

The economy of the Waikato region in 2022

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Executive summary

This report profiles the Waikato Region's economy – its current state and the trajectory it is on. In doing so, it canvases available information on the economic system – its productive processes and the stocks and flows of the inputs and outputs related to those processes. While published data is often measured in monetary terms, it is not intended to imply that only monetary values of wealth matter for economic wellbeing. Monetary wealth matters, but it is not the end of the story.

Wealth is evidently not the good we are seeking; for it is merely useful and for the sake of something else. (Aristotle)

In characterising the state and trends of the regional economy, several key opportunities and issues can be identified. The rising power of the Māori economy, an advantageous location, and diverse industries across the region can be real strengths for the region to leverage. Challenges are also clear: economic outcomes for many are poor; productivity is stagnant; our institutions may need to adapt to maintain our economic foundations, especially as external circumstances change.

The Waikato Region is endowed with rich natural resources and its proximity to Auckland and the Bay of Plenty bring significant economic advantages. Links to Auckland and the Port of Tauranga provide ready access to export markets and make the region a crucial logistics hub. The region overall is very diverse, balancing the emerging metropolis of Hamilton as a centre of manufacturing and services, with highly varied – and sometimes highly specialised – local economies with comparative advantages based on primary industries. The region's Māori economy continues to emerge as an economic force. While the region does not have some of the advantages of scale that Auckland does, if anywhere in New Zealand has the raw ingredients for economic prosperity, the Waikato Region does.

Despite two major shocks – the Global Financial Crisis (GFC) and the Covid-19 pandemic – economic activity, as measured by gross domestic product (GDP), in the Waikato Region has risen by an average of 2.3 percent per annum over the last 20 years. In itself, this performance is reasonable over a sustained period, albeit slightly lower than the 2.6 percent national GDP growth rate since 2001 – largely due to a bumpier ride in the post-GFC period of 2013-19. However, this has not translated directly into improved prosperity for the people of the region. GDP per capita has increased by only 0.7 percent per annum, and barely moved between 2007 and 2021. Likewise, productivity (GDP per worker) has been sluggish for an extended period, and in fact declined in the region over the last five years. Reversing this poor productivity performance would yield significant benefits, if done in a way that can be sustained.

Labour and human capital are crucial inputs to economic activity (whether it is measured by GDP or not). The Waikato Region has a rapidly growing population – driven particularly by Hamilton City and the Waikato and Waipā Districts. This increasing population is being put to work – labour force participation is high, and unemployment is very low. Indeed, finding adequate supplies of appropriately skilled labour has become a key issue for employers in the region. This has helped real (that is, inflation-adjusted) household incomes increase at an average of 2.3 percent per annum over the past 20 years – the same as GDP growth. But this does not just reflect rising wages – it also reflects household members working more, perhaps as a response to the cost of housing. Again, improving productivity is a key to improving the returns to labour.

Physical capital, including housing and infrastructure, and natural resources are all important foundations that support the economy. Much of the investment in the region is the result of private business decisions, but government has a role to play in terms of infrastructure, planning and regulation of resource use. Having the right institutional systems in place is a pre-requisite for getting the optimal level and mix of infrastructure and to ensure that resources are not

degraded over time. Past studies have suggested that the institutional building blocks are in place in the Waikato Region but need to be better utilised – especially in the context of a changing world.

The ongoing effects of the Covid-19 pandemic and other global trends are likely to create ongoing challenges for the regional economy. These global issues are not the subject of this report but are important context. Most immediately, the re-emergence of inflation is creating challenges for businesses in controlling costs and eroding real incomes. While containing inflation is a job for the Reserve Bank of New Zealand, managing balance sheets and supply chains, where possible, can help mitigate some of the effects of inflation. The apparent roll-back in globalisation, rising geo-political tensions, and food security concerns in some of our export markets, may also create issues for our export-oriented primary industries. The effects of climate change – both here and abroad – will have to be adapted to. On the other hand, the turbulent state of the world may create an opportunity for the Waikato Region in attracting investment and skills to our relatively secure and stable corner of the Pacific.

1 Introduction

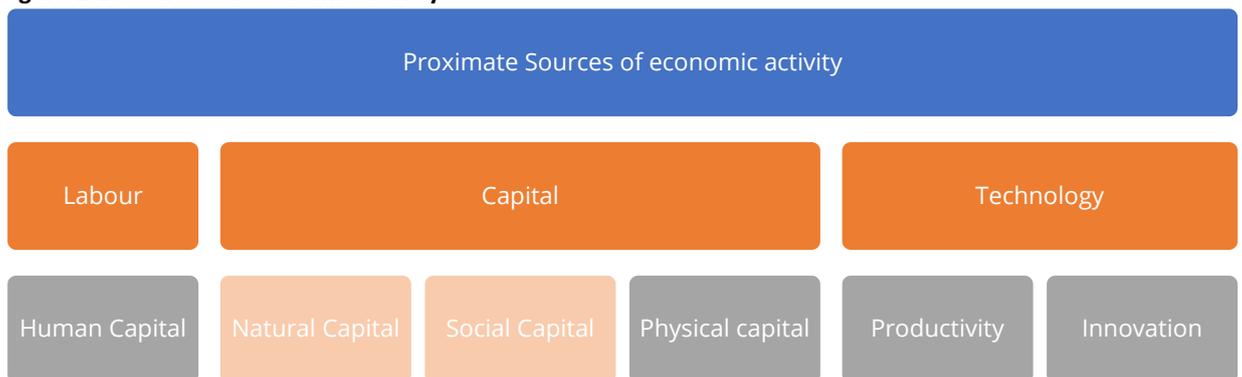
This report describes the Waikato economy. It focuses on the current state, but also provides context by looking at trends from the last 20 years. The intent is to understand the shape of the region's economy – strengths, weaknesses, risks and opportunities, and gaps in knowledge. This is intended to guide future research efforts and inform economic development and related policy decisions.

Economic development is complex, and is a function of actions by businesses, government (central and local), iwi and the community. The intention of this report is not to provide a roadmap or recommendations about economic development per se, but to provide a baseline for future work in this direction. In this context, it reviews the components of the economy, and the proximate and ultimate drivers of economic prosperity.

When we talk about 'the economy', we often refer to measures of Gross Domestic Product (GDP). GDP sums up all the income from work and from businesses, or the returns to labour and returns to capital. In principle this is the same as all the value that is created by our businesses and industries and is also the same as all the final spending in the economy on consuming goods and services, investment in buildings, businesses and infrastructure, and exports, less imports.

GDP is not a perfect measure. It is based on the flows of income and expenditure over a given period; it does not measure stocks of capital or wealth, nor how these are accumulating or degrading. It doesn't count unpaid activities, nor when something breaks, nor the costs of pollution for example. All these things matter for a better society, and GDP is not designed to capture them. Nevertheless, GDP is a good measure of the activities that create jobs, and GDP per person is often correlated with improving prosperity. Because of this, and the availability of national accounting statistics, this report uses GDP as a lens for looking at the drivers of economic activity (see figure 1-1). Recognising its limitations, however, we attempt to place GDP in the context of 'wellbeing', as well as considering issues around capital stocks and non-market values.

Figure 1-1: Sources of economic activity



Source: Adapted from Acemoglu (2009)

Chapter 2 of this report looks at trends in GDP and the associated employment in the region. It also describes the industrial make-up of the region, including the relative importance of the primary sector and food production industries across different parts of the region. The growing dominance of service industries – a common feature of developed economies – is also evident. In terms of technology as a driver of economic activity, trends in productivity – which have been generally poor – are illustrated, and issues related to innovation are outlined. The growing importance of the Māori economy as a driver of economic activity is also summarised.

Chapter 3 further explores the region's capital base, including human capital (demographics, employment and incomes), physical capital (housing and infrastructure), and natural capital

(natural resources and ecosystem services). The region’s population and the capital it has to work with can certainly be a strength for the economy, but investment in and maintenance of capital stocks is critical.

Following the approach of Acemoglu (2009), chapter 4 briefly describes the fundamental sources of economic success, noting that, while there is little that can be done to influence geography and culture, making sure that the region has the right institutional arrangements can be key to optimising economic performance.

Figure 1-2: Ultimate sources of economic prosperity.



Source: Adapted from Acemoglu (2009)

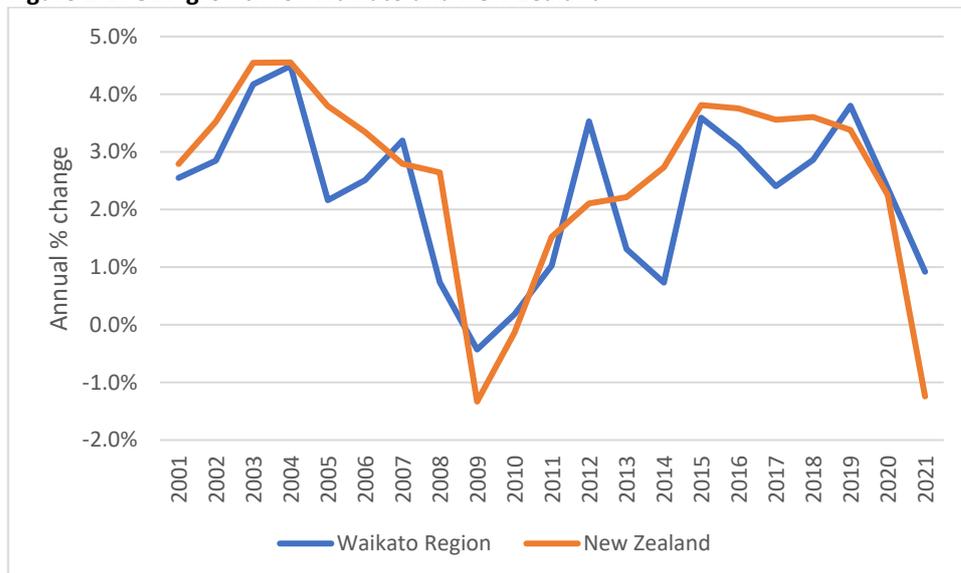
2 The Waikato economy

The Waikato region's economy is broad-based, with significant specialisation and concentration of industries at a sub-regional level. Total value-added production, measured by gross domestic product (GDP) has grown steadily, but has largely been driven by increasing inputs – especially labour. Related measures, more closely related to wellbeing (GDP per capita) and productivity (GDP per worker), have grown only slowly. The region has both a recipe and many of the raw ingredients to improve its productivity performance, but this has yet to show up in overall measures of the regional economy.

2.1 Gross Domestic Product

The total GDP of the Waikato in 2021 was \$29.2 billion according to Statistics NZ, around nine percent of the national economy. Apart from those regions that are home to our three largest cities (Auckland, Wellington, and Canterbury), the Waikato is largest regional economy in New Zealand. Long-term GDP growth has averaged 2.3 percent since 2000, although this includes some particularly large economics shocks – the 'Global Financial Crisis', or GFC and the Covid-19 pandemic. Excluding those events, GDP has grown by between 2.5 and 3 percent.

Figure 2-1: GDP growth for Waikato and New Zealand



Source: Infometrics Ltd.

While total GDP is a useful indicator of activity levels, GDP per capita is a better indicator of overall prosperity of people in the region. Since 2014, much of the GDP growth in the region has been driven by a growing population; total regional GDP has increased by an average of 2.5 percent per year over that time, but 90 percent of this growth is the result of the region's population growing by an average of 2.2 percent per year; only 10 percent is due to an increase in GDP per person. This means that, even while GDP has been growing steadily, there have been only very small gains in the average prosperity of the people of the region. In the 14 years since 2007, GDP per capita in the Waikato Region has increased by just 2 percent – an average of 0.1% per year.

Spotlight: The rising Māori economy

Māori made up nearly a quarter of the population of the Waikato Region at the time of the 2018 Census, are growing twice as fast as the general population, and have a much younger age profile than the general population (half of Māori in the region were under 25 years old, compared to half under 37 overall). As such, Māori will become increasingly important to the region's economic future. While Waikato-specific estimates of the Māori asset base are dated and lacking context, it clearly represents an economic force. Berl Ltd estimated that Māori assets grew by 10 percent per year between 2013 and 2018. A similar rate of growth applied to Māori assets in this region, up to 2022, would imply a value of \$14.7 billion. Māori contribution to regional GDP, estimated to be 8 percent of the total, is also significant.

However, while Māori make up nearly one fifth of workers in the region, Māori experience higher rates of unemployment than for the population as a whole, and have lower incomes, averaging 88 percent of the regional average. While 79 percent of secondary school leavers in the region have NCEA level 2 or higher, the percentage of Māori school leavers is 67 percent. Nicholson Consulting Ltd (2022) find that Māori-owned businesses are less profitable, with indicative margins of 90 percent of those of non-Māori businesses (although the reason for this is unclear – it may reflect the industries in which Māori businesses operate; it may reflect objectives that are wider than profit margins; it may suggest a need for upskilling governance and management for some).

Clearly the Māori economy is a source of a large and growing part of the region's capital and labour. The poor health and education outcomes for many Māori are therefore a handbrake on the economic potential of the region (and the country as a whole), and addressing these issues could yield significant benefits. Moreover, the institutions and culture of Te Ao Māori represent a more holistic way of considering economic success, with longer timeframes. The recognition of how systems function and their components interact; the implications of non-market and external costs and benefits in decision-making; and the excessive discounting of the future (for example, of irreversible environmental impacts) are issues that affect economic efficiency.

Key Māori economy statistics

Indicator	Estimate date	Number	Share of Waikato	Share of NZ
Population	2021	124,6700	25%	17%
Under 15	2021	40,170	39%	27%
Working age (15-64)	2021	76,010	24%	16%
65 and over	2021	8,490	10%	7%
Employment ^a	2022	50,500	19%	14%
Unemployment ^b	2022	6.8%	3.9%	3.4%
Average annual earnings	2021	\$54,700	88%	83%
Māori-owned businesses	2020	1,191	11%	8%
Assets Total	2014	\$6.2bn		
Businesses of Māori employers	2014	\$2.6bn		
Business of self-employed Māori	2014	\$0.7bn		
Trusts and other Māori entities	2014	\$2.9bn		
GDP	2017	\$1.8bn	8.0%	

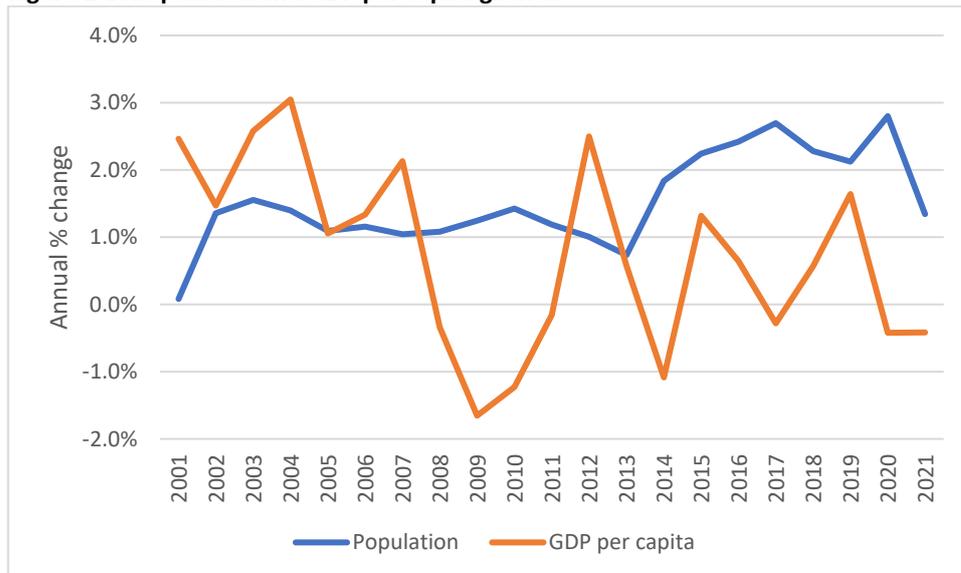
Sources: Infometrics Ltd; Statistics NZ; Te Puni Kōkiri (2014), Nicholson Consulting Ltd (2022), Te Waka (2019).

^a Number represents: the number of employed Māori in Waikato; Māori share of employed in Waikato; Māori share of employed in NZ.

^b Number represents the unemployment rate for: Waikato Māori; all groups in the region; and all groups in NZ.

^c Businesses where at least 51% of wages paid to directors, partners or active shareholders are to individuals of Māori ethnicity or descent.

Figure 2-2: Population and GDP per capita growth



Source: Infometrics Ltd.

2.2 Regional production by industry

The Waikato Region is known as an agricultural, or, even more specifically, a dairy region. Indeed, at 8.4 percent of GDP in 2021, agriculture contributes a larger proportion of regional GDP than any other industry (see Table 2-1). In fact, the Waikato Region has a relatively large contribution from across the primary industries (compared to their contribution to the national economy) as well as in food manufacturing. The primary sectors contribute the bulk of international exports from the region, with more than 80 percent coming from the dairy, meat, forest products and horticulture sector. Collectively, the Waikato Region provides 13 percent of New Zealand's exports of goods and services – well above its share of national GDP. This export-orientation can be an important source of dynamism for an economy, although the focus on primary commodities and the concentration on a few export markets also carries risks for the region.

The region also has larger than typical shares of GDP from utilities (particularly the Waikato hydroelectric and geothermal electricity generation), construction, healthcare and social assistance, and education and training (including major healthcare and tertiary education institutions). On the other hand, services make up only 48 percent of regional GDP, compared to 60 percent for New Zealand as a whole.

Table 2-1 shows the industrial make-up of the region, as well as for each respective district, by industry contribution to GDP. Except for urban Hamilton City, all the districts in the region have important specialisations in agriculture, ranging from 4.9 percent of GDP in Thames-Coromandel to nearly 32 percent of GDP in Ōtorohanga (compared to agriculture's 3.6 percent contribution to national GDP). The various parts of the region have additional specialisations that relate to their particular circumstances: Waitomo in agriculture and iron mining; South Waikato in forestry and related manufacturing; Matamata-Piako in food manufacturing; Taupō in geothermal energy, forestry and tourism-related industries; Thames-Coromandel in fishing and aquaculture and tourism; Hamilton City in non-food manufacturing and services related to being a regional centre.

Collectively this adds up to a relatively well-diversified economy for the region. An index of economic concentration (shown in the last row in Table 2-1) indicates the Waikato regional economy has a similar level of diversity as the national economy (a figure relatively close to zero is more diverse; the higher the index the more concentrated the local economy). The smaller

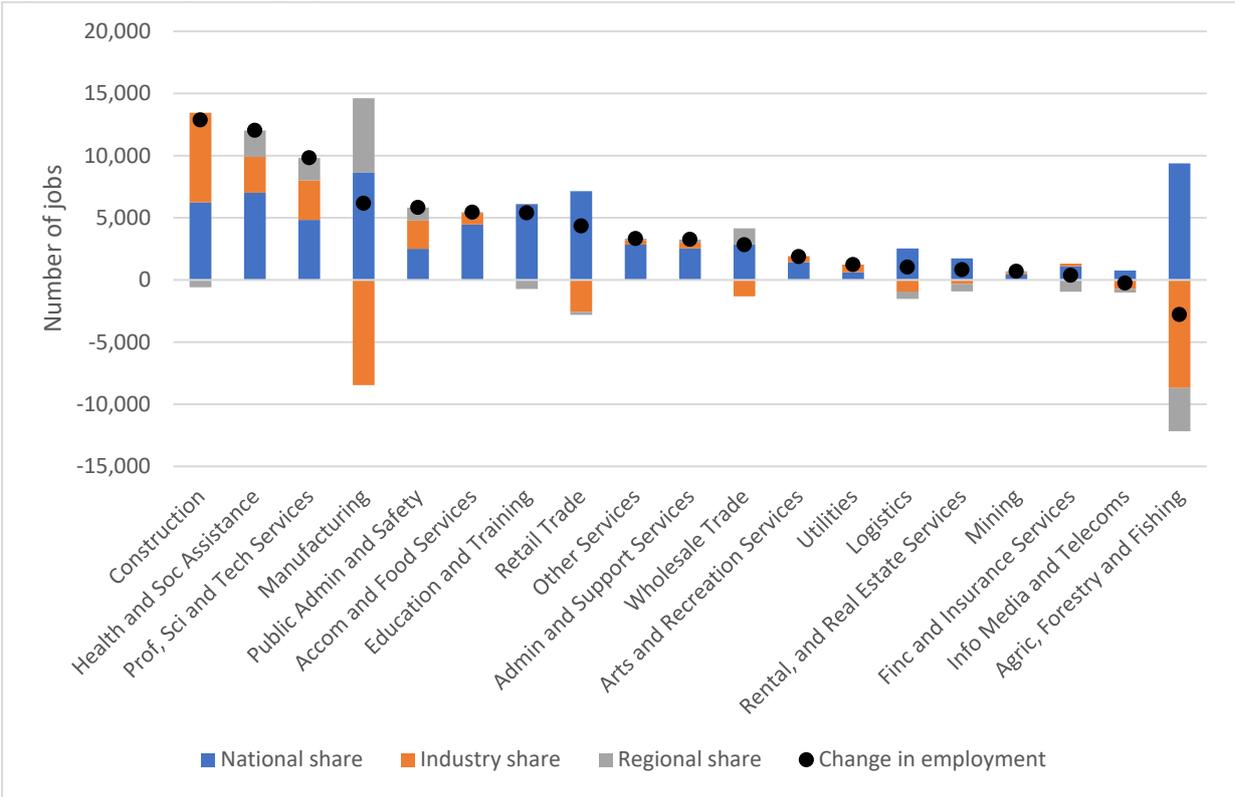
scale of the districts that comprise the region means they typically have less diverse local economies.

Whether an economy is more diversified or specialised may depend on a variety of factors (other than scale, where regional or national economies are likely to be more diversified than sub-regional ones). Many of the district-level specialisations highlighted in Table 2-1 result from the endowment of natural resources in different parts of the region, although some may also be 'historical accidents' (for example, decisions about where to build dairy or meat processing plants may affect whether one district or its neighbour has a specialisation in food processing). More specialised economies can, however, be more seriously impacted by industry-specific shocks – for example a significant fall in export revenues.

Over time the Waikato regional economy has evolved, with employment patterns changing as some industries have grown faster than others. Figure 2-3 shows the total change in employment in different industries. These changes are decomposed into three parts: those reflecting changes in the national economy; those related to the specific industry; and the remainder, which can be interpreted as the share driven by factors specific to the region.

In figure 2-3, the stacked bars add up to the overall change in employment in that industry in the Waikato region, shown by a black dot. Manufacturing, healthcare and social assistance, professional, scientific and technical services and wholesale trade have grown faster in the Waikato Region than trends in the wider economy, or in the respective industry would have indicated.

Figure 2-3: Change in employment, 2000-2019



The development of service sector industries has seen a proportional decline in the relative importance of primary industries over the past two decades. Indeed, the number of jobs in agriculture, forestry and fishing has declined in the region by around 2,800. Much of this reflects trends in the primary sector, but a significant part seems to reflect Waikato-specific factors. Understanding these Waikato-specific factors would be a useful avenue for future research.

Table 2-1: Industry makeup of the region in 2021 (% of economy by industry)^a

Industry	Waikato region	Hamilton	Hauraki	Matamata-Piako	Ōtorohanga	South Waikato	Taupō	Thames-Coromandel	Waikato District	Waipā	Waitomo	NZ
Agriculture	8.4	0.5	15.4	20.1	31.7	18.2	7.3	4.9	13.5	13.1	16.1	3.6
Mining	2.9	0.1	22.7	0.6	0.7	0.0	2.7	0.2	8.6	0.1	19.0	1.0
Forestry & logging	1.0	0.0	0.3	0.2	0.6	6.2	4.2	0.7	1.2	0.2	1.1	0.6
Other primary	1.2	0.4	1.5	1.7	3.3	2.5	1.6	2.8	3.4	1.8	2.4	1.0
Food manufacture	3.5	1.7	2.1	12.0	0.2	7.9	0.9	1.8	3.5	5.0	7.7	2.2
Other manufacture	6.9	7.9	3.5	6.6	6.7	16.2	4.6	5.8	5.9	5.7	2.1	7.0
Construction	7.4	7.3	5.4	6.9	4.9	3.9	7.2	10.1	9.2	8.7	4.2	6.6
Rental, hiring & real estate	6.6	5.3	6.4	6.1	5.3	5.6	8.9	11.1	7.6	8.0	3.8	6.6
Healthcare & social assistance	6.6	10.3	6.1	2.7	2.0	4.0	3.8	8.2	2.9	4.5	1.9	6.2
Prof, scientific & tech services	6.2	8.6	3.2	3.7	3.6	2.4	5.2	4.6	4.7	6.7	1.9	8.8
Retail trade	5.2	5.2	4.2	5.0	3.8	3.5	6.0	9.0	2.3	5.6	2.7	5.2
Wholesale trade	3.9	5.6	1.8	4.1	2.0	1.2	2.2	2.0	2.7	4.3	1.0	5.1
Utilities	4.9	6.3	0.6	0.4	0.7	1.0	10.5	1.8	4.2	2.9	10.8	2.7
Public admin & safety	4.0	5.6	2.4	1.6	10.3	2.0	3.4	2.7	3.8	1.8	2.5	4.8
Education & training	3.8	4.7	3.2	2.6	2.6	3.5	2.8	3.1	3.3	3.8	2.3	3.6
Finance & insurance services	2.5	3.6	1.6	2.7	0.8	1.1	1.7	2.3	0.8	2.7	1.0	5.7
Transport, postal & warehousing	2.2	1.9	1.2	3.0	2.6	2.2	2.6	2.5	2.3	2.4	1.4	3.5
Accommodation & food services	1.9	1.7	1.5	1.2	0.8	1.0	4.9	4.5	1.1	1.5	1.2	2.0
Other services	1.5	1.6	1.2	1.5	1.0	1.9	1.6	1.8	1.2	1.8	0.7	1.7
Information, media and telecoms	1.4	2.7	0.4	0.4	0.2	0.4	0.4	1.0	0.7	0.8	0.4	3.7
Admin & support services	1.2	1.7	0.8	0.6	0.7	0.4	1.0	1.2	1.0	0.9	0.3	1.7
Arts & recreation services	1.2	1.0	0.5	1.1	0.6	0.4	1.5	1.6	1.0	1.9	2.3	1.2
Other ^b	15.6	16.3	14.0	15.2	14.9	14.5	15.0	16.3	15.1	15.8	13.2	15.5
Economic concentration index ^c	21.3	35.4	93.3	50.2	102	50.2	31.1	31.7	29.1	29.1	77.5	22.8

Source: Infometrics Ltd.

^a The shaded cells show those industries which make a relatively high contribution to the local economy. An industry with a contribution at least 10 percent higher than its contribution to the national economy is considered to have some degree of specialisation, which may be due to some sort of comparative advantage, historical accident, or specific investments.

^b The 'other' category represents a proportion of output that could not be allocated to a specific industry, plus a technical adjustment to ensure the benefits of owner-occupied dwellings are treated consistently with the revenues from rental dwellings.

^c This index, more formally known as the Herfindahl-Hirschman Index, measures how concentrated an economy is. An index of zero would imply a highly diverse economy in which all industries contribute the same amount; the higher the index, the less diverse/more concentrated the economy is on relatively few industries.

2.3 Productivity and innovation

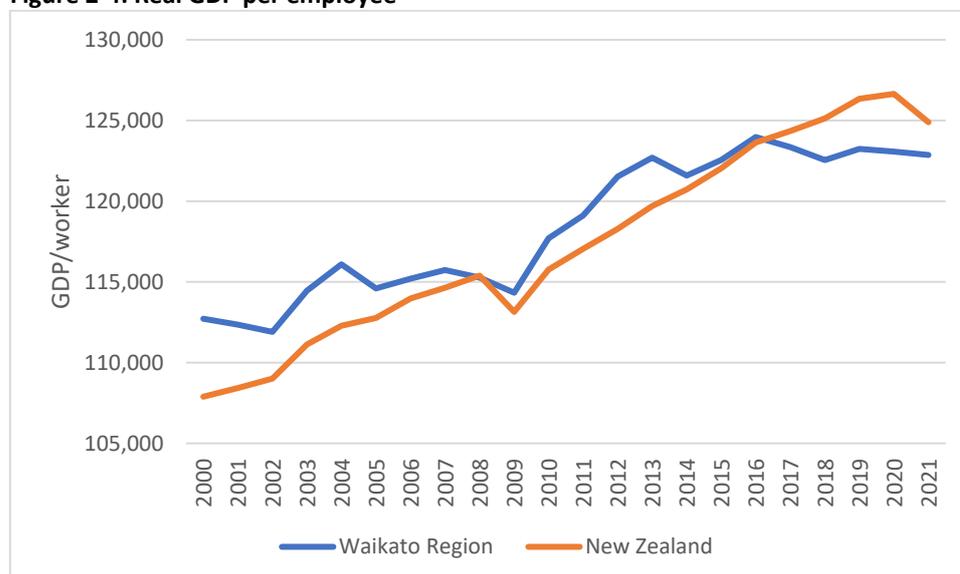
2.3.1 Trends in productivity

Productivity is about how good we are at turning inputs – resources, labour or other forms of capital – into outputs. It is a key determinant of economic growth over the long term but is also fundamental to minimising resource use for the output produced. Hence, regardless of whether the objective is economic growth, or a more sustainable economy, productivity matters. Nobel Laureate Paul Krugman famously noted that “productivity isn’t everything, but in the long run it’s almost everything” (Krugman, 1997).

New Zealand’s poor performance in improving productivity over a period of decades means our real incomes have not increased to the extent that would be required to meet our aspirations for improving living standards (Greenaway-McGrevy, 2020). The story in the Waikato Region is similar – while GDP has grown steadily in the region, this has largely been a result of adding labour inputs, rather than improvements in the productivity of that labour. Figure 2-4 shows an indicator of productivity (GDP per worker) over the last 20 years. In the Waikato Region, GDP per worker has increased by an average of just 0.4 percent per year. This compares with an average increase of 0.7 percent per year nationally, with the result that productivity in the Waikato has fallen from 104 percent of the New Zealand level in 2000 to 98 percent in 2021.

Recent changes have been particularly weak, with GDP per worker in the Waikato lower in 2021 than it was in 2016. New Zealand’s performance overall has also been poor, with its ‘frontier firms’ less than half as productive as those in comparable economies (New Zealand Productivity Commission, 2021). The Productivity Commission (2020) lists numerous government strategies dating back to the establishment of the ministerial portfolio for economic development in 1999 that have made little obvious difference to the country’s performance.

Figure 2-4: Real GDP per employee



Source: Infometrics Ltd.

2.3.2 Innovation

Broadly there are two paths to improving productivity – learning-by-doing and innovation. The former involves people getting better at repetitive tasks and tends to be a relatively short-term phenomenon for a given production process. Once someone has learned how to do a task as quickly as possible, further gains from learning-by-doing will require a change in those tasks. Finding new, more efficient ways of producing something, or new, higher value products to produce – that is, innovation – is crucial for ongoing improvements in productivity. Improving

regional productivity is important to be able to generate the income required to achieve the region’s aspirations. The Organisation for Economic Co-operation and Development (1999) notes that ‘the ability to create, distribute and exploit knowledge and information...is often regarded as the single most important factor underlying economic growth and improvements in the quality of life.’”

In its inquiry into frontier firms, the Productivity Commission summarised drivers of innovation and productivity, as well as the things that help these improvements spread across the economy. These drivers are summarised in table 2-2.

Table 2-2: Drivers of innovation and productivity

Driver	How it works
Strong competition	Competitive pressures improve productivity of firms at the frontier by: sharpening incentives for companies to develop new technologies and practices; improving managerial quality; and raising the quality, variety and innovativeness of available outputs and inputs. Competition can also encourage adoption by non-frontier firms.
R&D and other innovation-enhancing investments	Investments in research and development (R&D) can drive innovation and push out the frontier. R&D can result in innovation through new productivity-enhancing technologies, processes and practices. It can also help non-frontier firms test, adapt and adopt frontier technologies to their own circumstances.
Investment in intangible assets	Intangible assets are those that have no physical form (such as software, databases, knowledge, and brands). Intangibles tend to have increasing returns to scale and generate knowledge spillovers – both of which are important drivers of productivity.
Access to finance	Well-developed financial and capital markets provide firms with higher liquidity and credit options. This can enable investment in innovation and R&D, enable young firms to upscale, and can help firms manage risk.
International connections	International trade and participation in global value chains can intensify a firm’s exposure to information, ideas and technologies, as well as to stronger competition. Exporting and foreign direct investment also encourage learning.
Skills, management, quality and workplace relations	Firms need staff with the right skills, knowledge and other characteristics to implement production processes, and conduct innovation and R&D. High-quality management practices also have a significant impact on firm productivity.
Ease of labour mobility	Labour mobility allows more productive firms to expand with resources released from failing firms. The ease with which workers can move around will affect the ability to match skills with jobs. Infrastructure, such as the availability of affordable housing and good urban transport systems, will have an impact on labour mobility.
Ease of firm entry and exit	More competitive environments drive firms to improve productivity or exit and provide an opportunity for high-productivity firms to expand. The ease with which firms can enter and exit the market affects how efficiently capital and labour can be reallocated.

Source: Adapted from New Zealand Productivity Commission (2020, pp13-14).

The Productivity Commission found that New Zealand firms are less internationally connected, less export oriented, have less overseas direct investment, and are smaller scale than is typical

than for firms in other small, advanced economies that are characterised by higher productivity levels (New Zealand Productivity Commission, 2021).

The most recent comprehensive study of the Waikato region's innovation system, Chen (2017), found that many of the building blocks were there: quality tertiary institutions; crown research institutes; innovation infrastructure and support systems; and research and industrial capacity. However, while the region has strengths in the creation of knowledge, it struggles with knowledge exchange and commercialisation. Opportunities for collaboration were relatively rare, and this, along with a lack of innovation leadership, resulted in silos that do not enable the knowledge spillovers within and between businesses and industries that characterise successful innovation systems.

Many barriers to innovation are not unique to the Waikato region and need to be addressed at a broader scale. However, Greenaway-McGreevy et al (2020, p5) note that, despite lip-service from successive national governments, the necessary policy settings and commitments "*...remain lacking, or are, at best, incomplete and disconnected.*"

Chen (2017) proposed prioritising several key actions relating to institutions that would improve coordination, collaboration and leadership in regional innovation with the aim of breaking down silos and increasing knowledge spillovers. Clusters of businesses, in which spillovers can be maximised, tend to form naturally, but regional institutions such as local government and economic development agencies have an important role in creating the environment in which such clusters can thrive. The activities of organisations such as Te Waka (the Waikato's regional economic development agency), the Mayoral forum and the Waikato Plan have potentially important roles to play here, alongside the Ministry of Business, Innovation and Employment, New Zealand Trade and Enterprise, Callaghan Innovation and industry bodies.

The Productivity Commission (2021) note that, at the scale of the Waikato region, a focus on a few clusters in areas of comparative advantage is likely to be required to maximise overall innovation and productivity. As noted in section 2.1, the region has clear strengths in primary production and related manufacturing, but also in some high-value services and non-food manufacturing that already form the basis of clusters in the region.

The small scale of most businesses in the region (and New Zealand) and the lack of large, outward focused 'anchor firms' is seen as a barrier to innovation, but there is potential, with sufficient collaboration amongst smaller firms to achieve at least some level of such benefits (Productivity Commission, 2021). Another potential source of scale benefits may be from direct investment from large multinational corporations – although Greenaway-McGreevy (2020) note that this needs to be in the form of research or production functions, not simply marketing.

Finally, the Productivity Commission (2021) note that innovation policies to enhance productivity will only be durable if they are consistent with environmental and social objectives. Similarly, Greenaway-McGreevy (2020) emphasise the importance of a dual focus on enabling high value-added industries *while* reducing the environmental footprint of the economy. Whether adequate information to assess such matters exists is unclear – Greenaway-McGreevy et al (2020, p11) note that "*...the very limited investment in social science research is extraordinary, given that so much of the government expenditure and the range of issues ahead of us in adapting to technological innovation and addressing societal and environmental issues require quality engagement with social sciences and humanities.*"

3 Components of the economy

In this chapter, we examine key sources of economic activity. First, we consider our human resources – the labour and human capital inputs to the economy. Next, we outline the built capital – particularly housing and infrastructure – that enables economic activity. And finally, we note the natural capital upon which all economic activity ultimately and fundamentally depends.

3.1 People

The Waikato Region is home to an estimated 506,000 people – around 10 percent of the total population of New Zealand. More than a third of the people of the region live in Hamilton City, with nearly another 30 percent living in the Waikato and Waipā Districts. Population density is high in Hamilton, at around 1,600 people per square kilometre. Southern parts of the region – especially Ōtorohanga, Taupō and Waitomo Districts – are much more sparsely populated, with the lowest population density in the Waitomo District, which has an average of just 3 people per square kilometre.

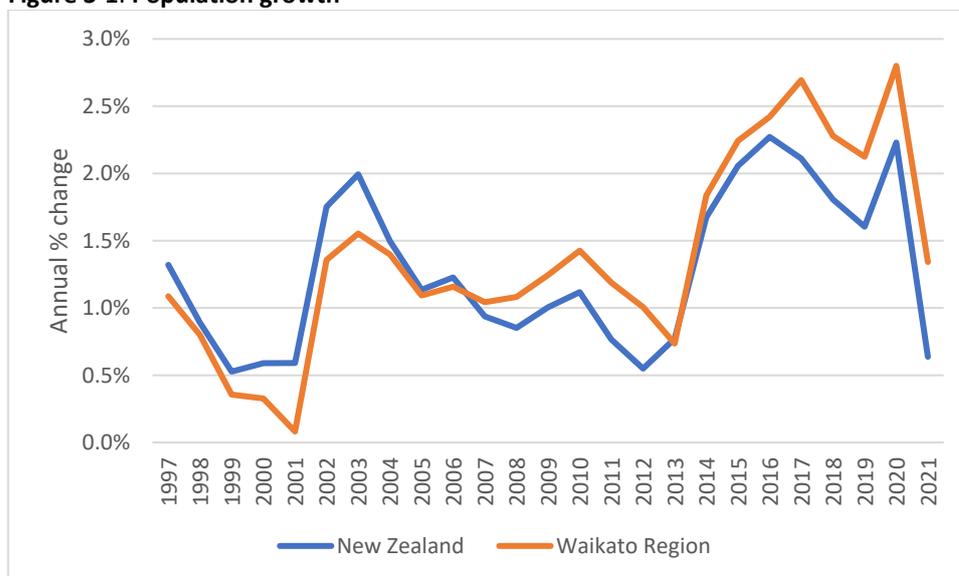
Overall, the age distribution of the Waikato population is not dissimilar to that of New Zealand as a whole. However, this varies greatly across the region (see Table 3-1). Hamilton City has a particularly young population – its median age of 32.7 is one of the youngest in New Zealand (which has a median age of 37.9). In contrast, Thames-Coromandel has the highest median age (54.8 years) of any district in New Zealand. Hauraki and Taupō Districts also have populations skewed towards the older end of the distribution (47.5 and 41.9 percent respectively).

The ethnic makeup of the region is also similar to New Zealand but has a significantly higher share of people identifying as Māori (24 percent compared to 17 percent nationally) and lower shares identifying as Pacific people or Asian (see Table 3-1). The main exceptions to this are in South Waikato, with a large Pacific community, and Hamilton City with a large share of Asian people. While the Māori proportion of the population is high across most of the region, it is particularly high in the south of the region, including Waitomo (45 percent), South Waikato (36 percent), Ōtorohanga and Taupō (both 30 percent).

3.1.1 Population growth

The growth in the regional population has generally tracked the trends in the national population, but the region has been relatively fast-growing in recent years – particularly in the post-GFC period. In the five years from 2015 to 2020 growth has averaged 2.4 percent. At that rate, the population would double in just 30 years. Growth dropped sharply in 2021, with the Covid pandemic seeing a sharp fall in migration.

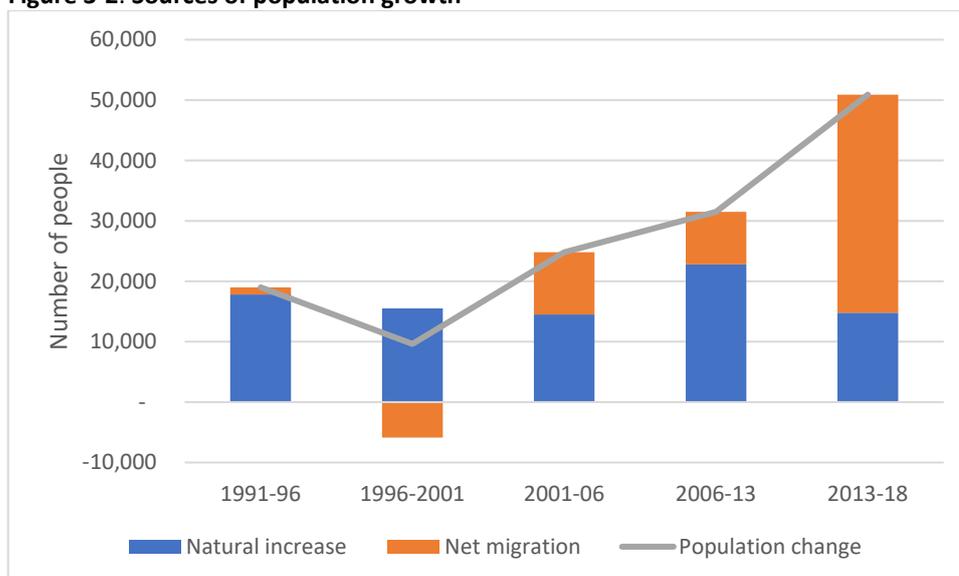
Figure 3-1: Population growth



Source: Statistics NZ.

Prior to the disruptions of Covid-19, migration had become an increasingly important driver of population changes. In the 1990s net migration was a relatively minor contributor to population growth (and in the 1996-2001 period there was net outward migration from the region), but 70 percent of the increase in the period between the 2013 and 2018 Censuses was driven by net migration to the region, and just 30 percent from natural increase.

Figure 3-2: Sources of population growth



Source: Statistics NZ.

Most of those migrants to the region whose origins can be identified have come from the Auckland region. More than half of these ex-Aucklanders (who are recorded as living in Auckland five years ago) are now living in the Waikato District and Hamilton City. This likely reflects the relatively high level of integration of these districts with the Auckland economy. Thames-Coromandel also has a significant number of migrants from Auckland, at least in part reflecting Aucklanders retiring to the coast.

3.1.2 Waikato youth

As noted above (and in Table 3-1) the Waikato has a similar age distribution as New Zealand as a whole. But some parts of the region are much younger than others, and in part, this reflects the relatively large Māori population. While 21 percent of the total regional population is aged under 14, 32 percent of Māori fall into this age group.

Nationally, the 15-19 year-old cohort makes up 6.1 percent of the population. Most districts in the Waikato Region are within 10 percent of this (the Waikato District at 6.7 percent and Hamilton City at 6.9 percent are higher; Thames-Coromandel at 4.5 percent and Hauraki at 5.4 percent are lower). However, in the 20-24 year-old age group *all* the districts in the region are significantly lower than the national average of 6.5 percent of the population except for Hamilton City, which is much higher at 8.6 percent. This reflects the stage of life for this age group, as they leave home and typically gravitate to cities for work or further education and training. Hamilton City is evidently the only place in the region that sees this influx of 20-24 year-olds, with the University of Waikato, the Waikato Institute of Technology (Te Pūkenga), and Te Wānanga o Aotearoa major attractors of this age group. Just over half of tertiary enrolments for those aged up to 24 were in Hamilton in 2019 according to the Tertiary Education Commission.

Access to ongoing education at least partly explains the relatively low 'NEET' rate (that is, *not in employment, education or training*) amongst 15-24 year-olds in Hamilton, estimated at 12.5 percent in 2021 by Infometrics Ltd. By comparison, most districts are significantly higher, with Waitomo (21.7 percent) and South Waikato (22.2 percent) the highest. Matamata-Piako (at 11.3 percent) and Waipā (at 10.5 percent) are the exceptions – possibly a reflection of their proximity to education and work opportunities in neighbouring Hamilton City.

According to the Ministry of Education, NCEA achievement rates are similar in the Waikato Region as for the country as a whole for levels 1 and 2, but at 46.1 percent are lower than the national rate for level 3 of 54 percent. Only two districts – Hauraki and Waipā – have level 3 achievement rates higher than the national figure. Ōtorohanga, which has a higher achievement rate for level 1 (90.3 percent compared to the national rate of 87.9), is on a par with the national rate for level 2, but has the lowest achievement rate for level 3 in the region, at just 19.4 percent.

Addressing these NCEA achievement rates beyond level 1, developing opportunities for those beyond Hamilton, and ensuring that opportunities cater for the growing Māori proportion of the Waikato population will be important elements of ensuring the region has a labour force that can meet the demands of future job markets.

3.1.3 Older people

With the ageing of the overall population in the region, the economic role of older people is increasingly important – especially in those parts of the Waikato with an older age profile. Firstly, people are increasingly working beyond the age of 65. At present the economy is characterised by severe labour and skill shortages. In these circumstances, older workers can be an important source of experienced labour. Around 9-10 percent of total jobs in the Waikato are filled by those aged 65 or over.

However, the share of people actively involved in the labour force will decrease as the proportion of older residents increases. In places with significant older populations, such as Thames-Coromandel District (where one third of the population is over 65, compared to 17 percent for the region) or Hauraki District (with a quarter over 65), their expenditure becomes an integral part of the local economy. This will mean a change in the sectoral make-up of the economy. Typically this will happen as an evolutionary process, although things like new medical facilities or retirement villages can mean significant changes in where related expenditure occurs.

Table 3-1: People of the region^{a, b}

	Waikato region	Hamilton	Hauraki	Matamata-Piako	Ōtorohanga	South Waikato	Taupō	Thames-Coromandel	Waikato District	Waipā	Waitomo	NZ
Population in 2021 (000s)	506	178.5	21.8	36.7	10.8	25.5	41	33	85.9	59.5	9.6	5,123
Age distribution												
0-14	20	21	18	19	21	22	20	14	22	20	21	19
(% of total)												
15-39	33	40	24	30	32	30	28	20	31	30	30	34
40-64	30	27	32	30	31	30	31	33	33	32	32	31
65+	17	12	25	21	16	17	21	33	14	19	17	16
Median Age	37.4	32.7	47.5	40.9	36.9	37.2	41.9	54.8	37.4	40.2	39.2	37.9
Ethic group/total population (2018)												
European or other	75	63	84	85	78	69	77	89	77	89	64	70
Māori	24	24	23	17	30	36	30	19	27	15	45	17
Pacific	5	6	3	2	2	13	3	2	4	2	4	8
Asian	10	19	4	6	4	4	5	4	6	4	4	16

Source: Statistics NZ.

^a Shaded cells represent figures 10 percent or more higher than the New Zealand equivalent.

^b Ethnic groups do not add up to 100 percent, since some people will identify with more than one group.

Table 3-2: Changes in population 2013-18

	Waikato region	Hamilton	Hauraki	Matamata-Piako	Ōtorohanga	South Waikato	Taupō	Thames-Coromandel	Waikato District	Waipā	Waitomo	NZ
Annual natural increase (% of pop)	0.7	1.0	0.2	0.5	1.0	0.7	0.5	-0.3	0.8	0.5	0.6	0.6
Annual net migration (% of pop)	1.6	1.4	2.0	1.0	0.9	0.7	1.7	2.6	2.5	2.0	0.0	1.4
Total annual average change (%)	2.3	2.3	2.2	1.4	1.8	1.3	2.1	2.4	3.3	2.5	0.6	2.0
Average annual change 2013-18	10,180	3,680	420	480	190	320	760	660	2,340	1,260	60	91,700

Source: Statistics NZ.

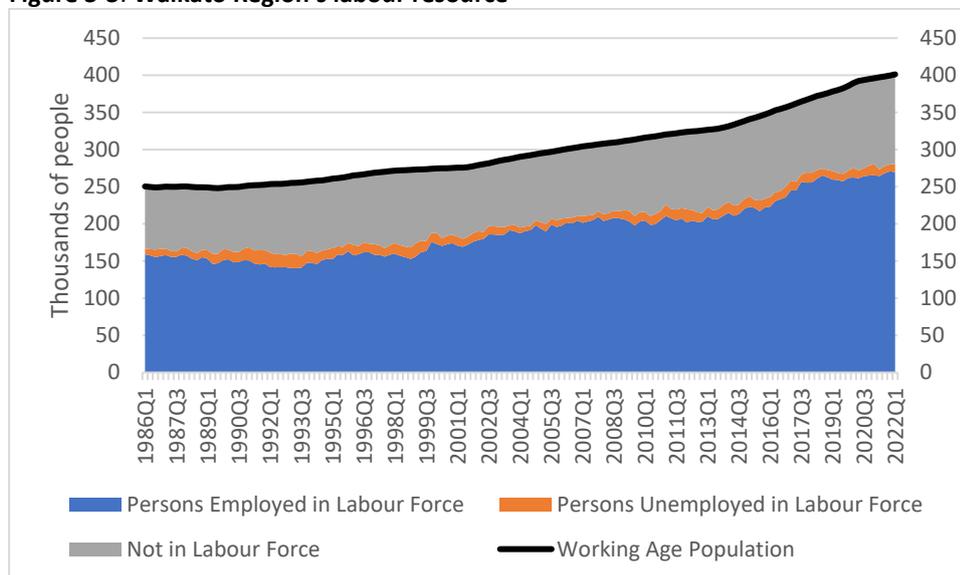
3.2 Employment & incomes

Up to a point, income is an important indicator of wellbeing. And the main way that most people generate income is through the labour market; that is, through their jobs. The corollary of this is that the region's labour force is a fundamental input to economic activity.

The Waikato Region's working-age population topped 400,000 in 2022. Of those, around 70 percent (281,000 people) are actively engaged in the labour market either as workers or unemployed but actively seeking and available for work – a relatively high rate of participation compared with most of the last few decades. In early 2022, about 270,000 were employed and 11,000 unemployed (see Figure 3-3). Apart from a slowdown in late 2020-early 2021, the number of filled jobs has grown by an average of three to four percent per annum over the last five years – significantly higher than the overall population. As with the patterns in regional GDP illustrated in Table 2-1, employment in the Waikato Region is more heavily weighted towards goods producing industries (the primary sector, manufacturing and construction) and less so towards services than national employment by industry. Consequently, the unemployment rate has declined from a post-GFC high of 8.1 percent in 2012 to current very low levels (3.9 percent of the labour force).

These trends are broadly in line with those for New Zealand as a whole. As well as very low unemployment, 'underutilisation' rates (where people are in jobs, but would like to work more) are also relatively low. Having averaged 13 percent in the region since the GFC, underutilised workers made up just 9 percent over the past year. Similarly, the number of work-ready people on Jobseeker Support benefits as a proportion of the population is very low. Much of the region is similar to the national rate of 2.1 percent (lower in Waipā and Matamata-Piako), but even in those parts where it is higher (South Waikato, Hamilton and Waitomo) it is low (see Table 3-3).

Figure 3-3: Waikato Region's labour resource



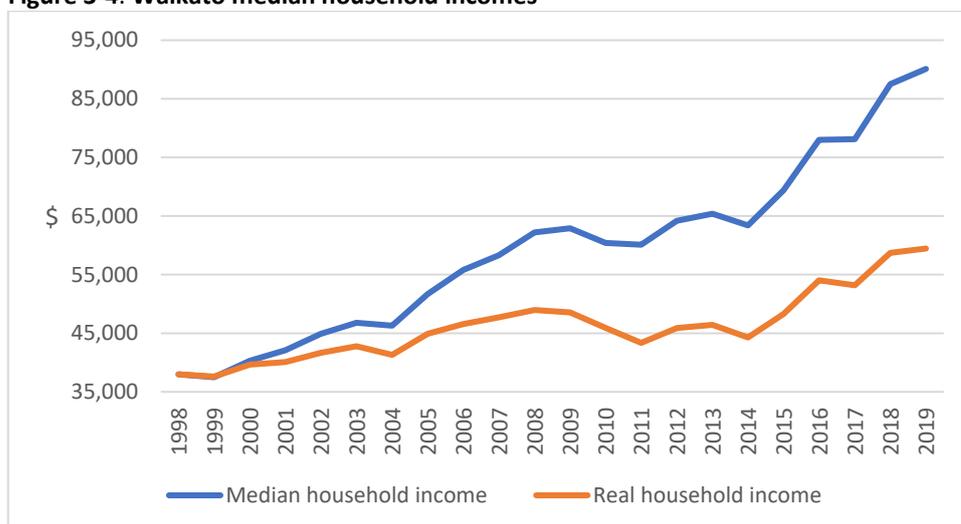
Source: Statistics NZ.

With unemployment and underutilisation rates at low levels, and participation rates already quite high, labour shortages are a significant concern for employers in the region at present, and a lack of labour represents a serious constraint on economic activity. Sense Partners (2022) estimated labour shortages across the country, finding the number of job vacancies was well in excess of locally available labour, with Taupō, Hamilton, Waipā and Matamata-Piako the most severely affected in the region. The region's economic development agency, Te Waka, reports 71 percent of surveyed businesses report skill shortages as a problem (rising to 91 percent for businesses with 11 or more employees), with construction, agriculture, hospitality and manufacturing reporting the most acute shortages (Te Waka, 2022). The New Zealand Institute

of Economic Research report that businesses are finding both skilled and unskilled labour difficult to find, and the majority of survey respondents reported labour as the primary constraint on their business (New Zealand Institute of Economic Research, 2022).

Household incomes in the Waikato Region have risen by 240 percent over the last 20 years, or about 4.5 percent per year – slightly faster than the median household income for New Zealand (which increased 224 percent, or 4.1 percent per annum, over the same period). In real terms (that is, after adjusting for inflation) Waikato median household incomes have risen by 158 percent, or 2.3 percent per year.

Figure 3-4: Waikato median household incomes



Source: Statistics NZ

Several trends have contributed to the rise in household incomes. Wages, as the return to labour, are expected to increase in line with productivity, which, as noted above, has been increasing only very slowly in the Waikato Region. Higher labour force participation and falling underutilisation of workers also mean that the hours worked by households have risen. So, as well as increasing wage rates, rising household incomes are also being driven by household members working more.

The rise of inflation over 2021-22 is likely to be accompanied by faster increases in incomes, although it is not clear whether *real* incomes will remain stable. At the time of writing, current regional income data is not available, but national data shows average ordinary-time hourly earnings have risen more slowly than consumer prices (annual increases of 4.8 percent and 6.9 percent respectively), resulting in a 2 percent fall in average real wages in the year to March 2022.

Table 3-3: Jobseekers in the region^{a, b}

	Waikato region	Hamilton	Hauraki	Matamata-Piako	Ōtorohanga	South Waikato	Taupō	Thames-Coromandel	Waikato District	Waipā	Waitomo	NZ
Work-ready jobseekers/Popn in 2022 (%)	2.4	3.0	2.2	1.5	2.0	4.1	2.0	2.0	2.2	1.1	3.0	2.1
% of jobseekers aged 18-24	21	24	18	20	18	21	18	14	20	21	19	20
25-39	31	34	27	28	31	27	31	25	27	29	25	31
40-54	28	26	30	27	28	28	28	30	31	28	31	27
55-64	20	15	25	25	23	25	23	31	22	22	24	21
% of jobseekers European	49	43	67	67	47	44	42	69	47	67	33	49
Māori	48	49	37	33	56	51	62	32	53	33	72	38
Pacific	5	6	3	2	2	12	4	2	5	2	1	11
Asian	4	5	1	2	0	1	1	1	2	2	1	6
Other/unclear	7	11	5	5	4	4	4	6	5	5	4	9

Source: Statistics NZ; MSD.

^a Shaded cells represent figures 10 percent or more higher than the New Zealand equivalent.

^b Ethnic groups do not add up to 100 percent, since some people will identify with more than one group.

Table 3-4: Incomes in the region^{a, b}

	Waikato region	Hamilton	Hauraki	Matamata-Piako	Ōtorohanga	South Waikato	Taupō	Thames-Coromandel	Waikato District	Waipā	Waitomo	NZ
Median household incomes (\$000s)	90.1	94.5	68.0	89.1	87.9	73.8	85.3	65.6	112.1	103.6	73.8	92.0
Median personal incomes (\$000s)	30.4	30.2	24.6	32.4	30.2	24.9	30.3	24.9	34.7	35.5	27.3	31.8
Med. personal incomes ages 15-29	17.5	17.0	16.7	22.6	18.6	15.6	18.4	16.7	16.7	18.7	18.3	17.2
30-64	43.6	44.2	35.4	44.6	40.0	37.3	42.1	34.2	47.7	50.0	37.1	45.3
65+	22.4	22.5	20.9	22.5	23.2	21.0	23.1	22.1	22.6	23.2	22.3	22.5
Med. personal incomes Europeans (\$ 000)	32.7	34.2	24.7	33.4	33.5	26.4	32.2	25.0	37.6	36.4	30.6	34.5
Māori	23.4	23.0	22.6	25.2	20.7	21.7	24.0	23.0	23.8	28.0	22.2	24.3
Pacific	23.3	22.8	21.3	26.2	17.8	21.2	24.8	23.9	25.5	28.4	26.7	24.3
Asians	28.3	26.6	26.2	31.4	32.7	30.6	33.7	29.3	32.4	29.1	33.0	28.4

Source: Statistics NZ.

^a Shaded cells represent figures 10 percent or more higher than the New Zealand equivalent.

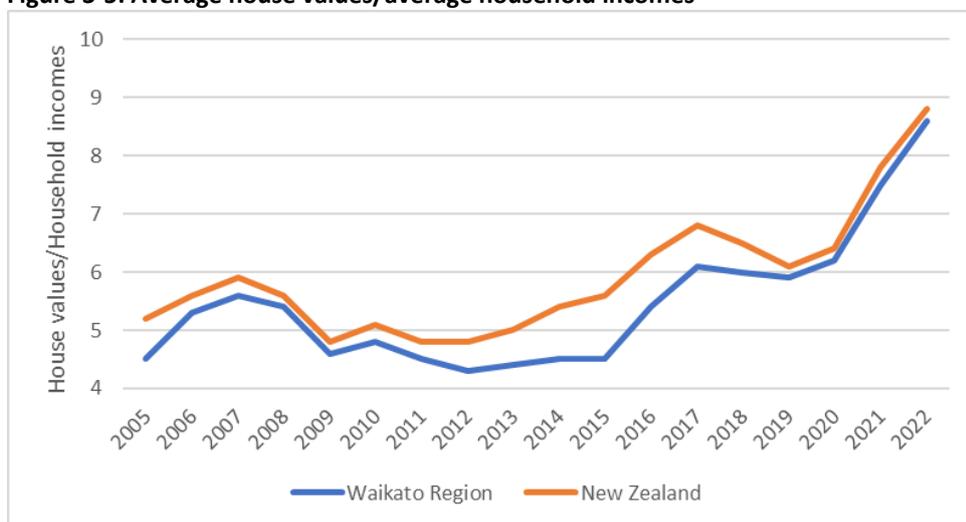
^b Ethnic groups do not add up to 100 percent, since some people will identify with more than one group.

3.3 Housing

In terms of the types of infrastructure that support the economy, housing is critically important for labour mobility and wellbeing. It not only is necessary as a basic human need, but good quality housing infrastructure also underpins the economy by enabling a healthier, more productive labour force. However, access to adequate housing has been seriously eroded over a sustained period in New Zealand, and the Waikato region has been no exception. Recognising this range of issues, the Waikato Housing Initiative¹ has been established as a joint effort to address them.

According to Rehm (2019) a ratio of average house prices to average incomes of three represents the upper threshold of an affordable housing market, while a ration over five is 'severely unaffordable. On this basis, housing has not been generally affordable in the Waikato region since sometime before 2005 and has been increasingly severely unaffordable since 2015 when house price increases accelerated again following a period of weakness due to the Global Financial Crisis. While 2022 has seen some improvement in affordability thanks to lower house prices and growing incomes, this is only partly unwinding the increases of the past few years.

Figure 3-5: Average house values/average household incomes



Source: Infometrics Ltd.

As a consequence, only 64 percent of households in the Waikato region own their own homes – the third lowest rate in the country after Auckland and Gisborne. Home ownership in Hamilton, at 54 percent, is the lowest in the country (Stats NZ, 2020). The 46 percent who do not own their own homes largely occupy rental housing, mostly provided by private landlords (88 percent), with state housing making up another 8 percent of rentals, and the rest from a mixture of local government, iwi or other community providers.

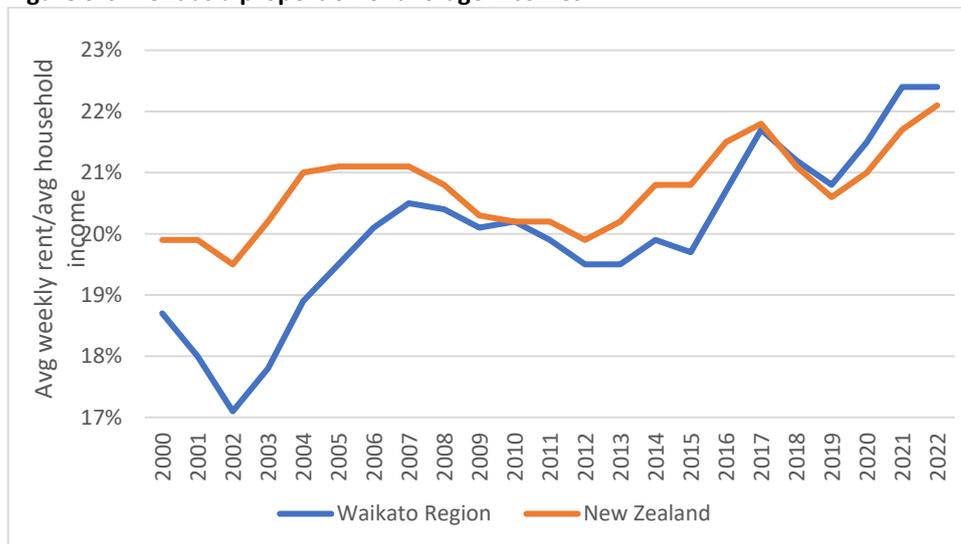
According to the Ministry of Social Development, there are around 40,000 recipients of the Accommodation Supplement in the Waikato region, equivalent to 21 percent of households. This varies across the region from as low as 14 percent in the Waipā District to 26 percent in Hamilton and 30 percent in South Waikato. Hamilton City has a much higher level of public housing tenancies (5.4 percent of households) than the rest of the region, although this reflects where the supply is as much as where the demand is. The South Waikato District has only 38 public housing tenancies - equivalent to just 0.4 percent of households, but this is because there is so little stock. The number of applicants for public housing is 300 percent of the existing number of tenancies.

¹ <https://www.waikatohousinginitiative.org/>

Table 3-5, below, shows that, while housing can be considered unaffordable throughout the region, the degree of unaffordability varies greatly. In 2022 the South Waikato and Waitomo districts, while unaffordable, were not severely so, whereas Thames-Coromandel, with a house price-income ratio of 17.2 is perhaps *the* most severely unaffordable housing market in the country. This latter situation is exacerbated by the fact that a significant share of demand in the Thames-Coromandel District is derived from outside the area – especially from Auckland. This additional demand pushes up house prices, while the relatively old age profile of the district means a significant proportion of the resident population are older and on fixed incomes. Accommodation for service workers who support older residents may be a particular problem, since these are often on relatively low incomes.

Similarly, rental affordability has also deteriorated steadily over time. Twenty years ago, average rents required about 17 percent of an average household income; in 2022 this has risen to more than 22 percent. Notably, renting in the Waikato was relatively cheap for much of the last 20 years, but since 2018, rents here in the region have been more expensive than the New Zealand average. Rent-income ratios were more than 10 percent higher than the national average in the Thames-Coromandel, Waikato, and Hauraki districts, and 10 percent lower in the South Waikato District in 2022 (see Table 3-5).

Figure 3-6: Rent as a proportion of average incomes



Source: Infometrics Ltd.

Table 3-5: Housing in the region

Affordability ^a	Waikato region	Hamilton	Hauraki	Matamata-Piako	Ōtorohanga	South Waikato	Taupō	Thames-Coromandel	Waikato District	Waipā	Waitomo	NZ
House prices-income ratio (2017)	6.1	6.6	5.7	5.0	3.1	2.4	5.6	12.4	6.4	5.4	2.3	6.8
House prices-income ratio (2022)	8.6	8.4	8.4	7.2	6.2	4.2	9.4	17.2	7.5	7.5	4.7	8.8
Land value as % of capital value (2022)		53%	48%	51%	51%	40%	52%	59%	53%	53%	35%	45%
Rents as % of income (2017)	21.7%	21.7%	23.9%	19.7%	14.3%	12.4%	21.3%	28.7%	24.6%	19.8%	16.2%	21.8%
Rents as % of income (2022)	22.4%	21.3%	25.4%	22.2%	20.1%	15.3%	23.7%	33.2%	24.6%	21.3%	19.9%	22.1%
Housing quality^b												
% living in overcrowded homes (2018)	10%	14%	8%	7%	9%	14%	8%	6%	11%	5%	16%	
% living in damp homes (2018)	25%	26%	27%	26%	29%	32%	21%	20%	25%	21%	33%	
% living in mouldy homes (2018)	21%	22%	23%	21%	21%	27%	16%	15%	20%	17%	28%	
Housing tenure												
Home ownership (including family trusts) (2018)	64%	54%	69%	66%	63%	63%	66%	73%	71%	71%	60%	65%
No. on Accom. Supplement/households (2022)	21%	26%	21%	17%	16%	30%	18%	16%	21%	14%	20%	19%
Public housing tenancies/households (2021)	2.6%	5.4%	1.2%	1.2%	0.9%	0.4%	1.1%	1.4%	1.4%	1.1%	2.5%	
Applicants/tenancies (2021)	53%	48%	60%	57%	103%	297%	87%	44%	62%	43%	57%	
Public housing tenancies (2021)	4,834	3,379	107	168	36	38	173	206	394	239	94	
Emergency housing approvals (2021)	5,028	3,663	143	119	20	110	584	107	104	161	17	
Annual increase in public housing applicants (2018-2021)	52%	55%	45%	60%	74%	54%	38%	46%	42%	54%	50%	

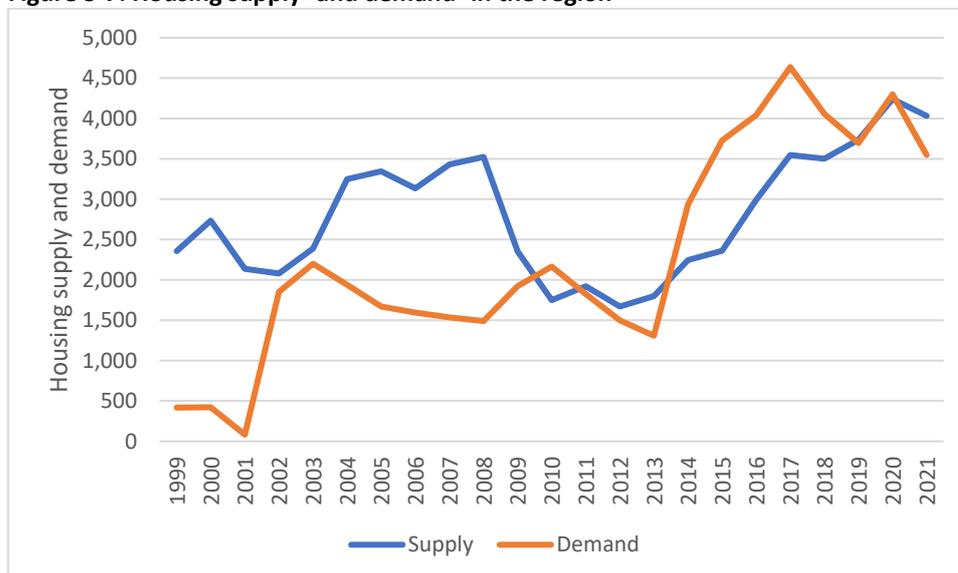
Sources: Statistics NZ, Ministry of Housing and Urban Development, Waikato Housing Initiative, Infometrics Ltd.

^a Green shaded cells represent figures 10 percent or more lower (more affordable) than the New Zealand equivalent; orange shaded cells represent figures 10 percent or more higher (less affordable) than the New Zealand.

^b Green shaded cells represent figures 10 percent or more lower (ie there are fewer living in poor quality houses) than the regional average; orange shaded cells represent figures 10 percent or more higher (ie there are more living in poor quality houses) than the regional equivalent.

In the period before the Global Financial Crisis (GFC), the supply of housing increased by up to 3,500 per year, well in excess of the increase in household numbers (see figure 3-7). Nevertheless, housing affordability – both in terms of home ownership and rents – remained poor over that time. The GFC saw a sharp contraction in credit availability and consequently, the rate of additions to housing slowed sharply. From around 2012-13, housing supply began to increase again, but this has been matched by sharply rising demand, and so has had limited effect in mitigating the severity of the unaffordability problem.

Figure 3-7: Housing supply¹ and demand² in the region



Source: Ministry of Housing and Urban Development

¹ New dwelling consents, 12-month rolling average, lagged 6 months.

² Resident population divided by average household size.

With ongoing population growth expected, continuing high levels of new housing supply will also be required. Mid-range population projections suggest the need for 2,500 new houses per year in the region for the next 20 years, while the ‘high’ projections indicate the need for 3,800 per year. Recent increases in supply suggest that these increases are feasible, provided it is enabled by zoning and the supporting infrastructure networks can also be financed and built. But with local government finances already under pressure, funding significant upgrades or new infrastructure may be challenging (these issues are addressed further in section 3.4 below).

3.4 Infrastructure

3.4.1 Regional infrastructure

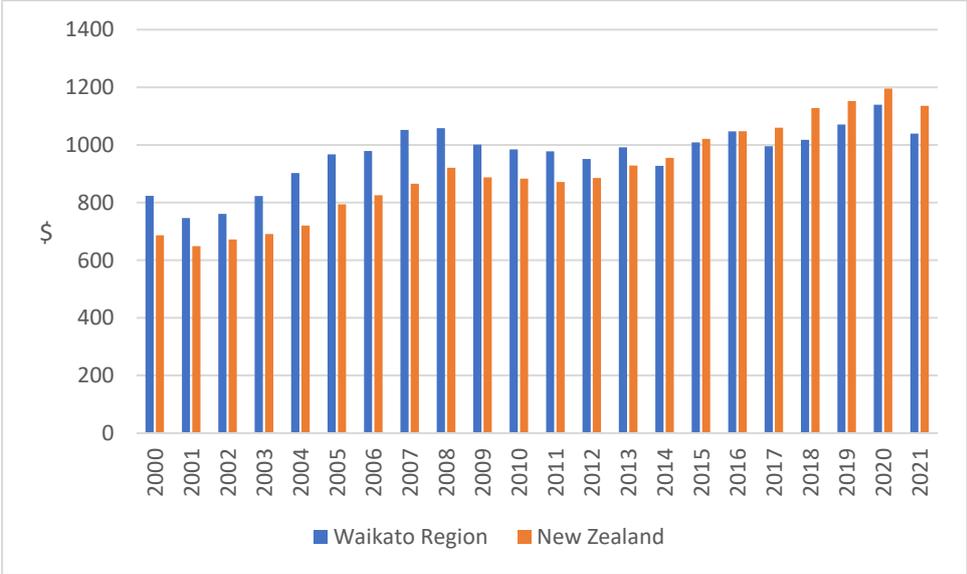
Infrastructure in the Waikato is a fundamental building block not only for local economic and social wellbeing, but nationally too. The eight dams and nine power stations of the Waikato River scheme provide a significant share of New Zealand’s electricity, including up to 25 percent of daily peak supply (National Institute of Water and Atmospheric Research, 2010). The region is home to the majority of New Zealand’s geothermal energy infrastructure, which, as well as direct uses of geothermal heat, is a major contributor to the national electricity supply. As well as being an important regional economy in its own right, the location of the region adjacent to Auckland and Tauranga – homes of New Zealand’s largest ports – means that the Waikato Region is a key logistics and transport centre for much of the country’s exports, imports and inter-regional commerce. Water-related infrastructure (supply, wastewater, stormwater reticulation and treatment, as well as flood defences), communications networks, and schools and health services are all crucial for the region’s communities.

Sense Partners (2020) estimate that every \$1 million in spending on infrastructure generates seven jobs for the period of construction (four in construction and three in related industries such as suppliers to construction businesses). Once infrastructure is in place, it becomes the

foundation for other economic activity and, by adding to the capital stock, investment in infrastructure can also improve productivity and increase long-term growth in incomes: a 10 percent increase in public capital stock is estimated to increase long-term economic growth by 1 percent (Sense Partners, 2020; Bom and Ligthart, 2014).

An important component of infrastructure activity is the production of the heavy and civil engineering construction sector, which was estimated to be around \$525 million in the Waikato Region in 2021, or around 2 percent of total regional GDP (Infometrics Ltd, 2021). Infrastructure construction per capita has generally risen over the last 20 years, from an average of \$810 per annum over 2000-05, to \$1,050 over the last 5 years. Although infrastructure construction per capita was higher than the New Zealand average from 2000 to 2013, it has since been slightly lower (see figure 3-8).

Figure 3-8: Heavy and civil engineering construction per capita



Source: Infometrics Ltd.

Note that this does not include some types of infrastructure – particularly non-residential building construction. For example, the value of buildings consented in the region for the health and education sectors – both important foundations for a healthy, productive labour force – has averaged around \$67 million per annum over the past five years.

The last comprehensive Waikato Region-specific review of infrastructure and its contribution to wellbeing was in 2013 (Waikato Mayoral Forum Technical Working Group, 2013). In particular, it considered the consequences of failure of different types of infrastructure. Its assessment illustrated the importance of a wide variety of infrastructure to the region, from supporting economic activity to public health and safety, to access to technology, leisure, education and social inclusion.

3.4.2 Challenges

While investment in infrastructure plays an important role in improving productivity, Sense Partners (2020) argue there remains significant underinvestment in infrastructure in New Zealand (as much as 25 percent of GDP), and highlight some of the key challenges to improving the situation, including:

- pipeline uncertainty – undermining firms’ confidence and investment in capability (people, knowledge and capital);
- policy U-turns – creating the risk that firms’ investment in capability does not pay off;
- public agency silos – feeding the boom/bust cycle through a lack of co-ordination and missing opportunities by agencies just focusing on solutions in their sector rather than broader economic, social and environmental outcomes; and

- *incentive issues – a funding and procurement environment that rewards least-cost offers and risk-shifting that end up exposing all parties to higher whole-of-life cost.*

3.4.2.1 Quality of investment

More investment in infrastructure may be necessary, but it is not sufficient to ensure better economic performance. The New Zealand Infrastructure Commission (2021) notes the importance of value for money and presents evidence that suggests New Zealand is relatively inefficient at delivering infrastructure. Our small scale and low population density mean infrastructure costs are typically spread over fewer people, while our difficult geography often adds to costs. As a result, it is difficult to achieve the same value as many other high-income countries for a given investment.

These factors are difficult to influence – at least in the short-medium term. Given this, it is important to consider our options more broadly. Non-infrastructure solutions such as distributed networks of solar energy or water supply, or demand management (for example via congestion pricing) may be more efficient alternatives in some cases; we should not simply build infrastructure for the sake of it but should prioritise investment in the services that improve community wellbeing (which may or may not be provided by large-scale infrastructure).

The quality of infrastructure investment decision-making is also identified as an issue. New Zealand Infrastructure Commission (2021) suggest a focus on high quality institutions – not just organisations, but well-established processes like robust decision-making processes are important, and informal institutions like trust in a credible infrastructure pipeline. In the face of increasing costs, environmental effects and community aspirations the Waikato Regional Council is developing a decision-making framework to support sustainable infrastructure investment (Beca, 2022).

3.4.2.2 Funding

Local government in New Zealand is a key provider of infrastructure – either directly (through local roads, water reticulation, flood defences and other social infrastructure) or indirectly through land-use planning. However, efforts to maintain the services provided by infrastructure (including catching up on previous under-investment) and supporting a growing regional economy have meant some local authorities are struggling to fund investment expenditure. Where infrastructure is funded primarily by targeted rates levied on the direct beneficiaries of the infrastructure, a relatively small pool of funders may struggle to fund renewals and upgrades required to maintain service levels. Indeed, these issues have led to a series of projects and inquiries into local government funding (including Funding Project Team, 2005, 2006a, and 2006b; Shand et al, 2007; New Zealand Productivity Commission, 2019; Tax Working Group, 2019; Kevin Ramsay Consulting Ltd, 2022).

3.4.2.3 Costs

Since 2020, funding issues have been further magnified by the financial difficulties for ratepayers related to Covid-19 and its economic effects such as rising inflation and interest rates, which have made construction much more expensive. Most recently the Treasury, Department of Internal Affairs and Ministry of Housing and Urban Development have been engaged in a work programme looking at local government infrastructure funding and financing².

3.4.2.4 Coordination

The ‘lumpy’ nature of infrastructure investment and the difficulty coordinating inputs has often led to inefficient deployment of resources over time – for example with delays to projects beginning while inputs are marshalled, and the temporary unemployment of resources following project completions. Efforts by central government – including the establishment of Te Waihangā (the Infrastructure Commission) – aim to coordinate infrastructure pipelines to address this.

² [Local Government Infrastructure Funding and Financing - dia.govt.nz](https://dia.govt.nz)

With the introduction of requirements for regional spatial plans as part of the reform of the Resource Management Act 1991, it will be critical to ensure these consider how infrastructure investment is coordinated across the region. Institutions such as the Waikato Mayoral Forum, the Waikato Plan and the Upper North Island Strategic Alliance offer opportunities to align the efforts of central and local government and private firms involved in the delivery and operation of infrastructure both within the Waikato Region and across its borders.

3.4.2.5 Uncertainty and climate change

The long lifespan of infrastructure means investment decisions will inevitably have to be made in the context of significant uncertainty. Changes in factors such as the environment, population, technology, costs and benefits (and the interactions between all of these things) will affect the optimal type and amount of infrastructure. While projections can be made through modelling and assumptions, these variables are not known with certainty at the time at which investment decisions are made. There will, however, be points in the life of the infrastructure (for example regarding renewals) when decisions are required that *will* be able to take account of changing circumstances. In such cases it is important to properly consider issues of sunk costs (which can bias decisions towards the status quo, even when it is not optimal) and the potential for creating stranded assets (for example, where infrastructure can be anticipated to become ineffective, or redundant).

The changing climate represents a significant challenge to infrastructure investment decisions. The environmental effects of increasing weather extremes (such as high temperatures, floods, droughts, storm events, sea level rise) are expected to see significant adaptations in the way the region and its economy function and will change the calculations about infrastructure investment. Simonson and Hall (2019), for example, provide estimates of local government infrastructure that will be exposed to the effects of sea level rise under different scenarios, which should be built into investment decision-making now. Adaptation and mitigation actions and behaviour will lead to changes in demand for (and the benefits of) infrastructure, while changing costs will affect the supply-side; both sides of the equation must be given careful consideration in decision-making.

3.5 Natural resources

The economy of the Waikato region depends fundamentally on the natural resources of the region. These resources can be thought of as ‘natural capital’ and, like other forms of capital, provide necessary building blocks that support the regional community and economy. Like other forms of capital, they can be used up or worn out, and require investment to make sure they are maintained and can continue to provide the services we depend upon. The region’s stock of natural capital, then, creates a flow of benefits – sometimes referred to as ‘ecosystem services’. Nutrient cycling, regulating water supplies and quality, food production, waste treatment, and protection against disturbances, such as flooding and storm events, are typical examples of the flow of benefits derived from natural resources. While these services are often not bought and sold (apart from production of food and materials), and so have no price, their economic value is very real.

Patterson and Cole (1999) estimated that the value of these ‘ecosystem services’ was \$9.4 billion per annum – comparable to estimates of regional GDP of \$9.9 billion at the time (Hughes, 1998). This followed the approach taken by Costanza et al (1997), which estimated the annual value of the biosphere to be US\$16-54 trillion (with an average of \$33 trillion compared to global GDP of US\$18 trillion).

Patterson and Cole (2013) updated their previous work, although provided national, rather than Waikato-specific, estimates in respect of ‘land-based’ ecosystem services. After adjustments to their methodology to avoid double-counting of some services, they estimate that land-based ecosystem services in 2012 was equivalent to 27 percent of GDP. The authors note that

“...indicative calculations demonstrate that the value of coastal–marine ecosystems in New Zealand is likely to be very high and significantly exceeding the land-based ecosystems.” This would imply that estimates of the dollar value of ecosystem services are likely to be well in excess of 50 percent of GDP. Moreover, one could argue that *all* of measured GDP is dependent on the foundation of natural resources that it is built on, or as Costanza et al (2017) acknowledge, estimates of the value of ecosystem services can be seen as an ‘underestimate of infinity’. In any case, the value of natural capital to the Waikato economy is very high and, as the region grows, it is critical to ensure that its use of natural resources does not degrade them to the point that they cease to provide the necessary foundation for the economy.

3.5.1 Land

The economy of the Waikato region is literally built on its land resources. The region’s 2,500,000ha of land have been transformed over the last 150 years, with around three-quarters of native land cover cleared of forests or drained of wetlands. Pastoral farming is now the dominant land use in the region, making up 53 percent of its total area, while a further 13 percent is in exotic forestry (Hill and Borman, 2022). Native forests and wetlands cover about 28 percent of the region.

Table 3-6: Land use capability in the Waikato region

Land use capability class	Description	% of the Waikato region
1	Good multi-use land, flat to very gently sloping, deep, easily worked soil, negligible risk of erosion.	1.9
2	Flat to gently rolling land with slight physical limitations, may be used for cultivated cropping, horticulture, pastoral farming or forestry.	11.2
3	Land with moderate physical limitations for cultivation; may be used for cultivated cropping, horticulture, pastoral farming or forestry.	11.0
4	Land with severe physical limitation for cultivation; constraints on the choice of crops able to be grown; may require intensive soil and water conservation treatment and careful management practices.	14.1
5	Too many limitations to be cultivated for cropping. Negligible to slight erosion risk under pastoral or forestry use. Typically stony, wet or sloping land with high quality, stable soils. Where slopes prevent cultivation, some horticulture may be suitable.	0.4
6	Moderate limitations for pastoral use. Suitable for forestry.	36.7
7	Severe limitations for pastoral use. Suitable for forestry.	15.9
8	Severe physical limitations; not suitable for any form of cropping, pastoral or production forestry use; only suitable for watershed protection.	5.3
Other	Includes lakes, quarries, towns.	3.5

Source: Waikato Regional Council

New Zealand has a relatively limited supply of highly versatile land, and a disproportionately large amount of it is within the Waikato region. Most of this land does, however, have some limitations for pastoral use and requires careful management practices and investment to maintain the natural capital it provides (Table 3-6). Without appropriate management, land uses can lead to issues such as erosion, pugging and compaction, contamination, and the loss of organic matter and nutrients that effectively lead to the depreciation of the region’s land and water resources. Water quality trends for the region have shown the effects of significant increases in total nitrogen, nitrate, total phosphorus, and E. coli, consistent with increased agriculture intensity above and beyond any improvements made through best management practice (Vant, 2018).

The intensity of land use in the Waikato Region has increased over the last 20 years, with a net change from planted forest to (more intensive) pastoral land use of 41,527 hectares between 2001 and 2018 (Hill and Borman, 2022). Most of this change occurred in the upper Waikato catchment, while there was a net *increase* in forest land around Lake Taupō (probably as a result

of regulation to limit nitrogen discharges to the lake to preserve its excellent water quality) and the western coastal catchments of the region. Similarly, the intensity of use has increased, with a significant increase in dairy pastoral land, while the area used for less intensive non-dairy pastoral uses decreased slightly since 2001. In general, these trends were much stronger between 2001 and 2012, and have slowed since.

The Waikato region is home to 70 percent of New Zealand’s geothermal resources and provides 90 percent of the primary geothermal energy extracted in the country. Nine power stations convert a proportion of this energy to electricity, which contributes 16 percent of the national electricity supply. Tourism based around geothermal features is also locally important, and pre-Covid, there were approximately 1.4 million visits in the region in 2016 (Luketina, Olubode, and Phillips, 2017). Without careful management, however, extraction of geothermal heat and fluids can cause systems to fail, ground subsidence, and the discharge of toxic chemicals to the environment.

3.5.2 Freshwater

Without water, there is no life; no people; no ‘economy’. The availability of water as an input to production is obviously crucial for land use industries like agriculture, horticulture and forestry, but also for water-based recreation (for example in Taupō and Karapiro). The eight dams of the Waikato River exploit the dependable flow to reliably generate more than 1,000 megawatts (and an average of 4000 gigawatt hours per annum), typically around nine percent of New Zealand’s electricity supply. In effect, *all* industries directly or indirectly rely on freshwater.

The Waikato economy has evolved over time in part thanks to plentiful supplies of water. However, Jenkins and Sung Soo Koh (2022) note that there has been a long-term decline in rainfall and increased rates of potential evapotranspiration leading to lower water balances throughout the region (see table 3-7). This, combined with increasing demand for water means that limits to water allocation are being reached.

Table 3-7: Simple Annual Water Balance Growth¹

Subregion	Annual Water Balance 1992 (mm/y)	Annual Water Balance 2020 (mm/y)	Change 1992-2020
Coromandel	940	521	-45%
Lower Waikato	456	47	-90%
Hauraki	500	87	-83%
Upper Waikato	724	219	-70%
Hamilton-Waipā	873	433	-50%
Westcoast	1103	656	-41%
Taupo	1005	613	-39%

Source: Jenkins and Sung Soo Koh (2022)

¹ This is an indicator of wetness-dryness. Annual Water Balance = Annual Rainfall – Annual Potential Evapotranspiration.

The Waikato Regional Council divides the region’s groundwater resources into three categories: low stress (where less than 10 percent of available water is allocated for use); medium stress (between 10 and 30 percent allocated); and high stress (with more than 30 percent of available water allocated). Around 89 percent of groundwater resources in the region are currently considered to be under low stress, 8 percent under medium stress, and 3 percent high stress.

While access to water is crucial for the economy, *too much* water – in the wrong place or time – can also be a problem. Municipal stormwater systems, flood defences and drainage schemes have been developed to remove an excess supply of water. The region also relies on its water bodies to transport, process and dispose of many waste products. While we often think of our freshwater resources in terms of our rivers and lakes, groundwater makes up a large proportion of the Waikato region’s freshwater resource at any given time.

3.5.3 Coastal and marine

As noted above, Patterson and Cole (2013) consider that the ecosystem services provided by the coastal and marine environment are likely to be worth well above those from terrestrial ecosystems (themselves estimated to be equivalent to 27 percent of GDP).

Marine farming has become an important industry in New Zealand and in the Waikato region in the last few decades. The Coromandel area accounts for 22 percent of New Zealand's oyster farming and 28 percent of mussels (New Zealand Government, 2019). Pambudi and Clough (2017) estimate that aquaculture directly contributes 7.2 percent of Gross Domestic Product for the Thames-Coromandel District (4.5 percent from marine farming and 2.7 percent from processing), or around \$70 million per annum in 2017. Ninety-four percent of this value comes from mussels, with the remaining 6 percent from oysters. Further development, including of finfish farming, can be expected to increase these numbers. Coastal tourism is also locally important for much of the region bordering the Hauraki Gulf, including the Coromandel Peninsula – tourism is estimated to have accounted for nearly 14 percent of Thames-Coromandel District GDP in 2020 (Infometrics Ltd 2022) - and for some west coast centres such as Raglan.

3.5.4 Climate, the economy and the environment

Thanks to its benevolent climate, including plentiful rainfall, the Waikato region has developed a highly productive – but also highly water dependent – agricultural economy. A serious drought in 2007-08 highlighted the vulnerability of the region's land use sector to disruptions to rainfall patterns and prompted various adaptative management practices on the part of land users (for example, relating to stock management and feed security). Since that time, dry periods have become more prevalent, both in terms of frequency and intensity. Because of reliable rainfall, the Waikato region has, historically, not had the need that some other regions have for irrigation. While irrigated land is still relatively small scale, it has increased by 85 percent between 2002 and 2019 to around 19,000ha, primarily for dairy farming (Statistics NZ, 2021).

In addition to the risk of drought, a warming climate may create favourable conditions for invasive species that affect crops, livestock and indigenous biodiversity. Heat stress for stock may also affect animal health. A warmer, higher-energy climate has the potential to result in an increase in the frequency and intensity of extreme events. These may see an increase in flooding risks and test the flood management infrastructure controlled by the Waikato Regional Council. Along the region's coasts, extreme events may result in storm surges (due to very low atmospheric pressure), further exacerbated by sea level rise with serious implications for coastal infrastructure and assets.

As these trends lead to increasing pressure on the region's natural capital, they will also accelerate the need to manage resources through regulation that may limit economic activity. In section 2.3, the importance of improving productivity was recognised in order to increase the yield of benefits per unit of input. However, while increasing productivity is critical, it is not an unqualified path to economic growth. While more efficient technology may reduce the amount of resources needed to produce a unit of something, it may also lead to an *increase in the total demand* for the resource. Originally observed by William Stanley Jevons in the 19th century, who noted that the consumption of coal increased sharply in response to improvements in the efficiency of steam engines, this phenomenon is sometimes known as Jevons' Paradox. Another example is the use of drip-irrigation technologies on the Colorado River. While it is far more efficient than the previously used flood-irrigation methods, it has led to more water being locked up in products (such as fruit), and less returning to the river for use downstream. In essence, improvements in productivity can open up new opportunities for profitable exploitation of natural resources, and regulation will be an important check where such opportunities may undermine the region's natural capital and long-term prosperity.

Where limits have already been reached, it begs the question of how any growth in economic activity can be accommodated. Investment in natural capital – whether through public or private sources – is likely to be necessary, as will adapting our economic activities so they have less impact on natural capital.

4 Fundamental drivers of economic outcomes

So far, this report has focused on the structure of the region’s economy and looked at trends in the classical determinants of growth – labour, capital and technology (as described by Solow, 1957). In this section, the underlying sources of economic prosperity are considered. In particular, Acemoglu (2009) proposes several hypotheses about the characteristics that can explain the differences in prosperity between economies³.

Table 4-1: Fundamental drivers of economic prosperity



4.1 Geography

Acemoglu (2009) describes the influence of geography in terms of factors such as climate and health effects. In this context, the Waikato region has significant advantages of its geography: it has a benign climate which, along with its rich endowment of natural resources has been a major driver of the evolution of the regional economy – particularly the relative importance of primary industries and food production. The location of the region adjacent to New Zealand’s largest regional economy (Auckland) and close to the major international connections of Auckland International Airport, and the Ports of Auckland and Tauranga also represent important opportunities. In a global context, however the Waikato Region – along with the rest of New Zealand – is relatively isolated, and has to overcome the ‘tyranny of distance’ to markets, and the associated costs of transport.

While the geography of the region is not something that can be readily altered, it must certainly be taken into account when considering the best options for the economy. Planning and decision-making about infrastructure (including connections with neighbouring regions – both real and virtual) offer the chance of access to important markets for Waikato products and a larger pool of human capital and sources of investment. The ‘footprint’ of a growing region will, however, increase the pressure on the region’s natural resources, and along with the effects of climate change, points to the need for the economy to adapt so that it does not undermine its own natural capital foundations.

4.2 Culture

This report does not attempt to synthesise a description of the culture of the Waikato Region. ‘Culture’, in this report, refers to beliefs, values and preferences influencing economic behaviour. Following Acemoglu (2009), it is distinct from the institutions of a place in that it is outside the direct control of individuals, and so, like geography is not something that can be readily changed. Nevertheless, two aspects of culture are identified as potentially important determinants of economic outcomes: intertemporal preferences (that is, the willingness of individuals to trade-off different activities or consumption today versus consumption tomorrow); and the degree of cooperation amongst individuals (Acemoglu, 2009).

³ In fact, Acemoglu (2009) also proposes a fourth hypothesised determinant of economic prosperity: Luck. In one sense, luck can be seen to work through the other factors – luck with geography, or lucky choices in establishing institutions, for example. Luck *per se* is not something that can be achieved through the actions of public or private decision-making, and so while it can be hoped for, it is not covered further in this report.

Nevertheless, it is worth noting that decisions about investments in infrastructure, natural capital, and social services such as health and education all demand consideration of whether to consume or invest now, and to be able to consume less or more in future respectively. Trade-offs should not only be considered in terms of current actions (what must be given up *now* to do/have something now), but also in terms of the future (what must be given up *in future* to do something now). Such choices are made more difficult by uncertainty, and efforts to clearly define the consumption/investment trade-off problem, and to reduce inherent uncertainty, will help make better decisions.

The degree of cooperation in an economy enables activities to be coordinated, which in turn, allows the gains from specialisation and trade, and economies of scale to be harnessed. A cooperative approach may be facilitated by the nature and quality of institutions.

4.3 Institutions

A society's institutions can be thought of as '*...the rules of the game...or, more formally, the humanly devised constraints that shape human interaction...[and that]...structure incentives in human exchange*' (North, 1990). As such, they can be seen as fundamentally constraining and/or enabling the behaviours and choices that collectively make up 'the economy'. Institutions are broader than 'organisations', and include the system of laws, courts and government, structure of property rights and the presence of (well or ill) functioning markets. They determine the allocation of resources and the way in which returns to (physical, human and natural) capital are shared. As Acemoglu (2009) notes, "*[s]ome ways of organising societies encourage people to innovate, to take risks, to save for the future, to find better ways of doing things, to learn and educate themselves, to solve problems of collective action and to provide public goods. Others do not.*"

Many of the institutions that determine economic success sit with central government, and again, are difficult to affect at a local level. But local institutions, including iwi and iwi organisations; the private sector and its organisations; non-government organisations and trusts; community groups; and local government *are* important. In the case of local government, its implementation of councils' statutory functions under the Local Government Act 2002 and other legislation is a key institution. The regional council's role in ensuring the sustainable management of natural resources is a critical to maintaining the economic base of the region. Territorial authorities fundamentally affect local economies through their planning and investment activities. The role of local government in infrastructure and service provision is also key to regional prosperity.

A detailed assessment of the institutions of the Waikato Region is beyond the scope of this report, although it is noted that this matter will be of critical importance to future planning and strategic direction for the region.

5 Conclusion

The Waikato Region is endowed with a wealth of resources, both natural and human. Based on these, the region's economy has evolved with a strong primary sector and associated food manufacturing, which form an important part of New Zealand's export revenue generating activity. But while the economy has grown steadily so far this century, this has largely reflected a growing population; economic activity per person has been sluggish. Identifying the reasons for this and addressing them, represents a real opportunity for the region in two ways. First, there is the opportunity to increase per capita incomes, and so creates the possibility of increased prosperity in the region. Second, this will lead to more efficient use of resources; for example, where the region faces constraints in the use of natural resources (to preserve the productive foundations of the economy), higher productivity means making better use of the resources that are available.

The natural capital base of the region is the foundation upon which the economy is built. But as the region's population and economy grow, and the effects of climate change manifest, pressure on these resources will intensify. Regulatory decisions about resource use are often based on the idea of trade-offs between the economy and the environment – but arguably this mis-specifies the issue. If economic activity is a function of the environment (among other things) then economic activity *now* that reduces natural capital will reduce the capacity for economic activity in the *future*.

The stewardship of these natural resources under the Resource Management Act 1991 has had mixed success, and this has led to work by central government to develop new legislation to manage natural resources. While the region will have little influence in how this new legislation is drafted (beyond lobbying of central government and select committees), it will be intimately involved in implementing it and so will have a central role in maintaining the region's natural capital base. Getting this right will be crucial to achieving economic prosperity in the coming years.

While the region is known for its primary industries, especially dairying, it is important to recognise that the economy is very diverse, and that there are very different 'economies' in different parts of the region. A balance is required between a consistent approach to economic development across the region and ensuring that local differences are recognised and accounted for.

This report has provided a description of the Waikato region's economy. It does not aim to determine a pathway to prosperity to the region but does provide a potential starting point for such an exercise. In characterising the state and trends of the regional economy, several key opportunities and issues can be identified. The rising power of the Māori economy, an advantageous location, and diverse industries across the region can be real strengths for the region to leverage. Challenges are also clear: economic outcomes for many are poor; productivity is stagnant; our institutions may need to adapt to maintain our economic foundations, especially as external circumstances change. These problems are challenging, although not insurmountable, and prosperity is not found by avoiding problems, but by solving them.

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