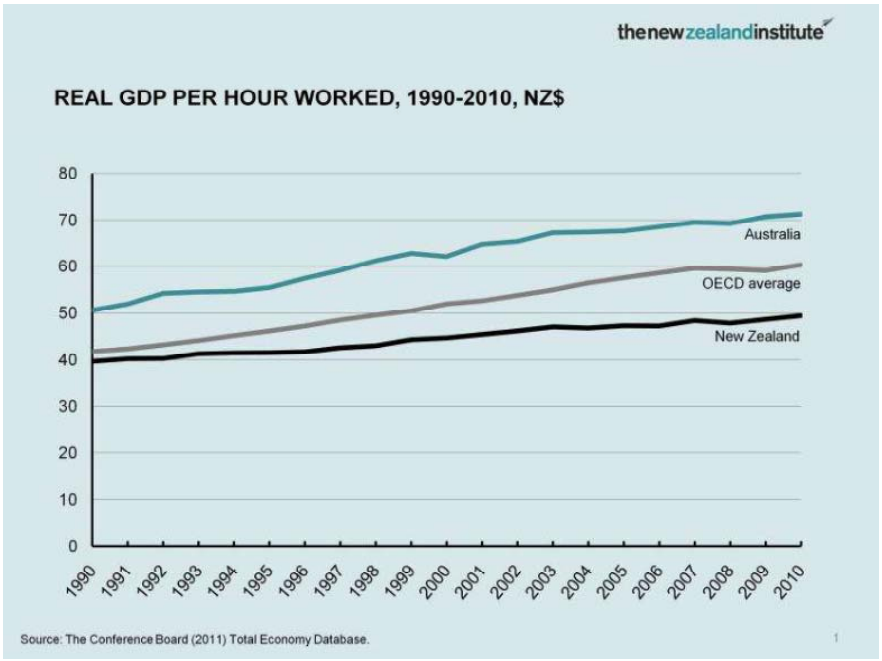

Figure 113: Real GDP per hour worked[373]

Figure 114 shows the contribution to New Zealand's labour productivity growth rate by the three main export sectors, the labour productivity of those sectors, and the share of all workers each sector employs. None of these sectors attains Australia's average labour productivity of NZ$71 per hour worked.[374]

[372] New Zealand Institute (2011b) NZahead – GDP per capita.
[373] New Zealand Institute (2011a, p. 54).
[374] New Zealand Institute (2011a, p. 57).

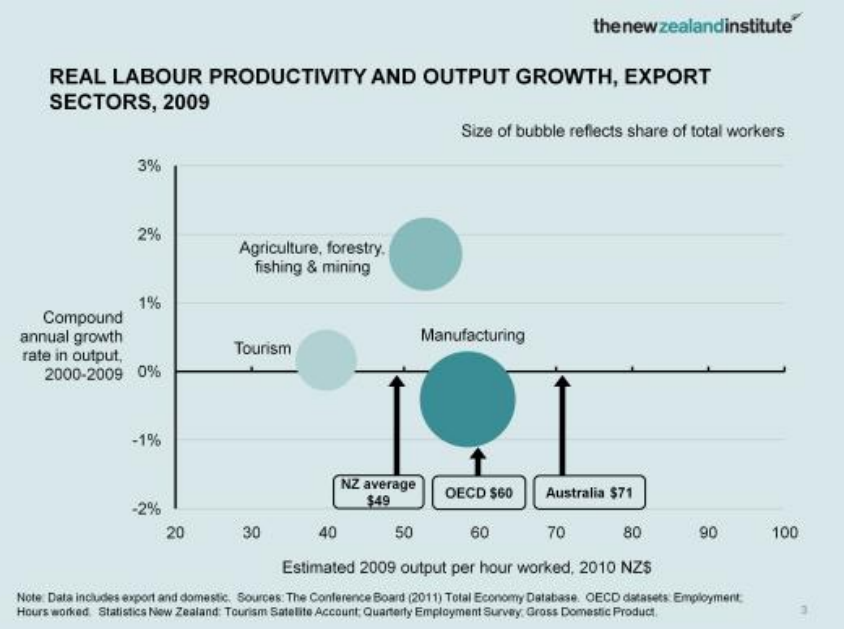

Figure 114: Real labour productivity and output growth, exports sectors, 2009[375]

9.4.2 Waikato region labour productivity

Labour productivity here is defined as the contribution to GRP per employee and is calculated by dividing economic value-added within the Waikato region by total employees including owner-operators. Average Waikato labour productivity was $73,000 in 2011, higher than $67,000 for New Zealand.[376]

Most Waikato sectors have higher labour productivity than their national counterparts, with the exception of forestry, mining, oil and gas, and electricity, as shown in figure 115. This could be caused by Waikato employees in those sectors working longer hours, being more highly skilled, or having higher levels of man-made or natural capital per employee. If it is due to higher capital intensity we would not necessarily expect to see higher wages because businesses need to earn a return on capital and could be because natural capital is being eroded. Higher labour productivity is therefore not an indicator of stronger economic performance in the region.

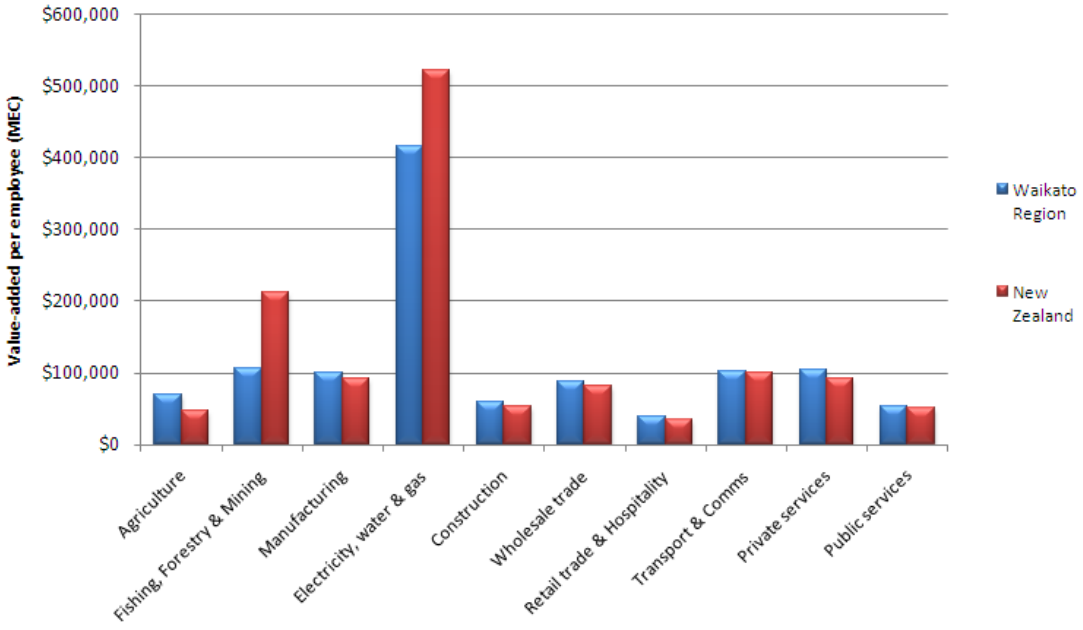

Figure 115: Comparison of Waikato region and New Zealand labour productivity (2011)

[375] New Zealand Institute (2011a, p. 55).
[376] Data sourced from the Market Economics Ltd multi region input output model, 2011.

Capital productivity is value added divided by the consumption of fixed capital (e.g. buildings and equipment). Average Waikato capital productivity was $6.42 of value added per $1 of fixed capital consumed. This was about the national average of $6.45. Capital productivity can be increased by using labour and capital more efficiently, or by substituting natural capital for man-made capital or labour. However, this would decrease the productivity of natural capital. Natural capital is more difficult to measure and growth which depletes natural resources is unsustainable in the long term.

Labour and capital productivity by sector are shown in figure 116. The electricity, water and gas sector has the highest labour productivity by far, $570,000 per employee. This is because utilities sectors are very capital intensive, and capital and labour are substitutes in production. The capital productivity in electricity, gas and water is relatively low. The construction and real estate sector has the next highest labour productivity ($109,000) and high capital productivity as well ($20 value-added per $1 of capital). However, this result was fuelled by strong growth in property prices in 2007 (the latest year for which productivity data is available) and was not a sustainable source of growth.

Sectors with high capital productivity are generally good areas in which to invest more capital. Similarly, sectors with high labour productivity are good areas in which to "invest" more human capital (training, for example). The sectors that stand out are business and finance services and dairy product manufacturing because they have both high labour productivity and high capital productivity.

Manufacturing sectors tend to be characterised by high levels of capital per employee and high labour productivity. Meat, food, and other (e.g. textile, chemical, basic metal) manufacturing all have high labour productivity and relatively low capital productivity. High value (equipment and machinery) manufacturing has lower labour productivity.

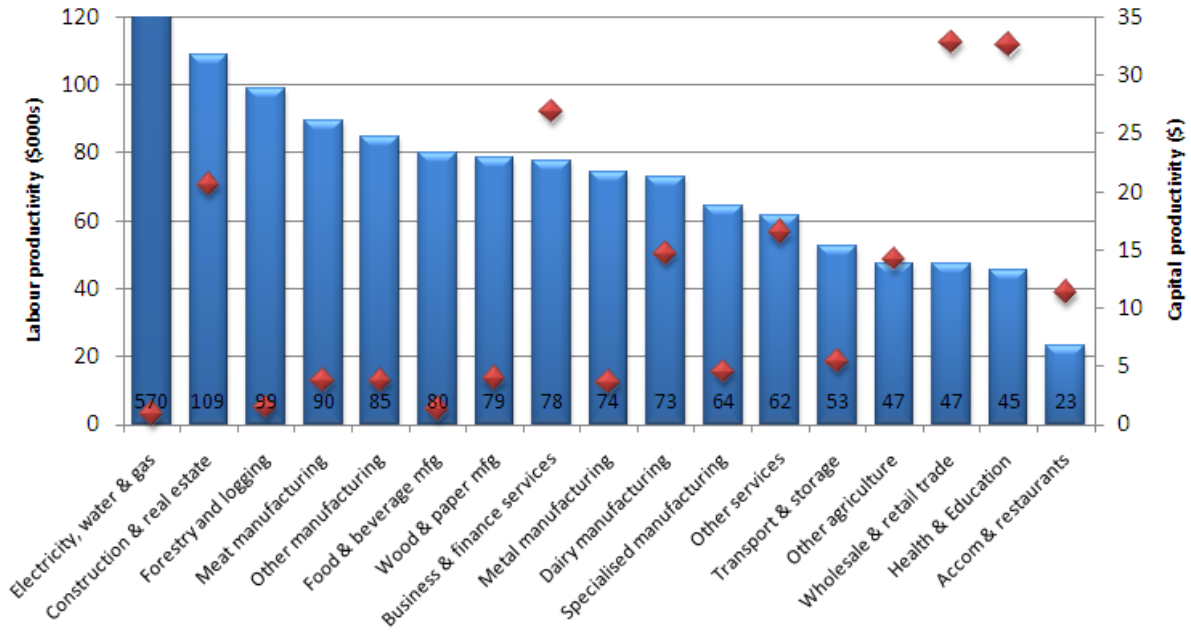

Figure 116: Waikato labour and capital productivity by sector (2007)

10 Capital

10.1 Summary

A financial system that provides firms with adequate access to finance on acceptable terms is crucial to enabling the country to achieve its full economic development potential.[377] Robust data on capital are almost nonexistent at the regional level. It appears that there a number of sources of finance available for firms at various growth stages and relatively few young company finance deals have been recorded in the region. The vast majority went to Hamilton firms, mostly to firms in the software sector, followed by pharmaceuticals, biotechnology and life sciences. There are no Waikato firms listed on the stock exchange.

10.2 Sources of finance

Table 16 shows the sources of finance available for firms at various growth stages, some of which are discussed in this section.

Table 16: Sources of financing by business growth stage[378]

Concept	Inception	Survival	Growth	Expansion	Maturity
Owners	Owners	Banks	Institutional	Capital markets	Cash flow
Friends	Friends	Government grants	New partners	Profits	International financing
Relatives	Relatives	Leasing	Profits	Joint ventures	Divestiture of segments
Suppliers	Suppliers			Licensing	
Customers	Customers				
Venture	Venture				
Govt grants	Govt grants				

The Reserve Bank of New Zealand publishes Money and Credit Aggregates that are broken down by sectors but not regionally. Information about debt funding[379] at the regional level is not available from the banks also.

Equity[380] markets provide an important source of financing for some companies and industries. Certain sectors, such as research and development-intensive industries, tend to be more dependent than others on issuing equity to finance investment. These industries are expected to grow more rapidly in countries with better developed equities markets.[381]

Business angels[382] and venture capital funds[383] are a distinct part of the larger market for financing small firms in that they focus on higher-risk ventures. Angel investors are generally involved in the early development of an enterprise, with venture capital financing coming at a later stage. The firms that are financed by both groups often

[377] Ministry of Economic Development (2011a) Access to finance.
[378] PwC (undated, p. 1).
[379] A debt is an obligation owed by one party (the debtor) to a second party, the creditor; usually this refers to assets granted by the creditor to the debtor. Debt increases the debtor's liability and must be paid back over a fixed period of time. Debt funding can be short or long term and come from many sources with many different financing options. Sources include banks, finance companies, trade credit, factoring companies and credit card facilities.
[380] Equity finance refers to the provision of funds in exchange for a share of ownership of the firm. It is an alternative form of financing to debt.
[381] Capital Market Development Taskforce Secretariat (2009, p. 6).
[382] An angel investor is a wealthy individual or professionally organised firm or group who invest in entrepreneurial firms. Although angels perform many of the same functions as venture capitalists, they usually invest their own capital rather than that of institutional or other individual investors.
[383] Venture capital refers to independently managed, dedicated pools of capital that focus on equity or equity-linked investments in privately held, high-growth companies. Many venture capital funds, however, occasionally make other types of private equity investments. Outside the United Sates, this phrase is often used as a synonym for private equity.

have low tangible assets and low or negative cash flows, and thus are unable to service or provide collateral for large amounts of debt. Empirical evidence shows that venture capital funds are an effective way to fund young, high-risk firms.[384]

There are two angel networks based in the Waikato region:

- *Greenfields Network*. With the Waikato Innovation Park acting as the conduit, Greenfields members are interested in early stage technology and high growth ventures requiring over NZ$100,000.
- *AngelLink*: initiated by WaikatoLink Ltd, the commercial arm of the University of Waikato. A national angel investment network to back New Zealand high growth technology ventures, with an emphasis on life sciences, engineering and information and communications technology. AngelLink's formation was to facilitate investment in early stage companies arising from Government funded research and, where appropriate, from private sector opportunities.

Venture capital and private equity[385] investment sectors are illustrated in figure 117. Although there do not appear to be any venture capital or private equity players based in the Waikato region, it appears that AngelLink has attracted some investment from the New Zealand Venture Investment Fund (NZVIF).[386]

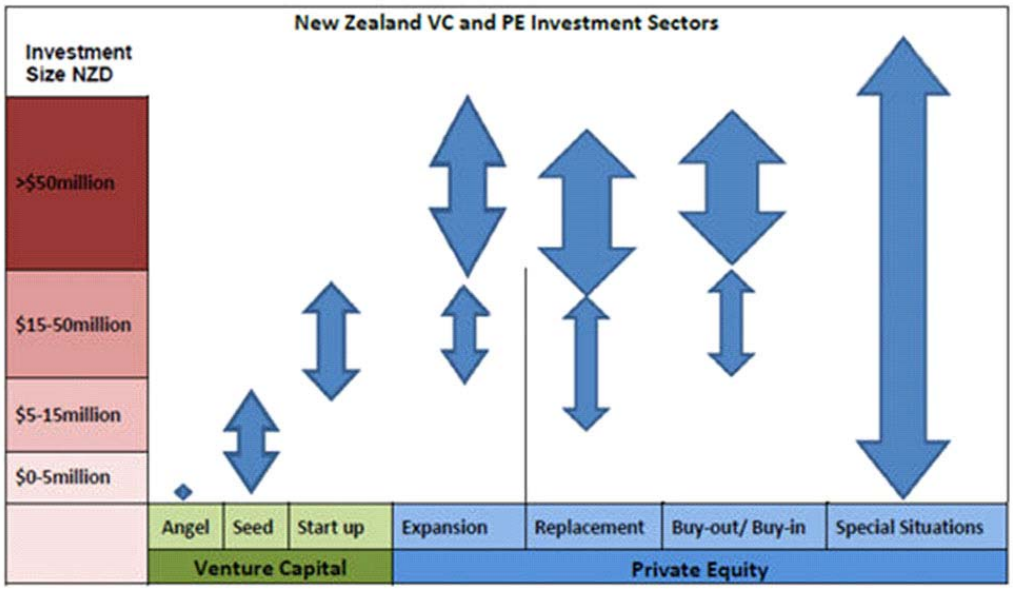

Figure 117: New Zealand venture capital and private equity investment sectors[387]

The New Zealand Venture Investment Fund was established by the New Zealand government in 2002, to help build a vibrant venture capital market in New Zealand. It is based in Auckland and governed by a private sector board of directors. The New Zealand Venture Investment Fund currently has $200 million of funds under management. It is invested through two vehicles:

- the $160 million Venture Capital Fund of Funds under management for investment alongside private sector co-investors in a series of privately managed venture capital investment funds; and
- the $40 million Seed Co-investment Fund: an early stage direct investment fund aimed at early stage businesses with strong potential for high growth.[388]

[384] Capital Market Development Taskforce Secretariat (2009, p. 7).
[385] Private equity includes organisations devoted to venture capital, leveraged buyouts, consolidations, mezzanine and distressed debt investments, and a variety of hybrids such as venture leasing and venture factoring.
[386] New Zealand Venture Investment Fund (2011a) Investee companies.
[387] New Zealand Superannuation Fund (undated, p. 2).
[388] New Zealand Venture Investment Fund (2011b) About NZVIF.

Expansion/development capital refers to the stage at which the business is established and requires capital for further growth and expansion. The company may require several rounds of capital to achieve the milestones set out in the business plan. The New Zealand Superannuation Fund adopted an expansion capital strategy to target firms within the approximately 2500 New Zealand small and medium-sized enterprises with annual revenues of $10-50 million.[389] It is unknown currently whether the New Zealand Superannuation Fund has invested in any firms in the Waikato region.

The New Zealand Young Company Finance Monitor records 24 deals with 10 firms in the Waikato region from quarter 1 2006 to June 2012. All but three of these deals went to Hamilton firms. Ten of these deals were with firms in the software sector, followed by pharmaceuticals, biotechnology and life sciences. Auckland accounted for 53 per cent of the deals by value nationally from 2006 to 2012, followed by Christchurch at 10 per cent and Wellington and Dunedin on 9 per cent each. Hamilton accounted for 5 per cent of deals by value, behind Palmerston North on 6 per cent.[390]

Listing on a stock market can enable firms to raise capital by selling shares to the public. The New Zealand stock market is known as the NZX. There are no Waikato firms listed on the NZX at the time of writing. The majority of listed firms are located in Auckland, with others in Wellington, Canterbury and Otago. There are some firms listed in Nelson and Bay of Plenty also.

[389] New Zealand Superannuation Fund (undated, p. 1).
[390] New Zealand Trade and Enterprise et al (2007-2012).

11 Innovation system

11.1 Summary

As noted earlier, innovation is a central component of the Government's economic strategy. The OECD Oslo Manual[391] identifies four types of innovation as outlined in table 17 below.

Table 17: OECD types and definitions of innovation

Type of innovation	Definition
Product innovation	A good or service that is new or significantly improved. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness and other functional characteristics.
Process innovation	A new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.
Marketing innovation	Significant changes in product design or packaging, product placement, product promotion or pricing.
Organisational innovation	A new organisational method in the firm's business practices, workplace organisation or external relations.

A typical regional system of innovation is organised around two interacting groups of actors:

- Firms linked to their customers and contractors. These firms have relationships with one another that can be both competitive and collaborative and that are probably as important in stimulating innovation as those they have with knowledge generators.
- Public research organisations, technology and knowledge transfer agents, educational and skills development organisations.

There are two other groups of actors which influence this, namely intermediary organisations and regulatory institutions.[392]

This chapter describes the public research organisations, technology and knowledge transfer agents, educational and skills development organisations present in the Waikato region and two government agencies that act as intermediaries. It appears that the region is well-endowed with tertiary education institutions but these are mostly concentrated in the larger urban areas, Hamilton particularly. Overall, the most popular subject areas are society and culture, management and commerce, education and health, according to the latest available data from the Ministry of Education. The largest number of industry trainees was in the dairy and meat sector, followed by forestry, electrical and agriculture.

Waikato is also well-endowed with research institutions and there is a base of intellectual property to build on, with several business incubators and science and technology parks available to help commercialise this as well as support innovative entrepreneurs and firms. According to the 2006 Performance Based Research Fund evaluation, the University of Waikato is first in 10 subject areas with more firsts in the sciences than any other university. Although they are outside the Performance-Based Research Fund framework, Waikato Institute of Technology and Waiariki Institute of

[391] OECD, Eurostat (2005, p. 48).
[392] OECD (2008, p. 30).

Technology both value and undertake research extensively and the Waikato region has a strong presence of primary sector-focused Crown Research Institutes. Business development and growth is supported by government agencies such as the Ministry of Business, Innovation and Employment, New Zealand Trade and Enterprise and Te Puni Kōkiri (Ministry of Māori Development), science and technology parks focused on primary industries and clean energy, and business incubators focused on weightless, AgBio, biotechnology and information and communications technology sectors.

11.2 Education

In the Waikato region there are 452 early childhood education providers, 253 primary to intermediate schools and 56 secondary schools (including composite schools). The sole university is the University of Waikato, with 12,800 enrolments. The Waikato Institute of Technology (Wintec) has a similar number of enrolments, 12,300. Te Wānanga O Aotearoa, with 36,000 enrolments, is the third largest education institute in New Zealand after the University of Auckland and the Open Polytechnic. These numbers are presented in table 18.

Table 18: Education institutions and enrolments

Institution type	Institutions	2010 Enrolments
Early childhood education providers	452	18335
Primary and intermediate schools	253	42915
Secondary schools	56	31436
Universities	1	12841
Institutes of Technology	1	12269
Wananga	1	35991

11.2.1 The University of Waikato

The University of Waikato was opened in 1964 and in 1998 began teaching in Tauranga.

The University of Waikato is comprised of seven faculties/schools of Studies:

- Faculty of Arts and Social Sciences
- Faculty of Computing and Mathematical Sciences
- Faculty of Education
- Te Piringa - Faculty of Law
- School of Māori and Pacific Development
- Faculty of Science and Engineering
- Waikato Management School.

In addition there are a number of specialised research institutes, centres, groups and units.

The University of Waikato offers a wide range of undergraduate degrees, postgraduate diplomas, masters and higher degrees, including higher doctorates (LLD, DLit, DSc), the supervised doctorate (PhD), supervised professional doctorates (EdD, SJD), and the Master of Philosophy (MPhil).

The University of Waikato has 1,460 full time equivalent staff, of which more than 650 are academic staff.

As shown in figure 118, 3,772 people gained qualifications from the University of Waikato in 2010, of which 2,600 were domestic students. 32 per cent were honours or post-graduate level qualifications, a slightly lower rate than the average for New

Zealand universities (34 per cent). More detail on the national comparison is shown in figure 119. The most popular subject area for University of Waikato qualifications in 2010 was society and culture (36 per cent), followed by management and commerce (27 per cent) and education (25 per cent). Despite the Waikato region being an agricultural hub there were very few qualifications conferred in agricultural studies. However, the national count is also low with only 545 qualifications gained in 2010.

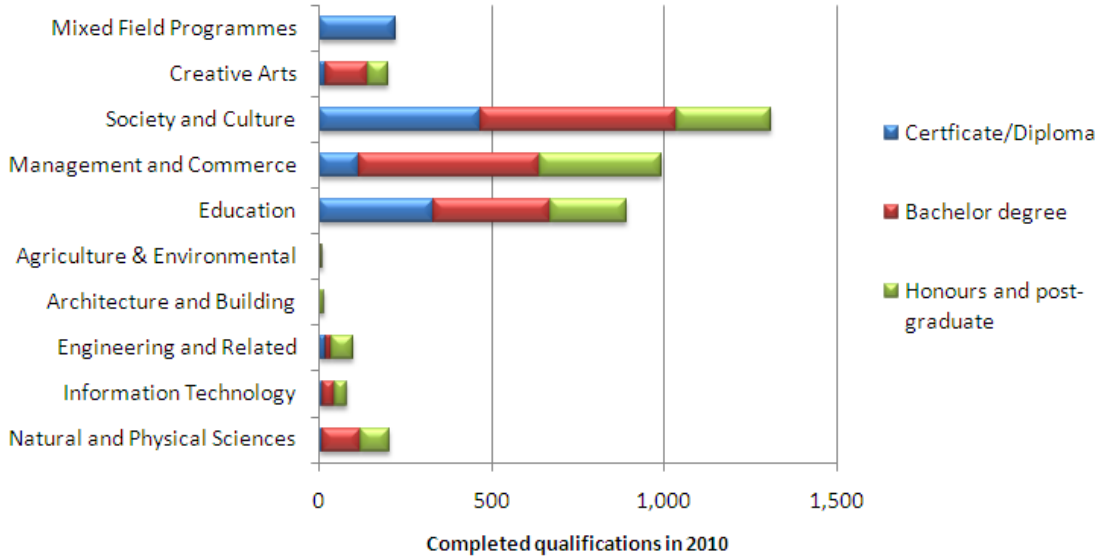

Figure 118: University of Waikato completed courses by area and level

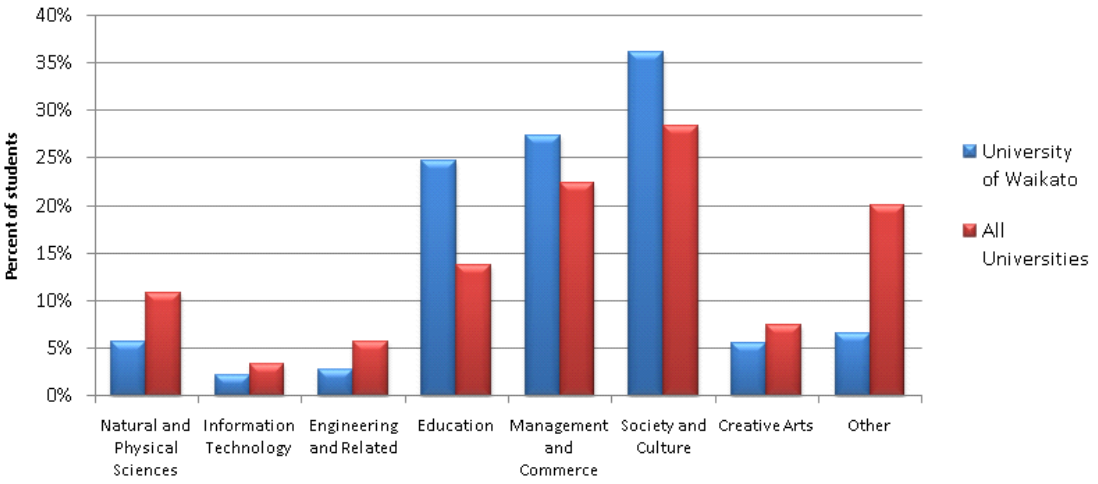

Figure 119: Comparison of subjects with all New Zealand universities

11.2.2 Waikato Institute of Technology

Founded in 1924 as the Hamilton Technical College to provide technical and trades training in the Waikato region, Waikato Institute of Technology (Wintec) has three campuses in Hamilton (City, Rotokauri and Hamilton Gardens) as well as Thames, Te Kuiti and at the Ōtorohanga Trade Training Centre. There are approximately 650 full-time equivalent staff, of which approximately half are academic staff.

Wintec comprises the Schools of:

- Business
- Education
- Centre for Health and Social Practice;
- Media Arts
- Sport and Exercise Science

- Information Technology
- International Tourism, Hospitality and Events
- Trades
- Engineering, Science and Primary Industries
- Centre for Foundation Studies, and
- Centre for Languages.

Study options include short courses, a Trades Academy, English Language and Introduction to Study programmes, undergraduate and postgraduate programmes up to Masters level.

As shown in figure 120, in 2010 there were 3,400 qualifications completed at Wintec, of which 3000 were undertaken by domestic students. A third of completed qualifications were level 5 or above, compared with 29 per cent for all New Zealand polytechnics. The most popular subject area was management and commerce (19 per cent) followed by creative arts, information technology and health.

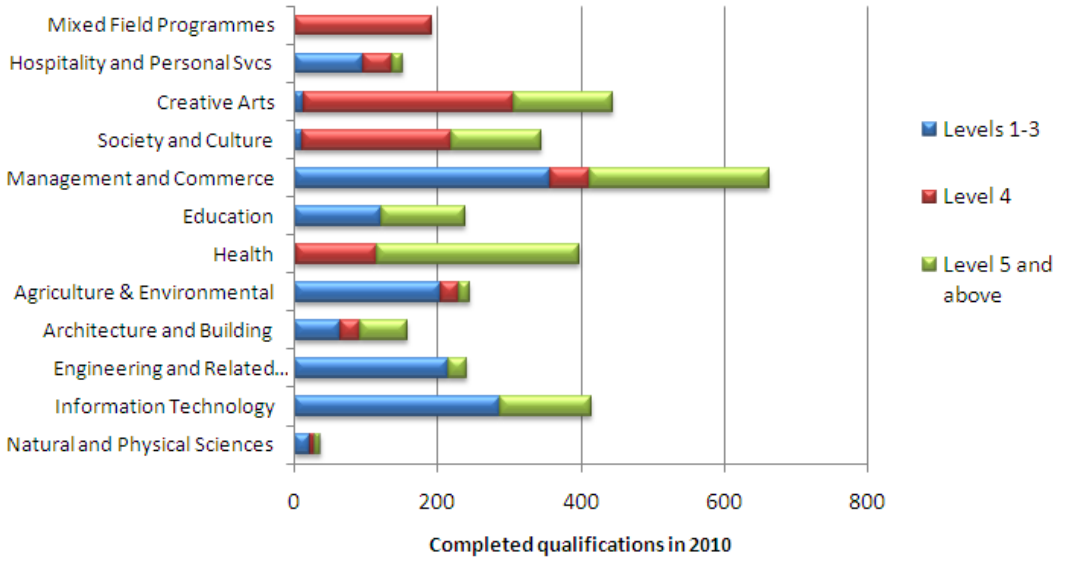

Figure 120: Wintec completed courses by area and level

11.2.3 Waiariki Institute of Technology

Established in 1978 as a centre for adult and trades education, there is an 8 hectare campus in Rotorua, a Primary Industry Campus at Waipa and smaller regional centres at Taupō, Tokoroa and Whakatane.

The Waiariki Institute of Technology Schools and Academies are:

- School of Business and Tourism
- School of Computing, Technology and Communications
- School of Forestry and Primary Industries
- School of Nursing and Health Studies
- School of Trade Training
- Te Wananga a Ihenga Māori Development, Humanities and Research;
- Waiariki Academy of Singing and Music, and
- Waiariki Academy of Sport.

Waiariki Institute of Technology employs over 550 people, with approximately 350 academic and 200 support staff. Waiariki Institute of Technology offers nine New Zealand Qualifications Framework level 7 degrees, some with multiple majors. It also offers graduate diplomas. There were 2,000 qualifications completed in 2010, 1660 of which were by domestic students. 34 per cent of completed qualifications were at level 5 or above. The most popular subject areas were agriculture and environment (24 per

cent), health (21 per cent) and hospitality and personal services (17 per cent), as shown in figure 121.

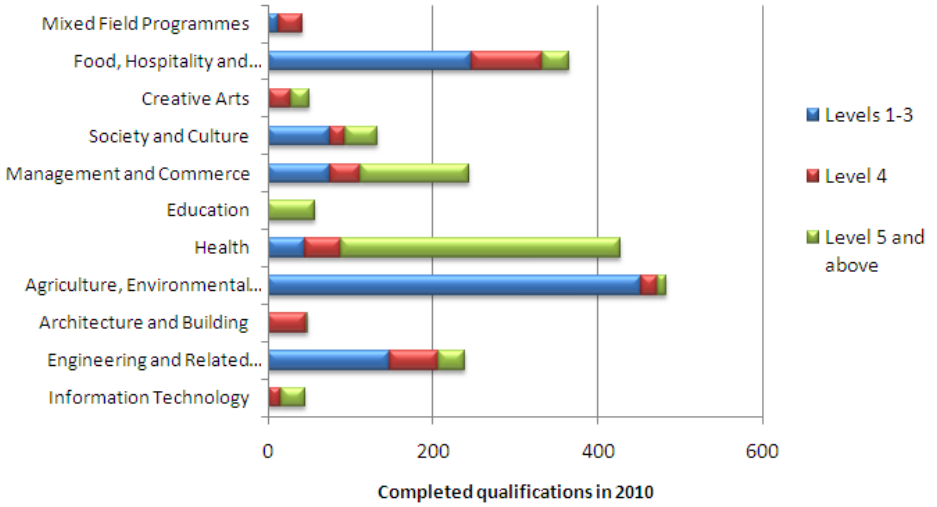

Figure 121: Waiariki Institute of Technology completed courses by area and level

The percentage of Information Technology and Creative Arts students at Wintec in 2010 was significantly higher than all polytechnics, including Waiariki Institute of Technology. The number of management and commerce students at Wintec was somewhat higher than all polytechnics, including Waiariki Institute of Technology. The percentage of students of agriculture and environmental courses, health and hospitality and personal services at Wairaiki Institute of Technology in 2010 was significantly higher than all polytechnics, including Wintec, as illustrated in figure 122.

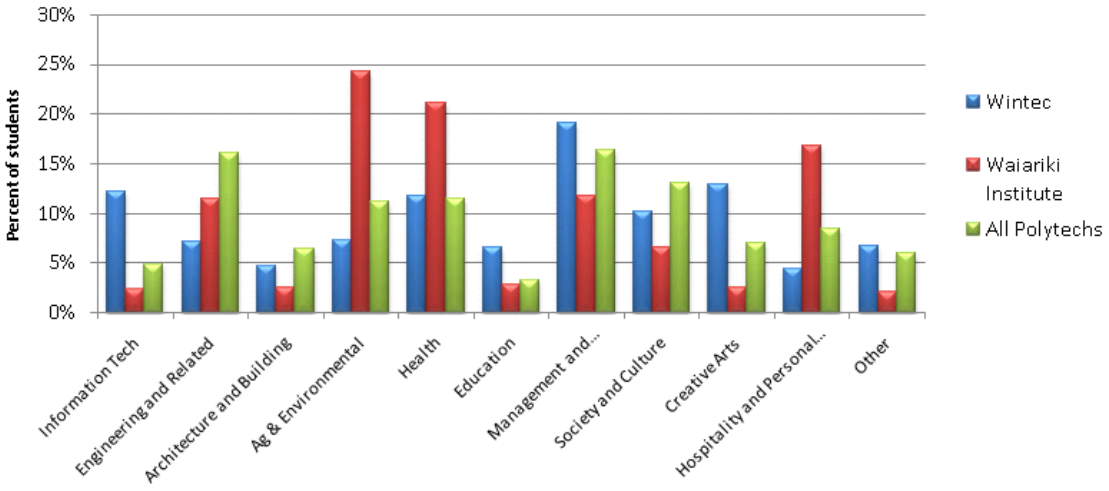

Figure 122: Subjects for Wintec, Waiariki Institute of Technology and all polytechnics

11.2.4 Te Wānanga o Aotearoa

Te Wānanga had its beginnings in the creation of the Waipa Kōkiri Arts Centre in 1984, whose purpose was to provide further educational opportunities for those without qualifications in the community. In 1989, the Waipa Kokiri Arts Centre changed its name to the Aotearoa Institute, which became Te Wānanga o Aotearoa when it gained tertiary status in 1994. Te Wānanga o Aotearoa operates from over 80 locations throughout the country. There are 1,367 staff.[393]

Te Wānanga o Aotearoa offers a range of certificate to degree level qualifications. There were 18,000 qualifications completed in 2010 and all but 48 were domestic students. The majority (72 per cent) were level 1 to 3 certificates. Half of all

[393] Te Wānanga o Aotearoa (2011, p. 1).

qualifications completed were in the society and culture subject area, followed by management and commerce (33 per cent), as shown in figure 123.

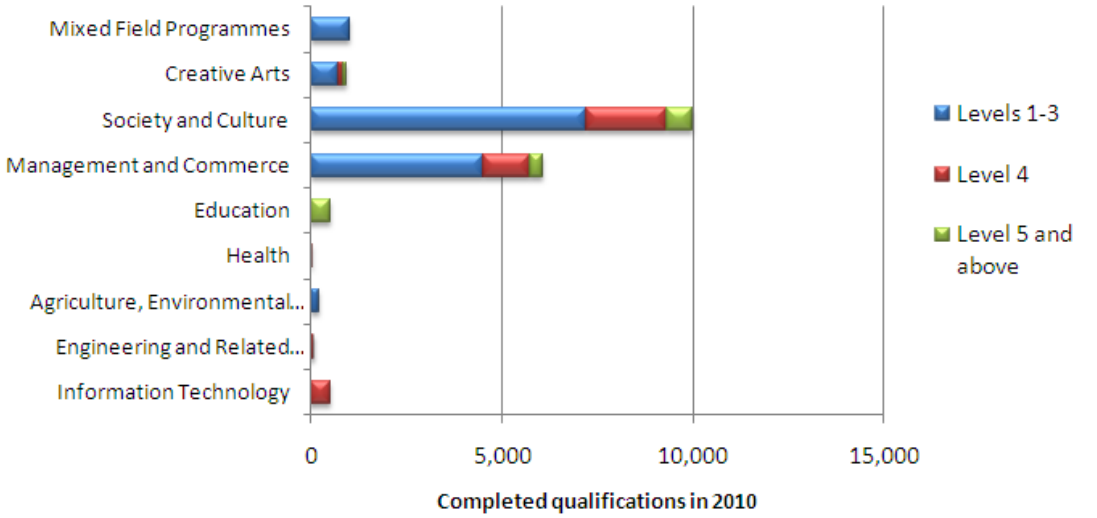

Figure 123: Te Wānanga o Aotearoa completed courses by area and level

11.2.5 Industry Training Organisations

Industry training is learning and skill development linked to the needs of workers, workplaces and industry. It provides employees with structured training, both on-job and off-job and is linked to the New Zealand Qualifications Framework. This means employees can earn while they learn.

Industry training is co-ordinated by the 39 Industry Training Organisations around New Zealand. These are set up by industries and are recognised by the government. Industry Training Organisations receive funding from both the government and industry.

The system covers most of New Zealand's industries from traditional trades like building and plumbing, the primary industries, and manufacturing and retail, through to government and community services.

According to the latest available data from the Ministry of Education, there were 10,655 industry trainees in the Tertiary Education Commission Waikato region at 31 December 2010 out of 102,242 nationally, behind Auckland (23,690), Southern (11,308) and Canterbury (11,140). As shown in figure 124, the largest number of trainees (including Modern Apprentices) was in the dairy and meat sector-focused New Zealand Industry Training Organisation, but the Southern region had a larger number of industry trainees than Waikato in the Agriculture Industry Training Organisation (1170) and the Bay of Plenty region had a larger number of industry trainees in the Forestry Industry Training Organisation (3496).

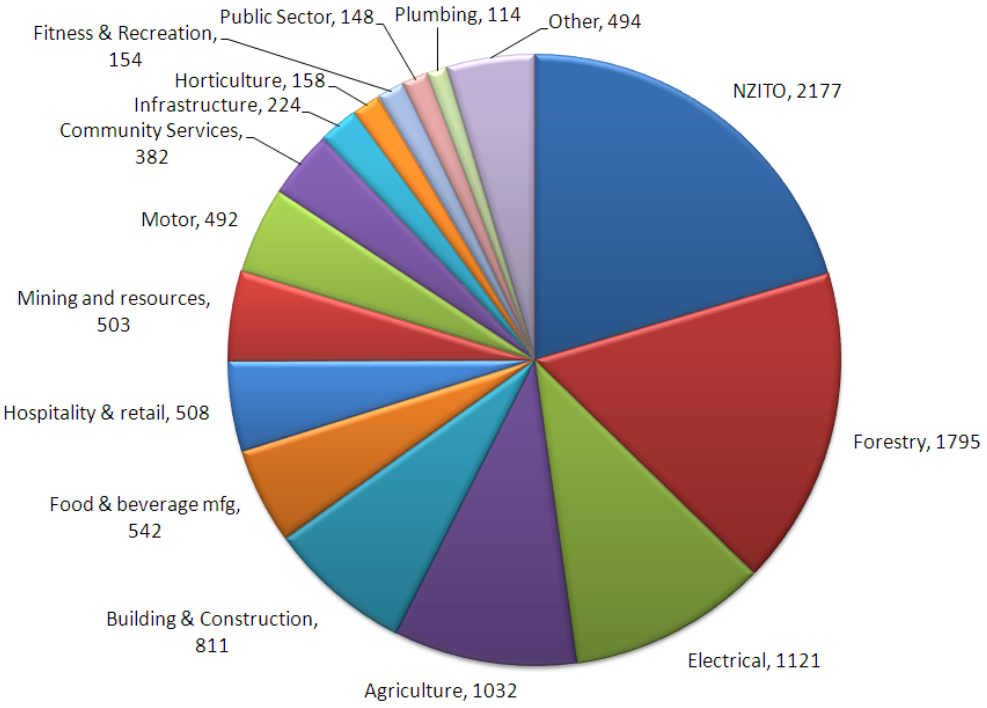

Figure 124: Waikato ITO trainees (2010)

11.3 Research and commercialisation

11.3.1 The University of Waikato

The reporting to the Ministry of Education of quality-assured university research publications varies from year to year and all of the data available in a given year is published. Massey University and the University of Auckland did not publish a research counts figure in 2011. The University of Waikato had the fifth-highest self-reported research output but the fourth-highest when output is divided by the number of full-time academic staff, as shown in figure 125.

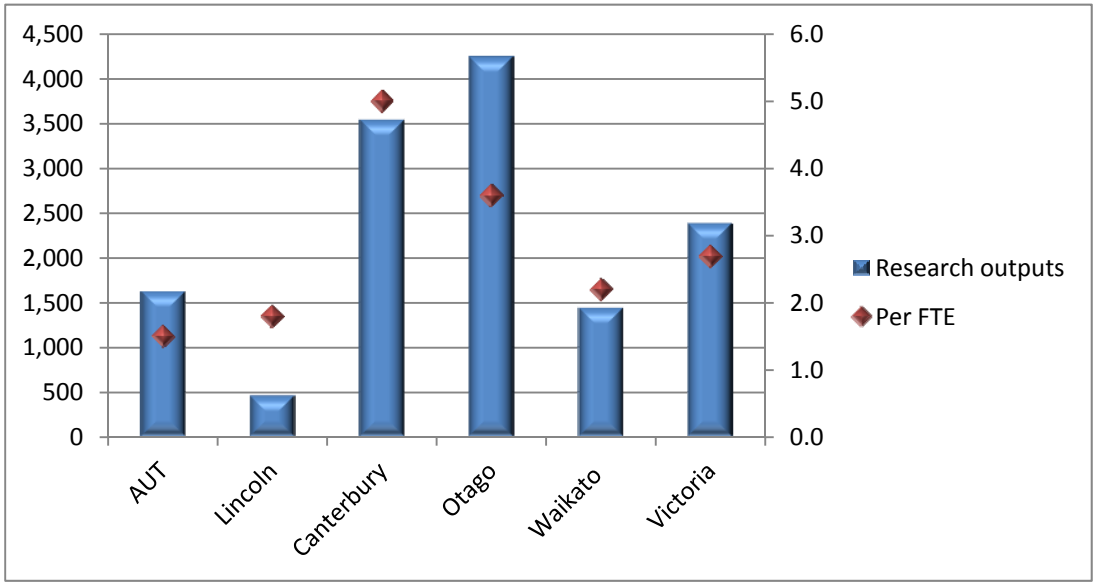

Figure 125: Self-reported research output by universities[394]

The Tertiary Education Commission conducts a national assessment of research quality and performance to determine funding from the Performance-Based Research Fund. It is based on the quality of staff members' research, by the number of postgraduate research-based degree completions, and by external research income. It

[394] Data sourced from the Ministry of Education reported research outputs 2011.

is held periodically – the initial round was completed in 2003 and a second, partial round in 2006. The next full round of quality evaluation was set for 2012 and is currently underway.

According to the 2006 evaluation presented in table 19, the University of Waikato is first in 9 subject areas with more firsts in the sciences than any other university. The Waikato Management School and the Faculty of Computing and Mathematical Sciences laid claim to being the best in the country as far as staff research quality is concerned. The University of Waikato also has the country's top combined Faculty of Education following the mergers of university schools of education with regional teachers' colleges.

Table 19: University of Waikato's 2006 top rankings[395]

Area	Subject	Ranked in top four
Business	Accounting & Finance	1st
	Economics	
	Management, Human Resources, Industrial Relations, International Business & Other Business	1st
	Marketing & Tourism	
Creative Arts	Music, Literary Arts & Other Arts	1st
	Theatre & Dance, Film & Television & Multimedia	
Education[396]	Education	1st
Māori Knowledge & Development	Māori Knowledge & Development	
Sciences, Engineering, Maths & IT	Chemistry	1st
	Computer Science, Information Technology, Information Sciences	1st
	Earth Sciences	
	Ecology, Evolution and Behaviour	1st
	Engineering & Technology	
	Molecular, Cellular and Whole Organism Biology	1st
	Pure & Applied Mathematics	1st
	Statistics	
Social Sciences, Humanities and Law	Anthropology and Archaeology	1st
	Communications, Journalism and Media Studies	
	English Language & Literature	
	Foreign Languages & Linguistics	
	History, History of Art, Classics and Curatorial Studies	
	Human Geography	
	Law	
	Philosophy	
	Political Science, International Relations and Public Policy	
	Psychology	
	Sociology, Social Policy, Social Work, Criminology & Gender Studies	

[395] University of Waikato (2010) 2006 PBRF quality evaluation round: subject area ranking.
[396] When University and College of Education scores are combined the University of Waikato is ranked 1st in education.

The University of Waikato has five major research institutes reflecting key areas of research competitiveness in the areas of business (Institute of Business Research), demographics and macroeconomics (National Institute of Demographic and Economic Analysis), education (Wilf Malcolm Institute for Educational Research), the environment (Environmental Research Institute), and iwi development (Te Kotahi Research Institute).

WaikatoLink Ltd is the commercialisation and technology transfer company of the University of Waikato. A wholly-owned subsidiary of the University of Waikato, incorporated in 1993, WaikatoLink's key role is to commercialise opportunities and intellectual property developed by the University of Waikato. WaikatoLink's office is situated at Waikato Innovation Park, in order to enhance the linkages between the University of Waikato and innovative and entrepreneurial organisations.

Commercialisation facilitates:

- industry and business access to university technologies
- expansion of research opportunities for the university
- increased opportunities to form mutually beneficial industry partnerships and collaborations, and
- increased work experience and employment opportunities for students.

To effectively commercialise University of Waikato-generated intellectual property, WaikatoLink Ltd undertakes four main functions:

- commercialisation
- intellectual property management
- technology development (The HotHouse), and
- building industry linkage.

Commercialisation successes of WaikatoLink include the following firms:

- 11Ants Analytics build powerful software that makes data mining simple and accessible to non-technical people.
- Endace designs, develops, sells and supports high-speed network packet capture technology, and is now a United Kingdom-listed global business selling products in over 30 countries.
- Graftoss is a medical device company that is developing a range of orthopaedic devices, which have bone graft and bone replacement applications.
- Novatein specialises in the development of bio-degradable plastic materials.
- Obodies is developing a new paradigm of high affinity proteins for medical applications, which may provide various advantages over currently available antibody proteins.
- RuralLink provides wireless broadband services to remote rural areas through its no8wireless and lightwire brands.
- Solenza is a solar energy company that is developing building-integrated solar roofing materials.
- Zygem is a rapidly growing biotechnology company that has developed a range of innovative enzyme-based products and technologies.

11.3.2 Waikato Institute of Technology

According to the Tertiary Education Strategy 2010, one of the three core roles of Institutes of Technology and Polytechnics is to "to undertake applied research that supports vocational learning and technology transfer"[397].

[397] Ministry of Education (2010, p. 18).

Wintec takes a dual approach to Research, Development and Transfer (RDT) that supports educational excellence and RDT-informed educational programmes relevant to industry and provides a scalable portfolio of RDT services focused directly on industry requests for RDT (such as the RDT Voucher Scheme, long term RDT partnerships with industry, and RDT facilities where Wintec focuses directly on industry-funded RDT). This dual approach aims to unlock optimal value and provide synergies that would not be possible otherwise.

Wintec has researchers from 11 schools and centres participating in research every year. In 2010, 118 staff participated in research and development projects.

Prima Group Ltd was established in 2011 and has been tasked with commercialising the knowledge, know-how and intellectual property generated within Wintec. Prima Group is 100 per cent owned by the Wintec Foundation, a charitable trust set up for the long term benefit of Wintec.

This commercialisation may take the form of expertise within faculty that can be applied to finding solutions to the practical problems of industry through consulting, or it may be shaping the resources that are used to teach tertiary students into a form that fits the needs of industry practitioners through customised training.

Prima Group Ltd views commercialisation of the practical inventions from Waikato inventors as core business and looks for ways to facilitate the development of ideas. It does this by providing practical advice and services and by injecting seed capital into projects that it believes have merit. It also has a panel of experts to assess new inventions and ideas and will, where appropriate, introduce inventors to experts and practitioners within Wintec schools to help.

Services include:

- commercialisation of intellectual property, knowledge and know-how
- provision of seed capital to early stage innovation
- facilitation of industry research
- investment in businesses that complement our vision
- development of blended educational and training resources
- supporting the growth and development of businesses in the community
- delivery of quality industry training
- provision of employment outcome focused training programmes
- specialist industry sector specific consulting services
- support of local, regional and national economic development initiatives, and
- provision of mobile and e-learning technologies.

Wintec supports Prima Group Ltd with its research voucher programme, which encourages people from industry to apply for pieces of research to be conducted within the institution. Industry can look to Wintec expertise in areas as diverse as health, trades, media arts, education, science, primary industries, engineering, sport science, business, information technology, social policy, hospitality, tourism and more. Prima Group Ltd offers the commercialisation vehicle for successful research outputs.

Current projects include scientific outputs from the School of Engineering, Science and Primary Industry, a humane self-reloading pest trap, a lightweight personal scaffolding system, a unique safety platform ladder system, document management software, a personal care device for the disabled, a rowing skiff that folds up into a car boot, a rowing bicycle and a novel barge system.

11.3.3 Waiariki Institute of Technology

One of Waiariki Institute of Technology's performance indicators for 2011-2015 is "Strengthening applied research outcomes and technology transfer informed by

research."[398] Research is essential and mandated within the academic staff who teach these degrees and advanced qualifications.

Research activity among the degree/level seven diploma academic staff has been recognised nationally and internationally. During 2010, academic staff produced approximately 127 research outputs, of which 10 are publications in international journals or texts. Other staff presented at international and national conferences, national and international seminars or curated exhibitions.

Waiariki Institute of Technology does not have a commercialisation and technology transfer office, although discussions presently are underway to re-establish a business incubator associated with the schools of Business and Tourism, Computing, Technology and Communications, Trade Training and Primary Industries to explore regional technology potential for the geothermal sector, construction technologies and mechatronic automation.

11.3.4 Te Wānanga o Aotearoa

According to the Education Act 1989 s162(4)(b)(iv) (iv) a wananga is characterised by teaching and research that maintains, advances, and disseminates knowledge and develops intellectual independence, and assists the application of knowledge regarding ahuatanga Māori (Māori tradition) according to tikanga Māori (Māori custom). Information about current research and commercialisation activities at Te Wānanga o Aotearoa was not available at the time of writing this profile. Te Rautakinga 2011 – 2030 is the strategic plan of Te Wānanga o Aotearoa and includes key attributes that will describe the organisation in 2030. One of these is that "Te Wānanga o Aotearoa is a leading edge Māori and indigenous research organisation and a recognised repository for mātauranga Māori."[399]

11.3.5 Crown Research Institutes

Crown Research Institutes are the eight science research businesses owned by the New Zealand government. They were formed in 1992 from existing government-owned research bodies, the largest of which was the Department of Scientific and Industrial Research established in 1926. Although national in scope, five Crown Research Institutes have offices/research stations in the Waikato region and Scion is located in Rotorua, just outside the regional boundary. Their Waikato-based research capability and commercialisation examples are listed in table 20.

[398] Waiariki Institute of Technology (2011, p. 20).
[399] Te Wānanga o Aotearoa (2011, p. 26).

Table 20: Crown Research Institute capability and commercialisation in the Waikato region

Crown Research Institute	Core purpose	Waikato-based research capability	Waikato-based commercialisation
AgResearch	To enhance the value, productivity and profitability of New Zealand's pastoral, agri-food and agritechnology sector value chains to contribute to economic growth and beneficial environmental and social outcomes for New Zealand	Approximately 402 staff out of 1081 nationally. • Animal molecular biology (genomics and cloning) • Reproductive technologies • Agricultural systems research • Land management • Forage • Plant pest control • Weeds • Dairy science • Meat science • Food processing technology and safety • Animal behaviour and welfare	SMARTshot – a long-lasting, injectable remedy for vitamin B12 deficiency in sheep. Time Capsule – a slow-release technology to prevent facial eczema. Foragemaster helps farmers improve New Zealand pastures. Introduction of a parasitoid to attack Clover Root Weevil.
Institute of Geological and Nuclear Sciences Ltd (GNS Science)	To undertake research that drives innovation and economic growth in New Zealand's geologically-based energy and minerals industries, that develops industrial and environmental applications of nuclear science, that increases New Zealand's resilience to natural hazards, and that enhances understanding of geological and earth-system processes.	Approximately 75 staff out of 390 nationally. • Geothermal energy • Volcanology • Groundwater processes and quality • Mineral and geo-microbiological resources	Dentro-bed system used to remove nitrates from sewerage systems and glasshouse waste water.

Landcare Research	To drive innovation in New Zealand's management of terrestrial biodiversity and land resources in order to both protect and enhance the terrestrial environment and grow New Zealand's prosperity.	Approximately 40 staff out of 400 nationally. • Soils and land use/effects • Biodiversity including wetlands, indigenous flora and fauna, pests • Futures and scenario development (with WRC) • Māori	Wastewater nitrogen removal technology developed with GNS Science, it is deployed but limited uptake to date. Invasive Species International – Consultancy focusing on eradication of pest species from islands.
National Institute of Water and Atmospheric Research (NIWA)	To enhance the economic value and sustainable management of New Zealand's aquatic resources and environments, to provide understanding of climate and the atmosphere and increase resilience to weather and climate hazards to improve the safety and wellbeing of New Zealanders.	Approximately 126 staff out of 650 nationally. • Water quality • Marine and freshwater pollution • Environmental monitoring	-
New Zealand Institute for Plant and Food Research Ltd (Plant and Food Research)	To enhance the value and productivity of New Zealand's horticultural, arable, seafood and food and beverage industries to contribute to economic growth and the environmental and social prosperity of New Zealand.	Approximately 75 staff out of 944 nationally. • Breeding Science • Bioprotection Technologies • Plant Pathology & Mycology • Biological Chemistry & Bioactives • Food & Wellness • Postharvest Fresh Foods • Bioengineering Technologies • Crop & Fruit Production Systems • Systems Modelling At Ruakura:	Provide research and development services to industry. Products commercialised from research at Plant and Food Research, Ruakura include: Timecapsule™ bolus for facial eczema control in animals in conjunction with AgResearch. Vigilant™ Herbicide Gel. Colorimetric sensor labels for monitoring fruit quality (e.g. Ripesense®).

		• Specialist bee research group. • Development and use of natural and biological products for controlling plant pathogens. • Bioengineering team has specialist expertise in sensor technologies for in-field and postharvest uses. • Functional food research to investigate and identify health benefits of fruit or fruit products.	ERC technology for ripening fruit. PFR proprietary plant varieties (e.g. blueberry, kiwifruit, potato). Biological control and pesticide products (e.g. Botry-Zen®, Armour-Zen®, Blossom Bless™, DRH™, TIPIT™, Garrison™ and Vigilant®).
New Zealand Forest Research Institute Ltd (Scion)	To drive innovation and growth from New Zealand's forestry, wood product and wood-derived materials and other biomaterial sectors, to create economic value and contribute to beneficial environmental and social outcomes for New Zealand.	Approximately 300 staff, based in Rotorua predominantly. Forestry science, including: forest management, forest genetics, forest environment and economics and forest protection. Manufacturing and bioproducts, including: wood and fibre processing, biopolymer and chemicals and biotransformation of natural resources. Sustainable design, including: forest industry informatics (includes software development), clean technologies for processing and value chain optimisation.	Water quality improved by application of modified zeolite. A-Grader: a grading machine that uses sound waves to grade timber in a sawmill, jointly developed with Falcon Engineering (Inglewood). Sold in New Zealand, Australia, USA and Canada. Microwave Moisture Sensor: device that can accurately measure timbers moisture content from 0 - 200%, jointly developed with Falcon Engineering. ATLAS Technology: development of software for forestry supply chain management and logistics. High Visibility safety clothing (HIVIZ fluoro). Dryspec™ kiln control system.

11.4 Business development and growth

11.4.1 Government agencies

The Government has recognised for some time that economic development depends on the performance of businesses and the Economic Development Group of the Ministry of Business, Innovation and Employment examines the development of management and business capability at the firm level and its link to business performance. Particular focus areas are the capabilities firms require to successfully innovate, access finance, export and grow.[400]

The Government announced in 2010 a new model for delivering information and development services to small businesses – a network of 14 'regional partners' run by New Zealand Trade and Enterprise and the Ministry of Science and Innovation, now the Science + Innovation Group of the Ministry of Business, Innovation and Employment.

The regional business partner for Waikato is a partnership between Opportunity Hamilton and Waikato Innovation Park, whereby Opportunity Hamilton is the contract holder and Waikato Innovation Park is a sub-contractor that delivers Science + Innovation Group services.

On behalf of New Zealand Trade and Enterprise, the partners are responsible for coordinating suitable training and information services in their regions by assessing local businesses and directing them to courses, advisors, information, and other public and private services that meet their particular development needs. In some cases businesses may qualify for a partial subsidy, in the form of a voucher, to help pay for the cost of training and business development services.

On behalf of the Science + Innovation Group, regional partners provide research and development advice and make and manage research and development investments from the TechNZ business programme. The programme includes the following components:

- project funding
- capability funding
- technology development grant
- technology transfer voucher, and
- global expert.

The Science + Innovation Group's predecessor, the Ministry of Science and Innovation, provided $33,417,406 funding to firms in the Waikato region from 2008/09 to December 2011. This was 8.9 per cent of all funding provided nationally at that time, which was slightly higher than the region's share of the number of investments made (151 or 6 per cent) and was the fourth largest following Auckland, Canterbury and Wellington.[401]

The Government also established in 2008 the International Growth Fund, a single grant scheme to assist businesses growing globally by combining three of New Zealand Trade and Enterprise's existing grant schemes into one single flexible fund. The fund is targeted at businesses New Zealand Trade and Enterprise is working closely with on a plan to help them develop and grow. These are businesses that New Zealand Trade and Enterprise has assessed as being most likely to contribute to New Zealand's long-term growth, including through success internationally in the short to medium term.

[400] Ministry of Economic Development (2011c) Building business capability.
[401] Ministry of Science and Innovation (2011a, p. 1).

The Business Facilitation Service of Te Puni Kōkiri helps new and existing businesses with advice and guidance. The service is available to any Māori entrepreneur or business. The Business Facilitation Service does not provide funding or finance but can help with:

- mentoring
- coaching
- problem-solving
- networking
- identify funding sources, and
- accessing resources and referrals to other business services.

11.4.2 Membership-based business organisations

A chamber of commerce is a local organisation of businesses whose goal is to further the interests of businesses. There are six chambers in the region: Cambridge, Raglan, Rotorua, Taupō, Te Awamutu and Waikato. In addition to networking and advocacy, the chambers offer information, education and training services to member firms.

The Employers' and Manufacturers' Association is under the umbrella of Business New Zealand. Its four divisions include advocacy (participating in central and local government processes and media relations), advice (from legal and employment specialists), learning (short courses and certificate programmes) and networks (networking services and events).

Export New Zealand is a division of Business New Zealand that promotes exporting through networking, information, facilitated delegation visits and partnerships with the Ministry of Foreign Affairs and Trade and New Zealand Trade and Enterprise. There are approximately 250 members in the Waikato region.

11.4.3 Science and technology parks

In its broadest sense a science and technology park is a managed environment established to leverage existing resources for the purposes of enhancing a region's economic base.[402] Although there is no uniformly accepted definition of a science and technology park in the literature, the essential features of a science and technology park are distilled into three main elements:

1. Initiatives for the establishment and growth of technology enterprises.
2. Formally and operationally linked to a centre of technical expertise.
3. A unique environment which provides management support and business incubation services for science and technology intensive companies.[403]

The objective of Waikato Innovation Park when it was established on 17 hectares of land next to the Ruakura Research Centre in 2003 was to facilitate the development and implementation of the latest research with a view to leveraging productivity and profitability in NZ's primary industries such as farming and agricultural services generally.

Wintec, the University of Waikato and AgResearch are strategic partners with Waikato Innovation Park, which is currently home to over 50 companies. The relationship gives park tenants ready access to specialist resources such as laboratories, IT systems, development capabilities, student support and tertiary programmes.

[402] Allen Consulting Group (2007, p. 1).
[403] Allen Consulting Group (2007, p. 2).

Waikato Innovation Park provides several services:

- Commercialisation: intellectual property brokering and Regional TechNZ funding.
- Business growth: professional services, network to local, national and international companies, links to venture capital, small and medium sized enterprise education, lettable space within core facilities building, shared facilities, shared services.
- Mature research and development functions: joint venture and merger opportunities, mobilise spin-offs, scientific network, innovation and collaboration culture, 100-year lease at commercial rates.
- Waikato AgBio Cluster: event management, projects, resource facilitation, mobilise spin offs, joint venture and merger opportunities.

By 2012, Waikato Innovation Park had achieved the following, among other things:

- building size increased from 3600m^2 to 8400m^2
- resident firms increased from 19 to 42
- employees onsite increased from 100 to 420, and
- establishment and ownership of the New Zealand Food Innovation Network (Waikato) Ltd facility a 500kg per hour spray dryer (discussed in chapter 3.3.3).

Examples of resident firms include:

- SciLactis Ltd: a research and consulting company. With extensive national and international experience in the agricultural and value-added food space, in particular relating to dairy production, science and research, and activities spanning both sides of the farm-gate.
- BioVittoria Ltd: a research-based, product development and marketing company that develops, markets, and sells proprietary active compounds that are naturally derived and biologically proven. The company also addresses and assists academic institutions and companies that are not equipped to bring their nutraceutical intellectual properties into worldwide commercial markets.
- Hill Laboratories: the largest privately-owned chemical testing laboratory in New Zealand. They offer a wide range of testing services for food, pesticide and veterinary residues, contaminants, plant tissue, soil and water.
- Tetra Pak: the global centre of excellence for large-scale milk powder and cheese manufacturing plants. The New Zealand division of the company provides design, engineering and project management to Tetra Pak sales offices all over the world and brings back to New Zealand significant market signals in the dairy industry.

Waikato Innovation Park has also led to the development of Dairy SolutioNZ and Beef SolutioNZ (discussed in chapter 3.3.6).

The New Zealand Clean Energy Centre was established to accelerate the adoption of clean energy solutions by industry, communities, businesses and households in New Zealand. Opened in 2011, the New Zealand Clean Energy Centre's headquarters is in Taupō at a site that the Taupō District Council has designated a science and technology park.

The New Zealand Clean Energy Centre offers a collaborative business environment for like-minded tenants to share business infrastructure, information, resources and business opportunities. The building houses a number of firms currently: Fitzroy Engineering's Clean Energy Division, Polytechnik Biomass Energy (an Austrian company), Renewable Energy Technologies, MB Century, Vertichem, Biosource and Clean Energy Ventures.

11.4.4 Business incubators

Business incubation refers to the variety of processes that aim to help reduce the failure rate of early-stage companies and speed the establishment of self-sustaining companies.

A business incubator provides facilities and services that support start-up businesses through their initial growth phase. A business incubator is usually a provider of joint premises for a number of start-up companies. They also provide managerial expertise and advice for residents. An important aspect of a business incubator's premises is that they also provide an environment where resident businesses can interact with each other as well as any associated external companies and/or institutions. The form of business incubators can vary greatly.[404]

SODA is a business growth centre based in Hamilton. SODA provides start-up businesses with the confidence, connections and capability to grow fast and to export globally. SODA aims to energise and transform its clients businesses for the benefit of the region and the national economy.

SODA provides:

1. Business incubation services for high-growth start-up companies including:

    - customized business coaching and mentoring to drive growth
    - preparing businesses for investment and market entry
    - raising capital through our investor networks
    - helping kiwi entrepreneurs export into global markets, and
    - extensive networking opportunities to develop strategic partnerships.

2. Business clustering services for Waikato companies to drive industry growth by:

    - enabling collaboration, knowledge sharing, and innovation
    - driving growth in revenue and export opportunities, and
    - promoting the collective capability of Waikato's digital community to the world.

SODA aims to contribute to a prosperous regional economy through supporting growth, collaboration and innovation of regionally embedded, globally successful entrepreneurs.

The WaikatoLink Venture Incubator was established in 2008 and draws on the success WaikatoLink has built up through incubating its own high growth ventures based on science and technology from the University of Waikato. Although the majority of resident firms incubated come from this source, the incubator also makes its expertise and processes available to local entrepreneurs, mainly through short stays and services delivered "virtually". The WaikatoLink Venture Incubator focuses on high growth technologies in the AgBio, biotechnology and information and communications technology sectors and has the expertise, partners and networks to offer the following services to entrepreneurs:

- assessment of business ideas and market opportunities
- developing business models and robust business practices, and
- assistance to find strategic partners, raise capital and access international markets.

[404] Ministry of Economic Development (2004, p. 3).

12 Key findings and next steps

The Waikato region is **important to the national economy** and there is a high degree of inter-regional and intra-regional interdependence. This highlights the importance of hard and soft networks:

- Waikato contributes approximately 8.5 per cent to gross domestic product, which is slightly lower to its share of land area and population.
- Several sectors are part of national value chains and align well with national priorities: dairy, meat and other food manufacturing, high value manufacturing (such as agritech and aviation), forestry and wood product manufacturing.
- Waikato relies on the Ports of Auckland and Tauranga and Auckland Airport for international connections. Its central location between the Auckland, Bay of Plenty, Hawke's Bay, Manawatu-Whanganui and Taranaki regions make it a nationally significant transport corridor. Hamilton Airport and the regional road network are important for maintaining inter- and intra- regional connections.
- Waikato is New Zealand's premier electricity region, generating more electricity than any other single region in the country. The region has almost 40 per cent of installed generation capacity. It is also an important corridor of the national gas network.
- Waikato is the most important minerals producing region in New Zealand, representing more than one-third of New Zealand's coal output. Waikato is also the largest interregional "exporter" of economic aggregate and industrial minerals for roading material. This goes predominantly to Auckland, which "imports" from Waikato almost 25 per cent of its needs.
- Hamilton is the region's "central business district" with concentrations of employment, research, tertiary education and manufacturing. Its industry strengths are inextricably linked to the primary production of the surrounding region, on which it also relies for labour and materials.
- Intra-regional transport, including roads and public transport, is vital to ensure equitable access to valuable assets, such as tertiary education and high-value employment.
- While the Waikato region contains most, if not all, of the constituent parts of the knowledge generation and diffusion sub-system (public research organisations, technology and knowledge transfer agents, educational and skills development organisations) – mostly concentrated in Hamilton – many other important organisations are in other parts of New Zealand.

The Waikato region's economy is closely tied to the resources and waste assimilation services provided by **its environment**. Finite productive land, poor water quality and reliance on finite fossil fuels, for example, mean that neither "business as usual" nor "more of the same" is sustainable:

- Three of the region's major industries (livestock and cropping farming, dairy cattle farming and forestry and logging) occupy 83 per cent of the region's productive land.
- There has been a net deterioration in river water quality across the region. In many cases the deterioration probably results from the widespread and intense use of land for pastoral farming.
- Water is fully allocated in some parts of the region and others are approaching full allocation.
- It is estimated that two thirds (66.3 per cent) of the total 36,546 terajoules of energy consumed by the Waikato regional economy to the year ending March

2004 was consumed as fossil fuels. The transport and dairy sectors are particularly vulnerable to both short-term price spikes and a long-term gradual decline in oil supply.

- Climate change due to greenhouse gas emissions and other influences means we need to think about how we are going to plan for and manage the projected impacts of climate change in Waikato and New Zealand.

The Waikato region is not achieving its potential in a number of indicators, all of which affect the economic and social wellbeing of communities in the region:

- Estimated Waikato gross regional product per capita in 2011 was $40,000, which is approximately 9 per cent lower than gross domestic product per capita nationally ($44,000).
- Waikato's median weekly household income is higher than only three other regions. Median weekly household income increased from 1998 to 2011 at a lower rate annually (3.4 per cent) than New Zealand (3.8 per cent).
- The distribution of incomes is narrower in Waikato than New Zealand as a whole. There are more middle income households and fewer households with annual incomes greater than $150,000 per year.
- The educational attainment of Waikato school leavers is below average, with only 66 per cent attaining a formal qualification (such as New Zealand Qualifications Authority level one or school certificate) compared with a national average of 75 per cent.
- The level of social deprivation is slightly worse than New Zealand as a whole.

There are **variations among sub-regional communities** that pose a challenge for the sustainability of some communities:

- Median annual household income in Hauraki ($38,000) is approximately 41 per cent lower than the small portion of Rotorua within our region ($64,000).
- Population growth is static or negative in the southern part of the region (Ōtorohanga, South Waikato, Waitomo), moderate in the northeast (Hauraki, Matamata-Piako, Thames-Coromandel and Waipa) and high in the centre and north (Hamilton and Waikato).
- The population is ageing, but not as much as many other parts of the country. Hauraki and Thames-Coromandel districts are projected to have among the oldest median age in New Zealand by 2026, while Hamilton and Ōtorohanga are expected to be among the youngest.
- Educational attainment is poorer in the smaller and more remote parts of the region (Waitomo, South Waikato and Hauraki districts).
- The level of social deprivation varies among territorial authority areas but there are many communities with high levels of social deprivation.
- Urban infrastructure such as water supply, stormwater and wastewater is of a higher standard in larger urban areas, which may reflect economies of scale.
- Hamilton has the highest international exports and its population is relatively more educated than other parts of the region, but its performance is not always the highest in the region – and still behind nationally – in the economic indicators.

There are also a number of **opportunities for the region**:

- To develop a strategy that identifies Waikato's role in contributing to the upper North Island, other regions and New Zealand as a whole.
- To adopt a green growth theme that is consistent with international trends, national approaches and the strategic direction of WRC.
- To improve coordination between location-, iwi-, sector- and firm-based economic development activities to increase effectiveness and efficiency.
- To take advantage of a population that is relatively young and has relatively more Māori.
- To improve the quality and coordination of regulatory processes for valuable sectors that cross local and regional boundaries, such as forestry and geothermal energy. This requires collaboration among local authorities and with central government potentially.
- To partner with Māori/iwi for economic development due to their unique advantages and long-term commitment to the future of the region and its people.
- To increase generation from abundant, renewable resources such as geothermal and wind energy. The region will continue to be well placed to deal with increased demand.
- The region can make better use of its existing infrastructure by identifying opportunities for improved management and finding better ways of managing demand. It can also be smarter about investing in new assets by considering how they function as a network. This applies at local and regional level.
- The roll-out of ultra fast broadband enables firms to improve communications, productivity and education without regard to location (particularly if rural communities gain equitable access).
- To increase the commercialisation of the existing knowledge strengths within the region's research and education institutions.
- To enhance collaboration among the knowledge generation and diffusion sub-system for greater innovation outcomes.
- To improve alignment between the regionally significant sectors and the education and research strengths of the region's institutions.
- To increase the value of our international and interregional exports, particularly in the regionally important sectors that present immediate opportunities because of their existing scale and growth:
    - high-value food manufacturing (dairy, meat and other food manufacturing);
    - high value manufacturing (such as agritech, aviation and materials and equipment manufacturing);
    - forestry and wood product manufacturing;
    - high value services (such as agriculture, geothermal energy and information and communications technology); and
    - aquaculture is small currently but has growth potential also.
- To align the attraction of business visitors with sector strengths and opportunities.

The challenges and opportunities identified are significant and inter-related. No single actor has the scale or scope to address them across the region and maximise the benefits to themselves or the wider community. Collaboration is therefore required among and between firms and industry groups, central and local government

organisations, iwi, tertiary education and research providers and commercialisation and economic development agencies.

The next step could be the development of a green growth-themed regional economic development strategy focused on unlocking the export and innovation potential of key regional sectors. As the economic, social and cultural wellbeing of communities are intertwined and dependent upon a healthy environment, the economic development strategy would need to be linked explicitly to a broader vision and strategy for the overall wellbeing of the region.

The authors encountered a number of knowledge gaps that they consider would be useful to address prior to the development of the strategy. These are particularly centred on the experience of firms in the regionally important sectors with regard to their opportunities in and barriers to:

- green growth
- the implementation of regulation, including its consistency across the region
- general and industry-specific infrastructure
- entrepreneurship (firm creation and growth and management capability)
- access to finance throughout the firm lifecycle
- labour issues such as education, skills and labour supply
- commercialisation of research
- international exports
- the operation of the regional innovation system generally and the firm-level sub-system specifically, and
- the operation of intra- and inter-regional sector value chains.

Interviews of firms in several sectors have been completed on WRC's behalf as an initial step in addressing this gap.

WRC intends to make available publicly timely information about aspects of the Waikato regional economy on an ongoing basis, via a website for example.

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