

Agriculture

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Providing you with a better understanding of the different components of the Manawatu region economy and the contribution each sector makes to the demographic and economic growth of the region.

Image courtesy of John Brock





Contents

Executive Summary	2
Sinclair Story	5
Definition	8
Humphreys Story	12
Measuring the Economic Impact of the Agriculture, Forestry and Fishing Sector	15
Estimating Economic Impacts	20
Indirect Economic Contribution	24
The Future Growth Outlook	29
Regional Growth	37
Constraints to Growth	38
Diversification and Intensification	42

Executive Summary

The agriculture, forestry and fishing sector comprises of enterprises mainly engaged in growing crops, raising animals, growing and harvesting timber, and harvesting fish and other animals from farms or their natural habitats. It also includes support services which include aerial topdressing, artificial insemination services, crop harvesting, and wool classing.

Agriculture is the most significant part of the groupings in the agriculture, forestry and fishing sector. In June 2007 the Manawatu region had 221,900 hectares of agricultural land, 1.5% of total agricultural land in New Zealand. Agricultural land, predominantly grassland, accounted for 75% of the total land in the Manawatu region. Agricultural land in the Manawatu region declined by 9,900 hectares between 2002 and 2007, a decline of 4.2%, this was a slower rate of decline than the national change of 5.7%. Production wise, in 2007 the Manawatu had 2.5% of the national dairy herd, 2.8% of the national beef herd and 2.6% of the national sheep flock. Of note is the strong growth in the number of employees in the regional dairy sector up 65% from February 2000 to February 2011.

The agriculture, forestry and fishing sector is important to the Manawatu region, contributing a significant amount of its economic activity and wealth. In 2006 the sector accounted for 7.3% of the total workforce in the Manawatu region, with a workforce of 3,651 people. Average earnings from salaries, wages and self-employment in the Manawatu region agricultural sector over the period from 2000 to 2010 were \$91.8 million, a 4.5% share of total average incomes in the region for this period. Economic importance is usually defined by the number of jobs created and the value of salaries and wages. Agriculture, however, is characterised by a large number of small businesses with few or no employees and a large proportion of income generated through self-employment. Income measures are more useful for industries such as the agriculture sector, but a further challenge in this sector is income volatility as it is an industry dependent on uncontrollable factors such as climate.

The agriculture, forestry and fishing sector comprises of enterprises mainly engaged in growing crops, raising animals, growing and harvesting timber, and harvesting fish and other animals from farms or their natural habitats.

Estimates for the contribution of the sector to regional economic activity or gross domestic product (GDP) suggest it had a direct economic contribution of \$268 million in 2011 and an indirect economic contribution of \$80 million, giving a total estimated GDP contribution of \$348 million. The GDP estimates suggest agriculture accounts for 25% of Manawatu District GDP and 1.5% of Palmerston North City GDP.

Measuring the agriculture sector's economic impact is also made complicated because there are different ways of defining the sector. This is not only in terms of regional boundaries and the movement of economic impacts across these, but also in the linkages between agriculture and other industries. There are clear linkages between producers and the processors of agriculture product in the manufacturing sector and companies in the distribution and wholesale sector that distribute fresh products to manufacturers and consumers. Estimating this wider impact of the agricultural, forestry and fishing sector is difficult since parts of the manufacturing sector process imported products as well as locally grown produce.

Once the agriculture sector is broken down further it becomes easier to identify economic impacts. For the dairy industry in 2011/12 there was a return of \$319,519 per herd (before tax). Data for sheep and beef farming is slightly harder to analyse as it comprises more products. In 2011/12 national sheep and beef farm revenue was approximated at \$213,841 (before tax). However profit for local farms does not equal revenue for the region- it is dependent on how much of their costs were spent locally, and how much of the nation's costs were spent in the Manawatu.

For example, there are industries in the region that service agriculture nationwide, including C-Dax, Stallion Plastics, Farmworks, and AllFlex. Often the differences between local and national costs are not clear cut. For example in animal health, vets' time is a local cost, but the drugs they use are a national cost.

Economic impacts can be estimated using economic multipliers. These are a statistical tool used to measure the flow-on economic impacts of a sector. They allow an estimate to be made for the direct, indirect, and induced effects of one additional unit of final demand in a particular industry on the entire economy.

In 2004 the New Zealand Institute of Economic Research (NZIER) produced a report for the Palmerston North City Council to identify the value of the multiplier for each sector in the Palmerston North City economy. These values have then been weighted in accordance with the sectors contribution to employment within the region. The report approximates that the extra income multiplier value for the agriculture sector is 0.297. This suggests that for a \$1 million increase in agriculture sector incomes, there is an expected \$0.297 million additional increase in the overall income in the Manawatu region. Within the agriculture sector the multipliers are likely to differ between, for example dairy and forestry. However further analysis of this is constrained due to limited data available of individual sub-sectors within agriculture.

The key issues for the agriculture, forestry and fishing sector are international supply and demand. This impacts the returns for agriculture businesses; these are often volatile. This sector is also impacted by factors outside of the sectors control; this includes weather and land characteristics. Within the Manawatu region these issues have driven annual incomes for the agriculture sector between 2000 and 2010 ranging from a high of \$134 million in the year to June 2002 to a low of \$70.3 million in the year to June 2007. It has also contributed to trends including the level of conversion to dairy farms, and various other methods of diversification and intensification (including agriculture tourism, rural-urban subdivision and off farm secondary incomes).

It is important to note that agriculture land has transferability of use. While this may be on a long time scale, land use trends can be seen; examples are the current shift from sheep and beef to dairy

The agriculture, forestry and fishing sector has many indirect economic impacts. These include impacts and linkages with the research and development sector, transportation systems, environmental issues and real estate.

As a region the Manawatu is facing a potential impact on the agriculture sector in the form of the Horizons Regional Council One Plan. This is a policy that has a potentially large impact on farming practices and the farming landscape within this region.

Agriculture production is reliant on the international trade situation because the majority of New Zealand's agriculture products are destined for export. In 2011 New Zealand had 2% of total world production in cow milk, 1% of the world beef production and 5.8% of the world sheep meat production. The strong New Zealand dollar has depressed export values for agriculture products. The debt crisis in the European Union (EU) has also been lowering demand for New Zealand's primary products. Growth in the agriculture sector for New Zealand therefore rests on the degree to which the other important New Zealand trading partners' economies can remain buoyant. A good growing season contributed to increased grass production in the 2011/12 season. Dairy production in 2011/12 was 1.7 million tonnes, up 11.4% from 2010/11. Dairy export revenue increased by 3.5% to \$13,659 million for the year ended June 2012. Beef production was down 1.8% for the year ended June 2012, reflecting lower beef cattle inventories. For the year ended June 2012 export beef volumes decreased 1.1% and export value decreased by 1.3%. Lamb production was up 5.9% due to increased lambing numbers and increased average carcass weight. Export volumes of lamb decreased 3.1% and export value decreased by 5.2%. Wool export value has increased 6.3% due to an increase in price and volume.

MPI expects export revenues from the primary industries to fall in the year to 30 June 2013 due to falling product prices and beyond then to increase with gradually rising prices for many products.

It is important to note that agriculture land has transferability of use. While this may be on a long time scale, land use trends can be seen; examples are the current shift from sheep and beef to dairy. While reasons are not clear cut, trends in a price taking country like New Zealand are often influenced in particular by global prices, which are in turn influenced by supply and demand. Another key influencing factor is Government policy, for example policies on agriculture emissions and biosecurity. Monitoring these land use changes is therefore important for local authorities such as Palmerston North City Council and Manawatu District Council so the best strategies can be made for the future of the region.



Sinclair Story by Jon Morgan 3/2012

To be named regional sharemilker of the year should be the pinnacle of attainment for any young dairy farmer. But Richard Sinclair can be excused for being slightly underwhelmed when he was named the local winner at a dinner in Palmerston North.

"This is the second-best thing to have happened to me today," he told the diners when he got up to accept the award.

He explained that wife Christine, very much an equal partner in their five-year-old dairying business, had delivered their second daughter earlier that day.

Asked what the audience's response to that news was, Mrs Sinclair, now back home with two-week-old Isabelle, chimes in with, "They went 'Awww!'"

But her husband can't recall. "They might have," he says. "The whole night went by in a bit of a daze."

He remembers how he answered one question by the MC of the evening because he has some of the answer written down. The note is now much folded and crumpled, but still legible.

The question was: What is so great about the dairy industry?

In reply he asked everyone present to turn and look at the person next to them. "You are what is great about this industry," he told them.

Then, referring to his notes – "I had something prepared, just in case" – he added: "It's great to be able to set clear and concise goals of where you want to be. The best part is that to achieve these goals you have all the support and help you can get from industry experts and fellow farmers alike."

Back on the farm with wife and baby, and two-year-old Emily – the day of the awards dinner was her birthday too, just to add to the confusion – he says he is glad he got a chance to say how much he appreciates the industry's inherently co-operative nature.

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He explained that wife Christine, very much an equal partner in their five-year-old dairying business, had delivered their second daughter earlier that day.

"It means your pathway of advancement is planned out ahead, but it's not there on a plate for you – you have to work hard for it. It's exciting and ever-evolving."

Entering the awards, which this year for the first time were open not just for sharemilkers but also for equity partners, has tapped into an extra level of support, the couple say.

"We've had phone calls and emails from people asking, 'Do you need a hand?'. Previous winners have rung offering to help us with the business section of the awards," Mrs Sinclair, who looks after the business's books, says.

The offers have come from their bank manager and accountant, but also from other dairy industry experts involved in such aspects as animal health, pasture production and milking plant efficiency.

They are grateful for all the help. "It means you have an outside eye looking in that might spot something that isn't obvious to you," Mr Sinclair says.

The awards are designed to encourage and lift the performances of recent entrants to the industry. Judging is by experienced farmers and advisers, who probe contestants' skills and knowledge of their business' finances, record keeping, staff management, plant hygiene, farm health and safety, environmental stewardship, pasture and milk production and leadership.

A farm manager of the year and a dairy trainee of the year are also recognised and the regional winners go into a contest to find a national winner, this year being held in Queenstown on May 14.

Mr Sinclair, 32, is a Pahiatua sheep and beef farmer's son whose first taste of dairying was as a relief milker on a nearby farm while at school. On leaving school he entered the army's officer cadet scheme and over the next five years lived at Waiouru and Linton, rising to be a signals corps lieutenant.

When his next posting was to be to a staff job, he decided it was time to leave. "I didn't look forward to sitting in an office all day."

By then, he had met Christine, a qualified chef who was the daughter of dairy farmers, and they decided to go dairying. "I wanted to work outdoors and remembered back to my relief milking days and how I had enjoyed working with the cows.

"There's a nice feeling of fulfillment about dairying, through calving and milking the cows and immediately seeing the reward for your work in the amount of milk in the vat."

He invested his army superannuation in a rental property and started work for Andrew Hoggard at Kiwitea, while Mrs Sinclair worked in the Land Transport NZ call centre in Palmerston North.

Two years later, with the basics well understood, he moved to be a herd manager on David and Linda Last's 500-cow farm at Kumeroa, where he had relief-milked as a teenager. It was also where he got his first taste of the awards when he won the Lower North Island dairy trainee of the year title.

Christine kept her job in the city but worked on the farm at weekends and holidays and the couple stayed there for three seasons, steadily increasing milk production each year.

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Then Mrs Sinclair's parents, David and Elizabeth Mills, asked them to come to their 400-cow, 165ha, farm on Makino Rd, near Feilding. They are now in their second season of lower-order sharemilking – receiving 25 per cent of the payout, from which they pay two full-time staff and relief milkers.

They say the common theme of these jobs has been the help readily offered by the people they have worked for. "Everyone is only too happy to answer our questions and to offer advice," Mrs Sinclair says. "I would say we've been lucky, but then this is common in the industry."

At Makino Rd, they have split calving between spring and autumn and are milking 100 cows through winter to protect pastures made sodden by spring rains. Previously, the herd, all spring-calvers, would trample much of the spring growth into the wet fields. Now the winter milkers keep pastures down in June and July so damage is reduced later.

The farm is 70 per cent rolling country and 30 per cent steep hills of heavy Manawatu clay. In winter it is prone to southerlies and rain and in summer to drying westerlies.

"We have learnt a lot about pasture management in the past two years," Mr Sinclair says. "We feel that as lower order sharemilkers our main role is to look after the pastures as best we can."

This year, the autumn weather has been kind to them and milking is going well. Production is expected to reach 135,000kg of milksolids from a peak of 420 cows, up from last year's 124,500kg from 390 cows. The introduction of in-shed feeding has also helped.

Their two staff, both young farmers on the lower rungs of the industry ladder, are important assets, reliable and trustworthy, Mr Sinclair says. Danielle Bennett, 20, is on her second fulltime job and Anthony Rastron, 19, has just begun fulltime work after being a relief milker.

Mr Sinclair's officer training has made him comfortable dealing with staff. He says the army was certainly no waste of time. "It helped with the work ethic of being proud of what you do. There's no doubt about it – it has set me up for life. I'd recommend anyone to give the army a go."

Their goal is to be half-owners with Mr and Mrs Mills of the farm and herd by 2016. Already, in five years, they have built assets of \$500,000, in two rental houses, cows and Fonterra shares.

"We are working hard on growing our personal equity," Mrs Sinclair says. "The awards competition has helped us a lot with that. It is what the competition is all about – really focusing on your business, deciding where you want to go and laying out a plan on how to get there."

An equity partnership is more attractive than the more usual next move of 50-50 sharemilking. "It ties us into the family farm and suits us. We want to stay here," she says.

"We're not your traditional sharemilkers who want to move onto something bigger every few years. Our 'bigger' is here."

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Definition

The Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 is a joint classification system designed by the Australian Bureau of Statistics and Statistics New Zealand to improve the comparability of industry statistics between the two countries, and with the rest of the world. This system defines agriculture, forestry and fishing as; enterprises mainly engaged in growing crops, raising animals, growing and harvesting timber, and harvesting fish and other animals from farms or their natural habitats. Support services which are classified in the agriculture, forestry and fishing production sector include aerial topdressing, artificial insemination services, herd testing, crop harvesting, fruit or vegetable picking, hay or silage baling or pressing, shearing services, and wool classing.

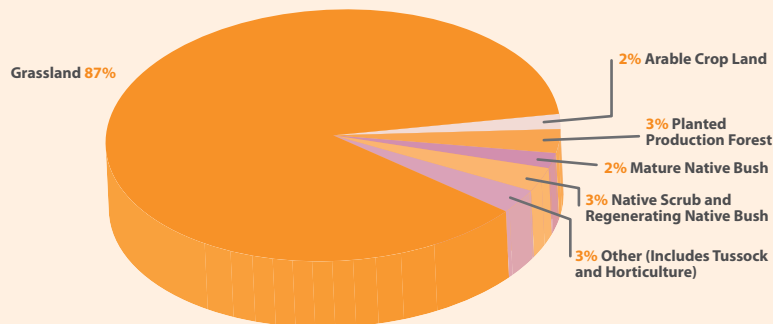
However there is still more to this definition, for example meat, and dairy product processing should, by definition, come under the manufacturing sector, yet there is a blurring of boundaries here as one sector cannot operate without the other, and often economic impacts cross these boundaries.

In an attempt at clarification, the agriculture, forestry and fishing sector can be further described in four key sections;

1) Agriculture land and production

The term agriculture is defined as encompassing both the growing and cultivation of horticulture and other crops (excluding forestry), and the controlled breeding, raising or farming of animals (excluding aquaculture). Agricultural areas are subject to a census every five years, with the last census held in 2007, and at the time of writing this report the results of the 2012 one had yet to be published. In June 2007 the Manawatu region had 221,900 hectares of agricultural land, 1.5% of total agricultural land in New Zealand. Agricultural land accounted for 75% of the total land in the Manawatu region. The predominant use of agricultural land was for grassland, which accounted for 194,000 hectares, 2.4% of total grassland in the New Zealand. There were 6,900 hectares of land in production forest (0.4% of the national total) and 10,100 hectares in mature native bush, native scrub and regenerating native bush (1.0% share). Arable crop land, fodder crop land and fallow land accounted for a further 5,300 hectares (1.5% share of the national total). The distribution of agriculture land in the Manawatu region is shown in Figure 1. Agricultural land in the Manawatu region declined by 9,900 hectares between 2002 and 2007, a decline of 4.2%, which was a slower rate of decline than the national change of 5.7%. This decline in agriculture land nationally and in the Manawatu region reflects residential and commercial property expansion into agricultural areas and other removal of agricultural land from any form of production. These trends however can vary based on different local by-laws as the Manawatu region includes Palmerston North City and Manawatu District authorities.

Figure 1: Agriculture Usage in the Manawatu Region (2007)
Area (hectares)

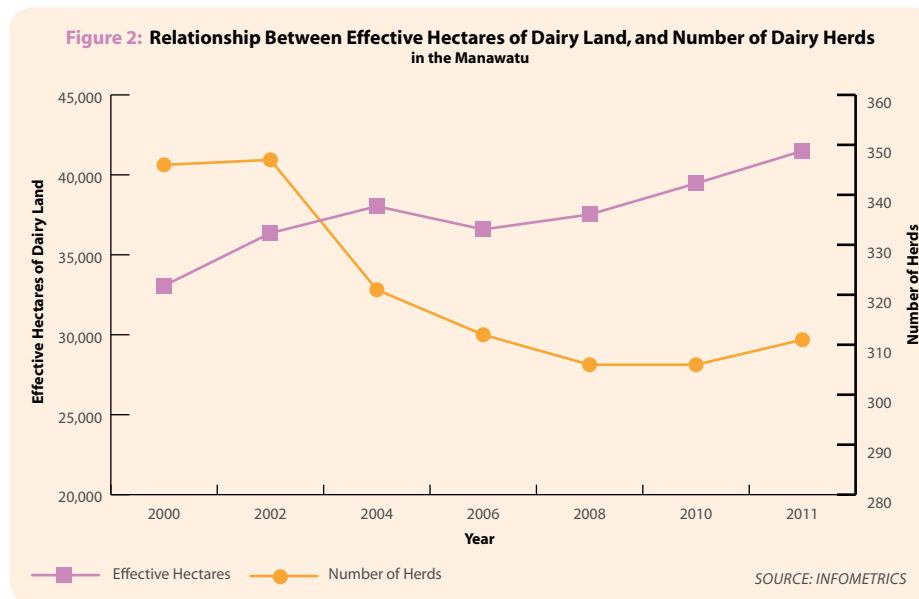


SOURCE: AGRICULTURE CENSUS 2007

New Zealand's pastoral landscape is becoming more dynamic and sophisticated, with greater movement of animals between properties and the boundaries between sheep, beef and dairy farms becoming increasingly blurred. Nationally the total area of improved pasture dropped by about 160,000 hectares between 2002 and 2009. It is likely that this reflects a mixture of urban and peri-urban (areas approximately 20 km from an urban location, Feilding or Palmerston North City) development, as well as land going into forestry, conservation, horticulture and arable farming. The precise distribution of these cannot be determined from available data.

The significant scale of grassland production in the region is reflected in its share of national livestock numbers. In the Manawatu region in 2007 there were 129,000 dairy cattle (2.5% of the national dairy herd), 123,041 beef cattle (2.8% of the national beef herd) and 982,297 sheep (2.6% of the national sheep flock).

Infometrics and LIC (Livestock Improvement Corporation) data annual estimates for dairy cow numbers suggest there was an approximate 20% increase in dairy cow numbers in the region between 1999/00 and 2010/11, with nearly 19,000 more dairy cows in 2010/11 than in 1999/00. However, despite this increase in dairy cow numbers the number of herds is estimated to have declined from 346 to 311 over this period, reflecting an increase in average herd size in the region from 269 cows in 1999/00 to 359 cows in 2010/11. National average dairy herd size has increased more dramatically from 236 cows in 1999/00 to 325 cows in 2010/11. The number of cows per hectare is still relatively low in the Manawatu region at 2.69, while the New Zealand average is 2.76, showing that dairy production is not as intensive in the Manawatu region compared with other regions in New Zealand. The relationship between the effective hectares of dairy land and the number of dairy herds in the Manawatu region is shown in Figure 2.



This growth in herd size is reflected in strong growth in the number of employees in the dairy sector, with the number of jobs in the region for dairy cattle farming increasing from 395 in February 2000 to 615 jobs in February 2011 (a 65% increase). The number of effective hectares has increased by 25% during this same period. This shows that the number of jobs in dairy farming has increased at a faster rate than dairy farm area.

The number of employees involved in sheep and beef farming of various types has declined by 8% between 2000 and 2010 (from 480 to 440). Consolidation of farm holdings has also occurred in the sheep and beef sector but the annual business numbers also show a change from specialist sheep farms to sheep and beef farming. There was also a small decline in the number of specialist beef and deer farms. Sheep and beef farms continue to be the dominant agriculture land use in New Zealand and in the Manawatu region. The Agriculture Census in 2007 breaks farms into types and recorded 300 dairy farms in the Manawatu region, compared with 1,089 sheep and beef farms (including specialist sheep or beef farms). The average effective hectares for a dairy farm in the Manawatu is 132 hectares. This leads to an approximate total of 18% of the agriculture land in the Manawatu region (including Palmerston North) being allocated to dairy. The equivalent of this data for sheep and beef farming is not available but in the Manawatu district 51% of agriculture land area is used for sheep and beef farming and 19% used for dairy. In the North Island 35% is used for sheep and beef and dairy is 23% (2007). The decline in sheep and beef farming in terms of land area and animal numbers may also reflect the particular impact of extreme weather events on this sector from 2002 to 2009.

The expansion of dairy and dairy support, as well as land going into forestry, conservation, and lifestyle subdivisions, has reduced the area of sheep, beef and deer farming over the last decade. Data from the Ministry for Primary Industries (MPI) shows that nationally sheep and beef farms have reduced the number of animals per hectare between 2002 and 2009 (sheep per hectare decreased by approximately 11% while beef cattle per hectare decreased by 8%). National annual beef and lamb production each declined (by about 7%) over this same period, as did the estimated land area used for sheep and beef farming. However, because animal numbers have dropped faster than production, production per animal has effectively increased. In dairy farming, by contrast, animals per hectare have gone up by 5% over the same period. Dairying has also increased annual production by about 19% (milk solids); however between 2002 and 2009 the MPI estimates the land used for dairying to have increased by 6%, so it is harder to draw conclusions about production per hectare and production per animal.

Changing management practices on dairy farms are also having an impact on the management of sheep-beef properties, with the development of dairy support activities. Data shows that nationally sheep-beef properties support increasing numbers of dairy cows, for example, winter grazing or rearing replacement heifers (between 2002 and 2009, the number of total dairy cows being run on sheep-beef properties increased by 44%). It is also likely that the expansion of dairy and dairy support has occurred on better quality, typically flatter, land, effectively pushing sheep-beef farming onto harder land on which achieving higher production may be more challenging.

Production data for the region is limited because much of the data for the agricultural area within the Palmerston North City boundary is suppressed for confidentiality reasons due to the small number of producers based within the City boundary. Data which is available for the region for 2007 includes maize production (4,894 tonnes; 2.6% of the national total), wheat (2,136 tonnes; 0.6% of the national total) and barley (5,359 tonnes in Manawatu District (Palmerston North data is confidential)).

2) Horticulture

While defined as part of agriculture, horticulture can be described on its own as it is quite different from the other part of agriculture, that of growing and farming animals. Horticulture can be defined as the practices of growing and cultivating fruit, vegetables, flowers and ornamental plants. The Agriculture Census (2007) records 99 farms in the Manawatu region as involved specifically in the business of horticulture. While for confidentiality reasons the census does not show this as an individual area, as a share of agriculture land in the region horticulture and tussock used for grazing represent 3% (as shown previously in Figure 1). The 2002 Agriculture Census showed 1,210 hectares of land in horticulture. The number of employees in horticulture has declined slightly between 2000 (377 employees) and 2010 (367 employees), there was a high in 2002 of 451 employees. Horticulture in the Manawatu region is supported by institutions such as Plant and Food Research.

3) Forestry

Often tied in with agriculture, fishing and mining in published data, forestry as an individual entity is a small part of the economic make-up of the Manawatu region. Forestry and logging activities include growing, maintaining and harvesting forests, as well as gathering forest products. In 2000 the forestry and logging, and forestry support services employed 3.4% of the total employees in the agriculture sector. This was relatively stable through to 2005 where it began to decrease to only 1.8% of the total employee count in 2010. The 2007 Agriculture Census determined there was 1,518 hectares of land in Palmerston North planted in production forest. In the wider Manawatu region this increased to 6,900 hectares, equating to only a 0.4% share of New Zealand's total planted production forests. There is still strong export demand for logs and timber from New Zealand (\$4.26 billion in export revenue for the year ending June 2012); even though exports to China have slowed, Japan and the US are expected to increase their demand. The Manawatu region has not benefited from this growth due to soils and land being better suited to more intensive production uses, such as dairying. In the Manawatu-Wanganui region only 331 hectares of new forest was planted according to the 2007 Census.

The Manawatu region has relatively flat land, but also steep gullies. As environmental issues such as land erosion receive increased awareness, there is a push for the re-planting, and retirement from grazing, of erosion prone land. This shows that there is a potential in the region for increased forestry. There are, on average, smaller pockets of this potential forestry land here than in other regions, which could mean the potential for more of a researched-based approach to forestry; for example, trying different tree species, especially with the influence of local research and development organisations including Landcare.

4) Fishing

Aquaculture refers to the controlled breeding, raising or farming of fish, molluscs and crustaceans and fishing refers to catching marine life such as fish or shellfish, from their uncontrolled natural environments in water. Fishing and aquaculture, as part of the agriculture sector in the Manawatu region, does not have a marked impact in terms of an economic contribution, primarily due to location factors. There have been no employees recorded in the fishing and aquaculture industry in the Manawatu region from 2000 to 2009 in the Annual Enterprise Survey. In 2010 there were six recorded employees under the heading 'other fishing' in the same survey. This heading includes activities such as paua fishing, and marine water fishery product gathering. There are employees under the label 'other agriculture and fishing support services' (215 employees in 2010), however, this number does not differentiate in which industries these employees are located, and includes agriculture related sub groups such as aerial crop spraying and wool classing. ANZSIC 06 defines only two sub-groups related to fishing under this heading; aquaculture support services, and fishing support services. One could therefore conclude that the majority of these employees are located in businesses related to agriculture.



Humphreys Story _____ by Jon Morgan 10/2009

The leaden rainclouds have departed, leaving behind swollen streams, boggy fields and soaked washing. A new onslaught is assembling on the western horizon, but, just for a moment, a weak sunlit haze hangs over Ross and Wendy Humphrey's Kiwitea farm and imparts an ethereal glow on a small mob of romney rams.

Mr Humphrey, embroiled in a lifelong search for the perfect ram – an endeavour with constantly shifting boundaries marked by market demand and scientific breakthroughs – could justifiably regard the briefly idyllic scene as a heaven-sent blessing from the sheep breeding gods.

But his appreciation is expressed in more earthy tones. "Look at the bum on that one there," he exclaims proudly. It is Brookfield 214/05, as close to perfection as a ram breeder can wish. Mr Humphrey grins broadly and holds his hands a metre apart. "His arse is so big he gets stuck in the race."

He can be forgiven the slight exaggeration. There's no doubting 214's capabilities. He has a broad chest and deep torso and, yes, a very big rump. These are the parts that supply the meat cuts the European lamb connoisseur demands. And he has the erect, proud head and steadfast gaze of a ram that has supreme confidence in his abilities – a trait that breeders of all stud animals rate highest of all.

His companions are no less impressive. They are the cream of the Humphreys' crop of romney rams, the product of almost a century of concentrated breeding on two Manawatu farms.

For most of that time, they were chosen on their looks alone to be the sires of useful commercial sheep. But the introduction of breeding values that measure fertility, survivability and growth has changed that. Looks are still important, but the numbers show if they can live up to that promise.

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The Humphreys are on a constant search to improve the quality of their rams. It led them 10 years ago to form the Trigg group with five other Manawatu romney breeders and to undertake an expensive programme of discovering which of their rams produced lambs with the most valuable meat cuts. It meant cutting, weighing and putting monetary values on every piece of meat, bone and fat, a time-consuming, messy business overseen by scientists.

From the results, the breeders' best meat-producing rams were discovered and shared around their flocks. It has allowed them to make big leaps in breeding with the use of rams such as 214, who has passed his traits onto his progeny.

As a further check, Mr Humphrey sent semen from 214 to be used in the prestigious Central Progeny Trials that measure ram performance from a variety of breeds and composites. The ram was this year rated second in eye muscle area, an indication of meat value, and scored highly in weaning weight and internal parasite resistance. He also, surprisingly, featured among the top rams for facial eczema tolerance, a characteristic he had not been specially bred for.

This is a valuable marketing tool for Mr Humphrey. "I just have to show my clients this book," he says, his hand on the CPT report, "and it's 'Holy Toledo!' They walk away happy."

However, his stud flock is now too concentrated on 214 and his sons and needs new blood. But not just any blood – it has to be of the highest quality. After giving the problem some thought he came up with an original idea. He approached Gladstone romney breeder Malcolm Wyeth, who has the top-ranked ram for weaning growth and autumn weight across 50 sires in a multi-flock evaluation, and proposed a swap. For one season, he will give Mr Wyeth 214 and will get in return his top ram.

"I'm very lucky to have talked him into giving away his best sheep," Mr Humphrey says. "He has a massive arse – the ram, not Malcolm," he adds with a grin.

Ever on the lookout for ways to improve the stud, he has come up with another plan – one that he thinks has not been tried in this way before. It means a radical change to the way he has farmed.

He has made a deal with Taihape hill country farmers Mike and Vicki Cottrell to take his stud ewe flock. The 800 ewes were trucked up to the Omatane farm earlier this year into the tail end of a drought but he says they have coped well. "The only steep hills these ewes had seen had been on the horizon so they have had to adjust to a lot more walking to get their feed. But the spring has been kind and lamb survival has been good."

Under the deal, Mr Humphrey chooses which ram mates with which ewe. Mr Cottrell looks after the ewes, raises the lambs, and does the tagging, docking and shearing. Mr Humphrey then returns for culling. He buys all the lambs from Mr Cottrell and takes them back to his Kiwitea farm.

At Kiwitea, the selected ram lambs, which arrive back as hoggets, spend a winter on a hill country lease block before their sale to clients. The culls are fattened for the works. The ewe lambs are mated as hoggets and, after their lambs are weaned, are sent as two-tooths back to Omatane.

The deal has been balanced to ensure no-one benefits at the expense of the other. Mr Cottrell has a guaranteed income from Mr Humphrey and has the wool cheque, such as it is. For Mr Humphrey, an advantage is that he has now cleared room on his farm to raise more cattle, though he jokes that with beef prices in a slump his timing has been poor.

This is a valuable marketing tool for Mr Humphrey. "I just have to show my clients this book," he says, his hand on the CPT report, "and it's 'Holy Toledo!' They walk away happy."

He has a couple of reasons for the move. One is his health. He admits only to being over 50 but has an arthritic knee that gets knocked about by sheep hurtling down the races. The other is a wish to expand his client base. His ram clients - almost all from the central North Island hill country - are mainly middle-aged and he figures that if he wants to attract younger buyers he should provide rams from a commercial hill country farm.

The most interesting aspect of the deal for people outside the rural sector is that neither of the farmers knew each other and that it has all been based on trust, sealed by only a handshake.

They were put in touch through their mutual bank manager, Greg Blackwood of BNZ, and instantly struck up a rapport. Mr Humphrey says Mr Blackwood's opinion that Mr Cottrell was an extremely conscientious farmer was confirmed in a trip around his farm. "I could see he was an excellent pasture manager and very good stockman."

Mr Cottrell says he recognised a fellow sheep enthusiast. "I was a bit hesitant at first because with a stud flock I knew there would be extra work and everything would have to be done 'just right'. But I could see Ross was someone I could work with and who had similar aims and aspirations."

An added attraction was that after the drought he was looking to restock and this allowed him to do so without a capital cost. "It has a lot of pluses and not too many minuses," he says. "We're going to look at problems as something to be solved, not as a hindrance."

Mr Humphrey admits that handing over the source of his livelihood to someone he has just met sounds "bizarre". "But it is not a gamble, or a risk, it is calculated. We've both made a commitment to make it work."

For Mr Cottrell, there's extra intrigue in the chance to compare his Rissington Breedline highlander composites with the stud romneys. If the deal proves to be a winner he could give more room to an expanded romney flock, increasing the pool Mr Humphrey will have to choose from.

For Mr Humphrey, there's always the hope another big-bottomed, high-performing 214 will be found. And there's a big chance of that. Before this year's lamb crop, 214 had produced 509 progeny and has seven sons competing with him to top the stud's rankings.

As the lowering clouds deliver their first raindrops, Mr Humphrey takes one last look at his "big boys". "I just love breeding sheep," he says. "You're never finished and you're never satisfied. It's damned hard, with more disappointments than successes, but when things do go right you know it's all been worthwhile."

Mr Cottrell says he recognised a fellow sheep enthusiast. "I was a bit hesitant at first because with a stud flock I knew there would be extra work and everything would have to be done 'just right'. But I could see Ross was someone I could work with and who had similar aims and aspirations."

Measuring the Economic Impact of the Agriculture, Forestry and Fishing Sector

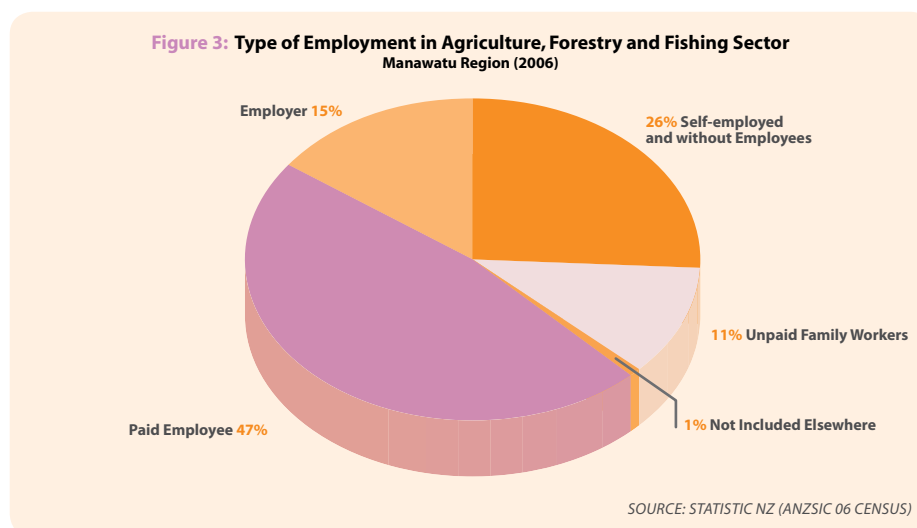
A major challenge in estimating the economic impact of the agriculture, forestry and fishing sector is that the structure of the sector is different from other sectors, where the economic importance is usually defined by the number of jobs created and the value of salaries and wages. Agriculture is characterised by a large number of small businesses with few or no employees and a large proportion of income generated through self-employment.

Income measures are more useful for representing the importance of sectors where income from self-employment is a significant contributor to total income, such as the agriculture sector, but a further challenge in this sector is the volatility of incomes from year to year.

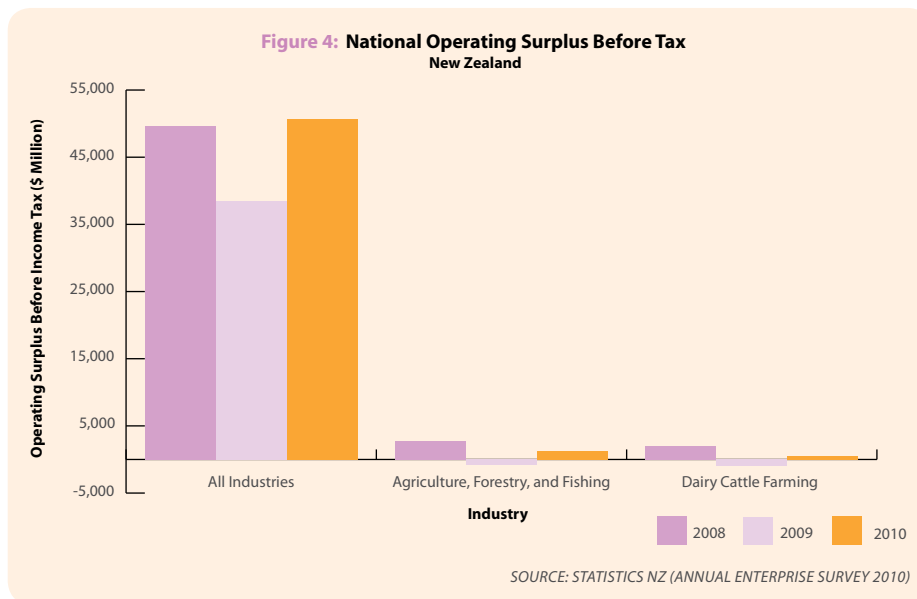
To analyse the economic contribution of the agriculture, forestry and fishing sector it is beneficial to further divide the sector into key industry groupings. One way of dividing this sector is as follows:

1) Agriculture, Forestry and Fishing Production

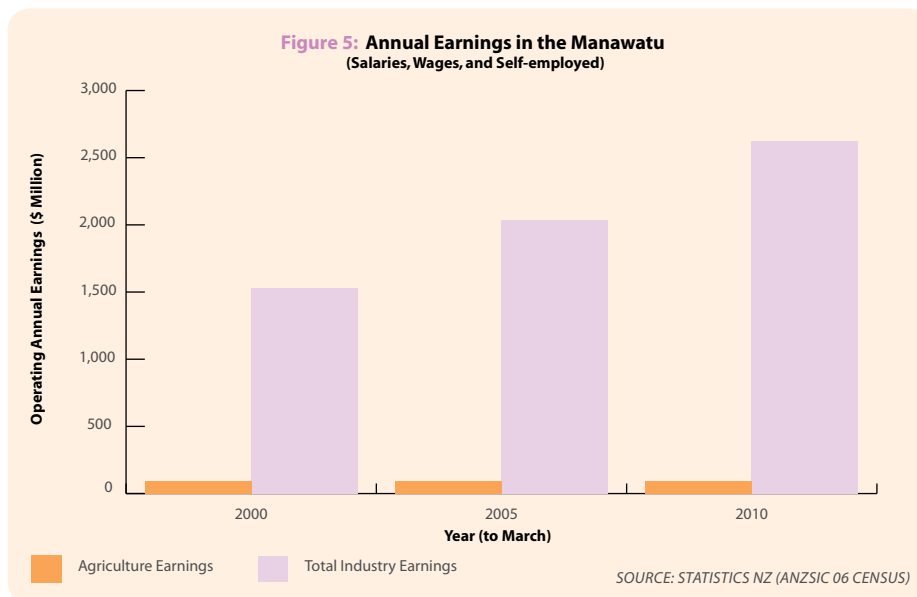
In February 2011 there were 1,960 people employed in the sector representing 3.5% of total employment in the region. However, as noted earlier, this is not a useful measure of the workforce in agriculture because of the high proportion of small units and the prevalence of self-employment. This number is not from a complete census, and as such only includes 'employees,' compared with the 2006 data which also includes employers, self-employed, unpaid family workers, and those not elsewhere included. Census 2006 data shows that less than 50% of the sector's workforce comprised of paid employees. There were 1,722 paid employees (47% of the total workforce), 561 employers (15%), 933 were self-employed (26%) and 408 were unpaid family members working in the sector (11%), giving a total workforce of 3,651 people. The 1,722 paid employees is equivalent to the 2011 number of 1,960, showing a growing level of paid employees. Figure 3 shows the type of employment in the agriculture sector.



The latest income data we currently hold for the agriculture, forestry and fishing sector is for the year to March 2010, a financial year in which the dairy producers, at a national level, recorded a financial profit of \$453 million, following a deficit of \$970 million in 2009, and a profit of \$2,073 million in 2008. The sector as a whole follows the same trend, with a profit in 2010 (\$1,296 million), a deficit in 2009 (-\$812 million), and a larger profit in 2008 (\$2,719 million) (as shown in Figure 4). This shows how volatile and easily influenced by external factors this sector is.



However like other sectors, this alone will not determine the economic impact to the region. Of importance is how much of their costs are spent locally and how much of the nation's agriculture costs are spent in the region. Measuring the level of income generated by the agriculture, forestry and fishing sector is even more challenging because of significant variations in income from year to year. Average earnings from salaries, wages and self-employment in the Manawatu region agricultural sector over the period from 2000 to 2010 were \$91.8 million, a 4.5% share of total average incomes in the region for this period. The agriculture share of total annual earnings in the Manawatu is shown in Figure 5.



Annual incomes for the agriculture sector between 2000 and 2010 ranged from a high of \$134 million in the year to June 2002 to a low of \$70.3 million in the year to June 2007 (as shown in Figure 6).

Figure 6: Annual Earnings for Agriculture, Forestry and Fishing in the Manawatu

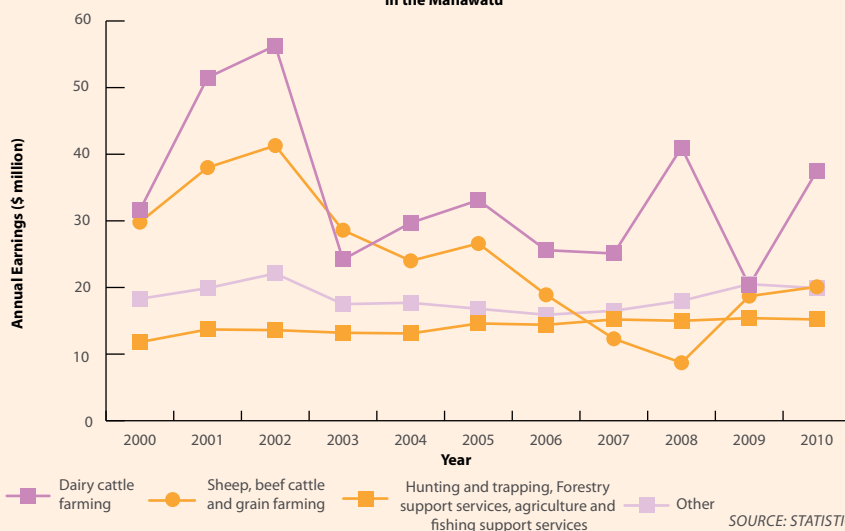


SOURCE: STATISTICS NZ

These annual earnings can be broken down into smaller industry groups, as shown in Figure 7. Once the agriculture sector is broken down further it becomes easier to identify economic impacts. For the dairy industry production of milk solids per region multiplied by milk solid pay out equals total money coming into the region for milk production (average kg of milk solids per herd for the Manawatu in 2010/11 was 115,654kg, with a pay out of \$7.98 per kg of milk solids, equalling a pay out of \$922,920 per herd). Annual costs are estimated (by DairyNZ) at approximately \$4.06 per kg of milk solids for 2010/11; this equals a return of \$453,364 per herd (before tax). Nationally, profit before tax for a dairy farm was \$319,519 in 2011/12 and MPI estimates in will fall to \$137,589 in 2012/13. However profit for local farms does not equal revenue for the region- it is dependent on how much of their costs were spent locally, and how much of the nation's costs were spent in the Manawatu. For example, there are industries in the region that service agriculture nationwide, including C-Dax, Stallion Plastics, Farmworks, and AllFlex. Often the differences between local and national costs are not clear cut. For example in animal health, vets' time is a local cost, but the drugs they use are a national cost.

Data for sheep and beef farming is slightly harder to analyse as it comprises more products. In 2010/11 sheep and beef farm revenue comprised 49% sheep meat, 12% wool, 21% beef and 18% other revenue (including dairy grazing). Beef and Lamb NZ has approximated national sheep and beef farm returns (after expenses but before tax) at \$102,900. Total profit per farm across the country was \$213,841 (before tax) and MPI estimates 2012/13 profit before tax at \$181,305.

Figure 7: Annual Earnings for Agriculture, Forestry and Fishing in the Manawatu



SOURCE: STATISTICS NZ

Volatility (the degree to which prices fluctuate over time) is different to risk and agriculture is an industry that operates on longer timelines than some sectors. This can be illustrated in Figure 8. For this reason it is useful to view long term data to gain a broader picture on the state of the agriculture sector.



2) Manufacturing and Processing

The importance of the agriculture, forestry and fishing sector in Manawatu can be clearly linked back to the strong manufacturing sector. Manufacturers which are mostly involved in processing locally produced primary products accounted for 1,321 jobs in February 2011 (33% of total manufacturing employment). There are clear concentrations of employment in sectors which process agricultural products (especially food processing) or supply the agricultural and food processing sectors (e.g. plastic pipes, agricultural machinery and stainless steel tanks). Food processing accounts for 34% of manufacturing sector employment in the Manawatu and textile and wood products a further 12%. Other primary product processing activities in the region include New Zealand Pharmaceuticals (chemicals sector) and wood processing. These processors and manufacturers use a range of local and out of region inputs, which means that not all grower revenue from food manufacturing procurement is retained in the Manawatu region. A breakdown of earnings within the manufacturing sector is not possible due to confidentiality rules for individual business data, but total earnings for the manufacturing sector in the year to March 2010 were \$213.8 million. The food processing industry's 34% share of this is \$73 million, but this probably overstates the economic contribution of the food processing sector due to the addition of out of region inputs. A major focus of the manufacturing sector in the region is producing materials and machinery for supply to the agricultural sector but estimating the contribution of this to total manufacturing earnings is difficult.

In relation to the agriculture sector, Fonterra is perhaps the most direct manufacturing link locally and nationally. While Fonterra has an office and research centre in Palmerston North, it only has one manufacturing plant, Longburn, and this itself plays only a small role in processing raw milk. Longburn produces milk only in the peak season when the Whareroa plant in the Taranaki region (Fonterra's second largest plant) cannot deal with supply. Longburn fills a pivotal role for lower North Island through, the collection of milk for transportation by road and rail to Whareroa and the production of mineral acid casein over the peak milk season for general trade use. If Longburn was a fully operational manufacturing plant it would provide greater economic benefits in terms of jobs and incomes for the region. Fonterra also has a processing plant in Pahiatua (by definition in the Tararua region), which processes some milk sourced from the Manawatu. These two examples emphasise how hard it is to measure the economic effects of agriculture to the region. Agriculture products on or close to boundary lines, are often processed out of the region as it is more economically viable, and economic activity is not constrained by Local Authority boundaries.

Manawatu has a number of other dairy manufacturers including; Goodman Fielder (Meadowfresh) located in Longburn beside Fonterra, National Foods (Yoplait), located in Highbury, Biofarm Products located in Whakarongo and Fonterra Foodservices (Kapiti Ice Cream) in Kelvin Grove.

Red meat processing is present in the region, but only processes a small portion of red meat production in New Zealand, with the majority of meat from the Manawatu going outside of the region's boundaries. AFFCO has a processing plant located in the outskirts of Feilding. It is AFFCO's smallest site, specialising in chilled beef products destined for Japan. Despite it being small, this plant still brings jobs and opportunities, not just in meat processing, but in transportation as well. Ovation Meats has recently shut a boning plant in Waipukurau and shifted the majority of production to their Feilding plant. The one other plant belonging to Ovation Meats is located in Gisborne. Ovation said the Waipukurau closure, which cost around 200 jobs, was a direct result of the decline in sheep numbers. Ovation has, however, created a new boning room at their Feilding plant, and has increased number of workers by approximately 150 people. ANZCO has two red meat processing plants located just outside of the Manawatu; CMP Rangitikei in Marton, and Riverlands in Bulls. Riverlands alone processes approximately 400 cows a day. Producers in Manawatu using Silver Fern Farms must transport animals to Hawkes Bay or Taranaki regions. Similarly Alliance requires transportation outside of the region, and has a plant located in Levin, processing lamb, sheep, and cattle, and a plant in Dannevirke.

3) Distribution of Primary and Processed Products

This section describes the wholesaling of farm and processed products, both within New Zealand and overseas. Basic material and fruit and vegetable wholesaling are important components of the logistics and supply chain sector based in the region and the transport sector is also a significant employer. The wholesale and transport sector is a major part of the Manawatu region economy, with total earnings of \$282 million in the year to March 2010. Basic materials wholesale employment accounted for 375 employees in 2011, 11% of employment in the wholesale sector. Road transport employment is not differentiated so it is not possible to estimate how many of the 830 people employed in road freight transport in the region are primarily involved in transportation of agriculture, forestry or fishing produce.

A practical example of this linkage is the Fonterra and Foodstuffs Coolstore and Distribution Centre. Located in Palmerston North City, not only does this enterprise provide jobs in distributing Foodstuff's products around the lower North Island, in particular chilled and frozen products, but the Fonterra arm of this manufactures high value ice cream products which are then distributed around much of the North Island.

4) Input Activities for the Agriculture, Forestry and Fishing Sector

These include items manufactured locally for the sector, such as agricultural machinery suppliers, prefabricated buildings, tanks, fencing and pipes, the wholesaling of agricultural supplies and farm machinery, and veterinary services. In February 2011 veterinary services accounted for 165 jobs in the region. A large amount of input activities into the agriculture sector also occurs in the form of rural professionals, for example, farm consultants. While not all input activities such as this are broken down into individual data, there is a growing trend in this type of support work. Data available for national dairy farm spend on legal and consultancy services was 2006/07, \$2,466 per farm, \$7 per cow and \$0.02 per kg/ milk solids. In 2010/11 this was \$4,555 per farm, \$11 per cow and \$0.03 per kg/ milk solids. Sheep and beef farms had a national spend in 2006/7 of \$1,755 per farm, \$2 per hectare, and \$0.39 per stock unit. In 2010/11 this was \$2,215 per farm, \$3 per hectare, and \$0.47 per stock unit. Farm consultants provide a range of services including one on one consultancy and advice (e.g. feed planning advice), farm business group facilitation (e.g. farm manager and second in charge staff groups), facilitation of industry funded programmes (e.g. event planning) and support services for research programmes (e.g. financial analysis). The industry wide goal here is improving knowledge and skill capital and contributing to the success and growth of the agriculture sector.

Estimating Economic Impacts

Economic multipliers are a statistical tool used to measure the economic impact of a sector. The key use of multipliers is for economists to measure the flow-on effects of an initial change in a particular industry. They allow an estimate to be made for the direct, indirect, and induced effects of one additional unit of final demand in a particular industry on the entire economy. Economic impact analysis follows the flow of money from agriculture businesses (farms) to:

- Households, who earn income from agriculture businesses, or supporting businesses,
- Other businesses, which supply goods and services to agriculture businesses, and
- Governments, through taxes on households and businesses.

The “direct” effects are the changes in revenue as a result of a change in agriculture production. For example, an increase in output in the agriculture, forestry and fishing sector leads to increased revenue for owners and wages for the additional employees required to produce the increased output. For example farmers receive more per carcass weight, and so send more animals to slaughter.

The “indirect” effects are the production changes which occur as a result of the increased revenue of the agriculture sector. For example this includes changes in revenue and the number of jobs in meat processing and distribution. Businesses supplying inputs to the meat processing industry, such as machinery manufacturers, represent a further round of impacts from the initial increase in agriculture production.

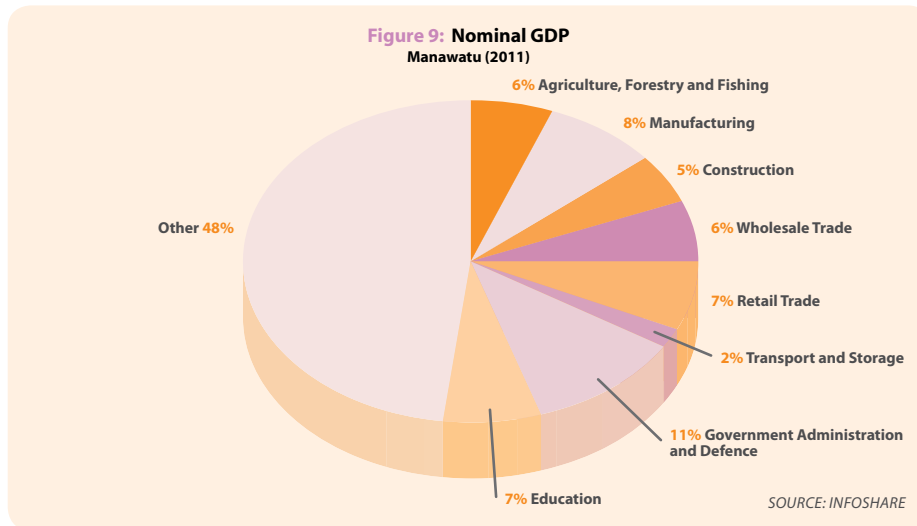
The “induced” effects are the changes in economic activity that the region experiences from the increased household spending of income earned directly or indirectly due to the increase in carcass weights. For example as a result of increased carcass weights, incomes in processors households increase, leading to more spending at supermarkets. This also increases revenue for supermarkets and their employees. This causes increased spending in the local economy on housing, food, transport and other goods and services.

The scale of secondary economic impact depends on the extent to which goods and services purchased are produced in the region or outside of it.

In 2004 the New Zealand Institute of Economic Research (NZIER) produced a report for the Palmerston North City Council to identify the value of the multiplier for each sector in the Palmerston North city economy. These values have then been weighted in accordance with the sectors contribution to employment within the region. The report approximates that the extra income multiplier value for the agriculture sector is 0.297. This includes; horticulture and fruit growing, dairy farming, livestock and cropping, other farming, and services to agriculture, hunting and trapping. This suggests that for a \$1 million increase in agriculture sector incomes, there is an expected \$0.297 million additional increase in the overall income in the Manawatu region. Within the agriculture sector the multipliers are likely to differ between, for example dairy and forestry. However further analysis of this is constrained due to limited data available of individual sub-sectors within agriculture.

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The multiplier shows that the agriculture sector is an integral part of the economy. This analysis also shows the interdependence of various industries within the economy, for example the multiplier is higher when including meat and dairy product manufacturing. It also shows how important the definition of the sector is, but emphasises how hard it is to create a definition that will allow the isolation of the economic impacts of a particular industry. Overall the agriculture, forestry and fishing sector is a large part of the Manawatu economy (as shown in Figure 9) and without it there would be a negative impact on the economy.







Indirect Economic Contribution

There are many instances where the agriculture sector has an indirect economic contribution in the Manawatu region. Examples include; research and development, environmental issues, transportation systems, and in real estate.

Research and Development

The agriculture sector in the Manawatu region has many connections of importance to science, and research and development institutions. Perhaps one of the key ones is the connection between Massey University and agriculture sector. Massey University is one of the two leading agriculture focused universities in New Zealand, the other being Lincoln University. Massey University has itself approximately 2,000 hectares of agriculture land. The land is split into three conventional dairy units, one organic dairy unit, two sheep and beef breeding units, one deer breeding unit, and one mixed enterprise/grazing/cropping unit, and it runs over 12,000 stock units between the eight farms. There is a range of science and agriculture degrees offered from Massey University. While many of these graduates leave the region to find jobs, Massey University provides a vital link into the research and development sector in Palmerston North. Massey University also has the only vet school in the country, and two of the seven Government-funded centres of research excellence, the Riddet Institute (food and nutrition), and the Allan Wilson Centre (molecular ecology and evolution).

Not only is there a major university in the region, but also several Crown Research Institutes (CRIs), research associations, and major business research centres. The CRIs located in Palmerston North are AgResearch, Landcare Research, and Plant and Food Research. AgResearch has four locations throughout New Zealand; the centre in Palmerston North is the Grasslands research branch with a focus on plant breeding, molecular biology, ruminant nutrition, and land management. Other research associations present in the region, often in some form of conjunction with Massey University, include Hopkirk Research Institute (animal health), Riddet Institute, New Zealand Leather and Shoe Research Association, and Ecological Economics Research New Zealand. There are also private research and development ventures operating in conjunction with Massey University. The biggest of these is the Fonterra Research Centre, which boasts the world's largest registered dairy pilot plant and is responsible for (in collaboration with Fonterra's other international research sites), innovations such as spreadable butter. There are also businesses around the region whose goal is to support and foster innovation and research and development (R&D). One of these is the BioCommerce Centre, who helps link research and commercialisation. This organisation is responsible for events such as Innovate Manawatu, which aims to turn innovative ideas into businesses.

All of these R&D associations have led to a centre of innovation in the region which both supports and benefits from activities such as Central District Field Days. These are growing in this area due to the strength of the agriculture sector and supporting industries such as Massey University, and Fonterra.

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Total R&D expenditure in the Manawatu is estimated to be 10% of the total national R&D expenditure, a significant contribution. The Palmerston North City Council has estimated 2,425 full time R&D employees in the region, contributing \$109 million in household income to Manawatu economy. This figure excludes unpaid post-graduate students. This figure is directly influenced by the agriculture sector, as a large amount of this R&D is in this field.

These research and development opportunities provide growth potential, not only in the region, but for the entire country. Increased innovation provides incentives for more research and science based organisations to locate here and create an even larger hub for future innovation. Such opportunities are supported by Massey University, a strong primary industry sector, and a well-established city providing secondary industry requirements such as logistics.

Environmental Issues

The agriculture, forestry, and fishing sector in Palmerston North is directly influenced by environmental issues in the wider region, and as an industry also influences these issues. The state of the Manawatu River is perhaps one of the key current issues and promises to be around for a while with no short term fix. Five percent of the North Island lies in the catchment for the Manawatu River, and this includes the entire Manawatu region. The agriculture sector in the Manawatu region contributes to the state of this river through pathogens washing into the River from animal defecation, sedimentation levels in the River from erosion of de-forested hill country, and nutrient (in particular phosphorous and nitrogen) leaching and runoff. The continued growth and intensification of the agriculture sector in the Manawatu has led to increased pressure on the River and other water ways. According to National Institute of Water and Atmospheric Research the lower Manawatu River has shown some improvement in quality in the last 20 years, especially in the treatment and cleaning up of point-source discharges. This has led to an increased relative contribution from agriculture pollution sources, which are often diffuse sources. It is important to note here that this sector is not solely responsible for the state of the River, and that it is a combination of agriculture, industrial users, and public services that has contributed to this environmental issue.

The Manawatu River and other environmental issues relating to agriculture can be traced back to past bush clearance and damage to the remaining tracts of native bush and forestry by introduced animals. Agriculture is beginning to have an impact on this deforestation with more awareness around the retirement of land, often into forest. This retirement of land into forestry or native bush is also assisted by the emissions trading scheme (ETS). There is also continued investment in pest control, especially a focus on reducing tuberculosis (TB) in cow and deer herds, as various organisations try to continue the downward trend in this disease, and farmers participate in pest control on their farms.

The local community is now calling for a solution to these environmental issues, and farmers and other industry players are collaborating to create more environmentally friendly practices. In the agriculture sector, money and time are being spent to fence off (Horizons Regional Council helped fence 112km of streambanks in the year to July 2011) and plant riparian strips. There is an increased use of nutrient budgeting, retirement of, and re-planting of steep hill country prone to slipping, contributions to pest control (for example TB in possums), and disposal of dairy shed effluent on to land (effluent was sprayed over 15,579 hectares in the Manawatu-Wanganui region in 2007).

All the issues discussed above have implications for the agriculture sector as farm management practices are affected, both negatively (e.g. the cost of retiring hill country land) and positively (e.g. the increased use of and awareness of nutrient management plans). There are also various third parties involved in this issue, for example, the Manawatu River Leaders Accord signed in August 2010. This is a group of key industry leaders with an interest in the Manawatu River, and includes representation from local government, iwi, farming and the environmental sector. This Accord and the proposed Regional Council One Plan are both key features for the future of agriculture in the region.

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The Manawatu River Leaders Accord and the Primary Sector Water Partnership documents have minimal numerical data on what has been achieved, however they both work with the Dairy and Clean Streams Accord in some areas, which provides comparable statistics and yearly trends. The Dairy and Clean Stream Accord is an initiative from Fonterra with the aim of promoting sustainable dairy farming in New Zealand focusing on reducing the impacts of dairying on the quality of New Zealand waterways. This is relevant in the Manawatu as there are approximately 39,000 hectares of dairy land (18% of agriculture land in the Manawatu). In 2011/12 full effluent discharge compliance with resource consent and regional plan requirements was at 91% (Horizons region). As of the 2010/11 snapshot of progress, nationally 46% of Fonterra dairy farms nationally had a nutrient management plan in place, while 99% nationally have a nutrient budget (less involved than a nutrient management plan) in place. The minimal numerical data provided in the Primary Sector Water Partnership document echoes these trends.

The state of the local environment and the initiatives underway to deal with environmental degradation has economic implications for the agriculture sector. They can rearrange where farm incomes are spent, and has the potential to change profit margins in order for landowners to maintain compliance with new rules, both regionally (e.g. the Horizons One Plan and Manawatu River Accord), and nationally (e.g. the Dairy and Clean Streams Accord and the Primary Sector Water Partnership agreement). It also has the potential to increase profit margins through more efficient farming, for example through more cost-effective fertiliser applications.

Transportation Systems

The agriculture industry does not only impact on the transportation systems in the region through those directly employed in road freight. Transportation in Palmerston North and the Manawatu region is well set up to cater for the agriculture sector, through road, rail, air and sea. There are well maintained state highways with a relatively low travel time connecting the lower North Island to Palmerston North; with under three hours travel time to Wellington, Taranaki, and Hawkes Bay. This is coupled with rail networks and an airport that continues to grow. The region is not located by a major port but can use road and rail linkages to access Tauranga, New Plymouth, Napier and Wellington ports. These networks have shown to be effective in making Palmerston North a centre in which it is beneficial for businesses to locate; Toyota, Foodstuffs, Countdown, EziBUY, and New Zealand Post, all have aspects of their businesses located here. Freight volumes moved are only expected to increase as our rate of production in key sectors such as agriculture increases. This is recognized by various groups and work is under way to ensure national transportation networks are maintained at a high level to promote growth in relatively rural areas such as Manawatu.

New Zealand Transport Agency (NZTA) is in charge of state highway management and funding major road investment in the country. It has identified seven roads of national significance it will need to upgrade as a matter of priority. The Wellington Northern Corridor, linking Wellington airport to Levin is one of these roads. This development will open up growth opportunities for the Manawatu region with reduced travelling times for freight to a major airport and a port. Manawatu is likely to see a benefit from this as lower transport costs increase efficiency; especially in the dairy industry where large volumes are processed at a local level for export. The roading development is a long term project and is expected to be completed in 2020. The land used in construction and disruption to travelling times during parts of the construction are unlikely to significantly impact upon the agriculture sector.

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Rail in the agriculture sector is already used, in particular by the dairy (Longburn Fonterra plant) and forestry industries, and has potential to expand. Rail is able to be used for dairy products where the main priority is keeping products chilled, and the shunting movement of the train is of minimal impact. Kiwirail is New Zealand's rail network and plans to invest \$250 million in the rail freight industry. This will benefit the agriculture sector nationally and in Manawatu as it lowers transport costs may encourage the locating of more manufacturing in Palmerston North (which has relatively lower cost land compared to, for example, Wellington). This may allow businesses to add more value in Palmerston North instead of transporting just raw materials, yet still be able to efficiently access the port and air facilities outside the region.

The Manawatu Gorge on State Highway 3 between Palmerston North and Woodville has been shut since October 2011. This has an impact on transport in the region as the alternative routes are longer and harder to use than the Gorge. This has impacted on travel times and freight costs to the Tararua region and Hawkes Bay. While the gorge has partially re-opened (in June 2012), there has been a short term impact on productivity for some agriculture businesses in the Manawatu, particularly in the red meat sector, as some meat sent for processing in Hawkes Bay. Work is continuing on upgrading the alternative routes and on finishing work on re-opening and stabilising the Gorge, and the effect of this transport disruption is still to filter through. The long run cost to productivity is however expected to be minimal.

Real Estate

The previous level of over 50% of 'farmland' in New Zealand has been declining as development has increased in many semi-rural locations. As Palmerston North City grows, not only does the urban space grow, but the area deemed rural-urban by the City Council also grows. This includes particular developments in rural areas, for example Moonshine Valley, where the standard historical minimum subdivided lot size is smaller (1.5 ha in Moonshine Valley) than the general rural subdivision size (4 ha). This urban development has led to a change in ownership structure of former farmland. An example is the increase in 'lifestyle blocks' which do not always have the primary income from the farm (of 4 ha in a rural zone and smaller lots in the rural-urban overlay). Real Estate Institute of New Zealand (REINZ) data shows the number of lifestyle farms sold in the three month period to February 2010 was 95 and has increased to 103 for the three months ending February 2012 (Manawatu-Wanganui region). This change also represents a change in lifestyle preferences. There is also a link here to transportation, with more people living peri-urban areas and commuting to work in an urban environment.

There are other factors driving subdivision including reducing debt and raising capital. Subdivision can lead to development but also includes farms with areas prepared for subdivision as an option but not sold. These issues affect the structure of future development and joint research between Massey University and the Palmerston North City Council is currently investigating the 4 ha rural subdivision minimum and other subdivision issues as part of the Rural-Residential Landuse Strategy.

Overall farm sales have been improving as prices lead to a change in types of agriculture, and as the property market begins to strengthen. In the year to February 2012 1,295 farms were sold (New Zealand wide), the highest number of farm sales on an annual basis since May 2009. Buyers remain focused on grazing, fattening and dairy properties with indications of a shortage of listings. This can be deduced from a lack of high quality dairy properties, and stronger pricing beginning to emerge for second tier dairy properties and convertible land. Second tier dairy land and convertible land is also becoming more valuable as inputs such as irrigation become more affordable, and common place.

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In the Manawatu-Wanganui region (as with all regions except for Taranaki) there was a recorded increase in farm sales volumes (of 20 sales) for the three months ending February 2012, compared with the three months ending February 2011. The 38 sales for the three months ending February 2012 represent approximately 10% of the total farm sales in New Zealand and were defined as 23 grazing farms, six finishing, and five dairy. In a national context these three categories were also the largest types of farms sold.

In the Manawatu-Wanganui region the average farm sale size for the three months ending May 2012 was 71 hectares. Price per hectare in Manawatu-Wanganui region has increased dramatically from \$7,311 for the three months ending February 2010 to \$21,142 in February 2012. A factor likely to influence this figure is the high degree of land in the region under urban influence. The Manawatu-Wanganui region was ranked fourth for the percentage of people living in rural areas with a high urban influence (as defined by distance from urban areas) in a study for the Rural Residential Land Use Strategy for the Palmerston North City Council. In New Zealand this has remained more constant, up from \$19,188 to \$21,641.

Developments in the agriculture sector are therefore linked to changes in the urban area through, for example changing lifestyle preferences. The factors described above are also linked to international prices and climatic conditions which influence the make-up of the agriculture sector, as shown by the continued growth in dairy and finishing properties.

The Future Growth Outlook

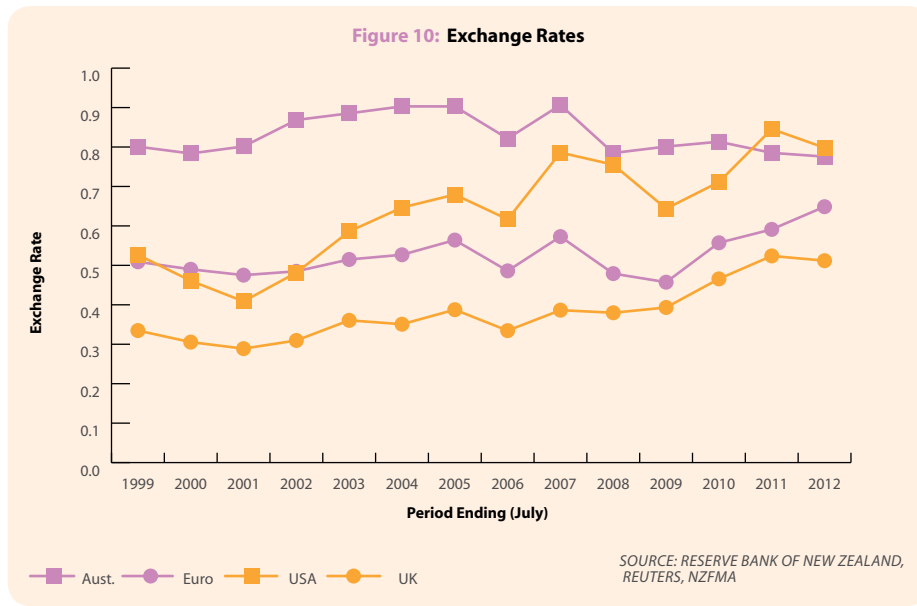
Global Trends;

Agriculture production is reliant on the international trade situation because the majority of New Zealand's agriculture products are destined for export. The debt crisis in the European Union (EU) has been lowering demand for New Zealand's primary products as it contributes to slowing global growth. Growth in the agriculture sector for New Zealand therefore rests on the degree to which the other important New Zealand trading partners' (the Asia-Pacific countries) economies can remain detached from these global events. China, in particular, continues to be the fastest growing primary export market for New Zealand. Other North Asian countries, in particular Japan, the Republic of Korea and Taiwan, continue to be of growing importance for New Zealand's pastoral production, with nearly a third of New Zealand beef and lamb related exports destined for this region, up from almost a quarter of exports 10 years ago. The previous economic downturn in the US has stabilized and is starting to show signs of strengthening, providing a timely balance to the downturn in the EU. Both these regions continue to be important markets for the New Zealand pastoral based industry. On a global scale in 2011 New Zealand had 2% of total world production in cow milk, 1% of the world beef production and 5.8% of the world sheep meat production.

Business confidence has fallen in New Zealand as a flow on effect from the global situation, and so consumption and investment measures have also experienced low growth; investment can be directly linked to productivity and output.

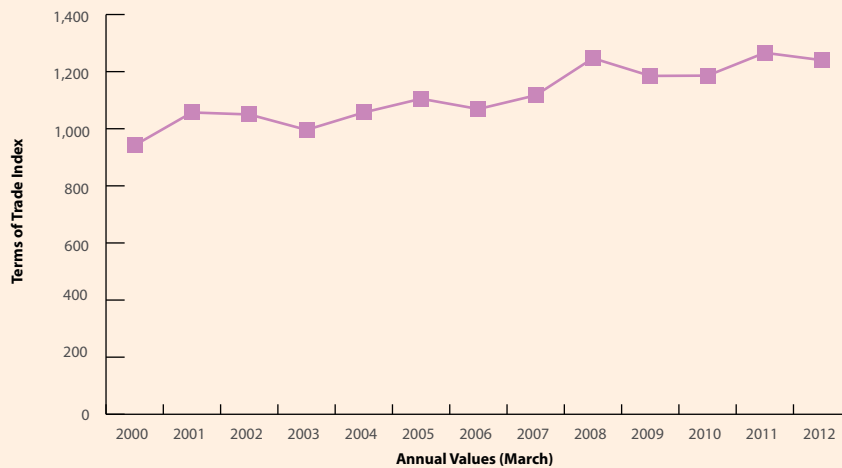
The export focus of the agriculture sector, means that the commodity price differentials have a large impact on the prices exporters receive and, therefore, on the output and composition of the sector (high dairy prices have led to growth in the amount of conversion from sheep and beef to dairy land). The EU and the US are two of the largest dairy producers in the world. Both are characterised by high regulation, for example government storage programmes and import tariffs. These distort price signals and result in price differentials in these and international markets. The relative absence of regulation in the New Zealand dairy industry and its dependence on global commodity markets result in high milk price volatility. A small change in global milk production has a magnified effect on the global supply of dairy products. In 2010 Agrifax suggested that if global demand or supply moves by 1%, the product shortage or surplus equates to 14% of free global trade. Volatile prices have a negative effect on dairy processors and end users of dairy products alike, as they create uncertainty about returns.

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Exchange rates also impact on prices received in New Zealand. Since January 2009 the New Zealand Dollar (NZD) exchange rate has strengthened against its main trading currencies (excluding a small decrease against Australia), as shown in Figure 10. In March 2012 the average exchange rates were; US 0.8208, UK 0.5186, Aust 0.7779, Japan 67.69, Euro 0.6212. For the year to March 2013 the NZD is estimated to remain largely unchanged against the USD, and appreciate against the GBP and the EUR. The current prediction (from Treasury) is for these strong exchange rates to continue for the next two years (2014), and then begin to depreciate, the exception being the NZD against Australia, which is expected to continue to experience slow rates of appreciation. A sustained high exchange rate against our major trading partners means lower returns for our exports; in particular of primary products (agriculture), our largest export group.

Figure 12: NZ Terms of Trade



SOURCE: STATISTICS NZ (ANNUAL ENTERPRISE SURVEYS 2010)

The high NZD remains a major depressant on farm-gate prices and commodity export prices are expected to decline in the coming year but still remain at historically high levels. This high commodity price can be partially explained by increases in demand. At the same time, weather events have constrained some areas of global supply and led to high prices. The terms of trade (effective purchasing power of exports), which was at a record high until June 2010, has since dropped, but is still relatively high historically (risen 32% since 2000), as shown in Figure 12. These levels can be attributed to strong global demand, in particular rapid growth in wealth and urbanisation in developing Asia. This appreciation has been balanced by rising global prices, from both supply and demand sides. Commodity export volumes are currently at these high levels due to strong agricultural production resulting from good growing conditions in New Zealand. The slowing global economic growth will likely impact on non-rural exports the most, as food demand tends to be less affected. Even with reduced economic growth outlooks for some countries, the rate of growth remains staggering by developed world standards, suggesting demand will continue to rise, underpinning prices. Analysis by the Reserve Bank of New Zealand, therefore, indicates that agriculture export prices are likely to remain elevated for some time.

Lower interest rates are also a factor in assisting improvement in overall farm returns. The Annual Enterprise Survey for the 2010 financial year shows some interesting national trends. Firstly expenditure on interest and donations across all industries has declined, from \$65,094 million in 2008 to \$45,529 million in 2010. However for the agriculture, forestry and fishing sector, interest expenditure is much more constant; \$3,345 million in 2008, \$3,640 million in 2009 and back down to \$3,315 million in 2010 (0.01% decrease overall). During this same time period the grouping 'other liabilities' has increased by 15.4%, from \$44,090 million to \$51,088 million. This could cause future problems, as it shows that while expenditure on interest is relatively stable in the agriculture industry, other liabilities have increased dramatically. This could mean that there is a lack of debt retirement while there are stable or decreasing interest rates, or more debt is being taken on. This can be linked back to climatic conditions; good growing seasons mean higher returns and more income to service debt. A marked increase was seen in the 'other liabilities' for dairy farming, with a 28.7% increase from 2008 (\$20,470 million) to 2010 (\$26,765 million).

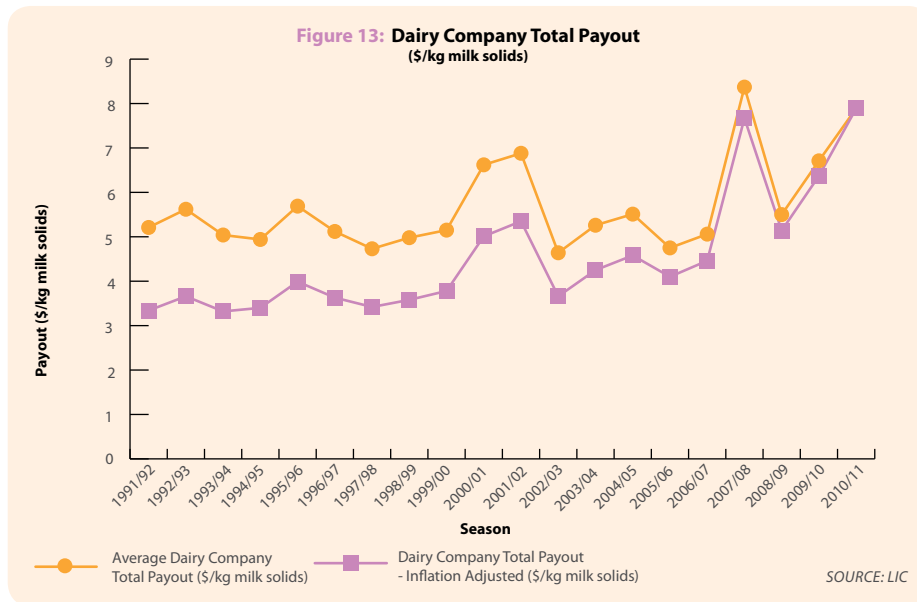
Debt levels have been trending upwards between 2003 and 2009; this can be attributed to different causes for different sections within agriculture. Dairying, which has seen relatively good returns in this period, has been influenced by the price of land, Fonterra's share price, and investment in new capital and technology. The increase in land area in use for dairy production also indicates a significant level of conversion; this typically requires significant investment which is likely to have influenced dairy debt. In contrast, the sheep and beef sector debt reflects lower returns and increased borrowing. It is important to note that this is a relatively small time scale, within which there was significant adverse weather. This led to reduction in stock numbers and, in some cases, production.

National industry trends and forecasts;

The Ministry for Primary Industries (MPI) releases situation outlooks for the primary industries. Situation Outlook for the Primary Industries (SOPI) (previously the Situation Outlook New Zealand Agriculture and Forestry) 2011 forecasts for dairy, forestry and meat and wool are for an increase of \$795 million in export revenue (or 3.2%) from the year ended 30 June 2011 to the year ended 30 June 2012. Climatic conditions in spring 2011 have been favourable for milk production and lambing and the Ministry expects pastoral production in the 2011/12 season to be above average. The agriculture sector is influenced by climatic conditions, which cause variations in seasonal prices, so forecasts are often revised.

Dairy

The outlook for the dairy sector is positive. There have been high international prices due to strong global demand. Dairy prices hit a record high at \$8.37/kg of milk solids in the 2007/08 season, dropped sharply in 2008/09 to \$5.50/kg, and have grown again to \$7.89/kg for the 2010/11 season (as shown in Figure 12). This drop in prices in 2007/08 can be attributed to our high exchange rate and increasing supply from major dairy exporters, such as the US and the EU. Since mid-2010 butter has been the fastest growing dairy product, although following the recent high payouts, is expected to stabilise along with other dairy products. Predictions from MPI show that growth is expected to slow to a payout of around \$6.08/kg for 2011/12 and \$5.73/kg for the 2012/13 season. While dropping slightly, it still shows that dairy is a profitable industry, especially as it must be looked at on a long term horizon to eliminate the impact of unplanned factors, such as adverse weather seasons. This drop is attributed to the strength of the NZ dollar against the US dollar, as well as weakening international dairy prices. The high exchange rate and lower dairy prices are expected to continue into 2012/13. Even with the high exchange rates and lower international markets export revenue from dairy products is forecast to reach \$13.9 billion (2011/12) which, if achieved, will be the largest annual export value to date from dairy. This is then forecast to decrease by 9.2% in 2012/13. The 2011/12 season is on track to increase by approximately 5% milk solids, with a mild winter and good spring conditions contributing to a record milk collection volume in September 2011. Dairy production is, however, extremely responsive to climatic conditions, and while forecasts use a 30 year average weather pattern to increase the accuracy of predictions, there is room for error. Long term predictions have the farm gate milk price at approximately \$7.80/kg of milk solids for 2015/16, with export revenue forecast to reach \$17 billion for the year ending June 2016.



Developing countries, such as China, continue to fuel demand for dairy products and especially milk powder. However, this demand has become sluggish since February 2011 peaks. Petroleum exporting countries (OPEC) are expected to pick up their demand as oil prices increase, causing greater wealth in countries such as Saudi Arabia which are already important export markets for New Zealand dairy in the past ten years. China has overtaken EU and the US, who were the top New Zealand dairy importers. OPEC and some Asian countries are also surpassing EU and the US, indicating a change from mature markets to emerging markets. This is partially as a result of EU Common Agriculture Policy reforms and the general depreciation of the US dollar.

As the pay out for dairy farmers continues to be strong New Zealand has seen increased production in the dairy industry, which can be attributed to many factors. Conversion to dairy has increased, and dairy farming has intensified; there are now more cows per hectare (2.6 in 2000/01 to 2.76 in 2010/11), and more milk solids produced per cow (334kg milk solids/cow in 2010/2011 up from 310kg milk solids/cow in 2000/01). There is limited data on conversion rates but data available indicates nine farms have applied for consent to convert land not previously used for dairy, since October 2010 (Horizons region). However, despite the potential for it, conversion rules imposed by the Regional Council are fairly strict and may limit this rate of change. Industries that compete for resources (such as land and labour) with the dairy sector, such as sheep and beef, lose from dairy's growth. However those industries that are tied to dairy production, such as dairy graziers, benefit. Favourable weather has a huge impact on these outcomes (there was a previous high of 330kg milk solids/cow in 2006/07 which was considered a favourable season), but research and development has also helped. For example nutrient budgeting has increased pasture growth, increased herd testing has provided better stock, and increased use of irrigation, have all contributed to New Zealand farming smarter than in previous years.

Meat and wool

The latest forecasts based on an average climatic season and exchange rates, by the Ministry for Primary Industries suggest meat and wool export revenue will reach \$7.2 billion for the year to June 30 2012. This is a 5.8% increase on the last season owing to increased meat volumes and wool prices.

Lower lamb export volumes, and in particular, adverse seasons in New Zealand and Australia in 2010, and increased global demand have led to a record lamb schedule price of \$6.35/kg (carcass weight) for year ending June 2012. Lamb export revenue for this year is expected to be \$2.58 billion, up over 5% on the previous year. Returns to farmers have been muted through a high exchange rate. Some further falls in price are forecast, but these are expected to be modest due to past declines in livestock numbers here and abroad. These falls are likely to be offset by increasing lambing percentages and lamb carcass weights, leaving lamb production and export volumes fairly static. Further increases in export revenue out to 2016 are therefore due mainly to an assumed depreciation in the New Zealand dollar. The trend in developed countries is for a change in focus to chilled product from frozen, and this puts an influence on developing New Zealand's supply chain to ensure meat and wool farmers capitalise on this opportunity. Sheep breeding numbers are expected to continue to decrease, due to competing land uses (and in particular dairy conversion) yet productivity is expected to increase in lamb production per breeding ewe and carcass weights. Improved lambing performance can be attributed to the introduction of pregnancy scanning in the early 1990s, the introduction of new breeds, on-going genetic selection and management improvements over time.

The farm-gate prices received for wool was \$5.30/kg average grade in the 2010/11 season. This increased to a (provisional) high of \$6.70/kg (average grade) for the 2011/12 season and is expected to soften looking ahead at the 2012/13 season (\$5.27/kg average grade). This softening can be attributed to softer demand from EU following the economic downturn, and increased cotton production, along with a decrease in the national sheep flock. Export revenue for wool is provisionally recorded by Beef + Lamb NZ at \$777 million (up 8.6% on previous season) for the year to June 2012. Up to January 2012 wool exports fell 8% as a whole, with demand in EU dropping and demand increasing in China which now consumes up to approximately 50% of New Zealand's export volume. The better quality clips have had more stable prices. Export prices are expected to drop away in the two years after this high, due to a general decrease in global economic activity. Export receipts are estimated by Beef + Lamb NZ at \$644 million for 2012/13. However, constrained supply is likely to help counteract this decrease and maintain relatively high prices, with an average prediction of \$5.15/kg (average quality, 2012-2015); an increase on average 2005-2010 of \$3.76/kg.

Beef export receipts accounted for nearly 4.5% of New Zealand's total exports in 2010. Total beef export value for the year ending June 2012 is estimated to be up by 0.9% to \$2.05 billion, reflecting a slight increase in price and a 1.3% increase in volume. By 2016, beef export value is projected to be \$2.52 billion as a result of increased prices. Beef demand and schedule prices have held up better than lamb schedule prices thanks to robust demand for animal protein from Asia and falls in Australian and US supply. The US is the largest importer of New Zealand beef exports and is itself a net exporter of beef. Current prices are approximately \$3.90/kg of carcass weight (average quality across steer, heifer, and bull) and forecast to hit over \$4.00/kg for the same measure.

New Zealand beef production comes from both dairy and beef cattle origins. Dairy's contribution has played a large part in maintaining overall beef and veal production over time as the traditional beef breeding herd has contracted. The expansion of the dairy herd over the last 10 years has meant cull dairy cows now account for 38% of total cattle slaughter at 866,000 animals. New Zealand beef production in the year ending 30 June 2012 is also expected to rise due to an increase in carcass weight with improved weather conditions compared to last year. Key world beef exporters Brazil, Australia, Argentina, and Canada are in herd rebuilding mode. However this is a long term situation and, thanks to the continued constrained supply and reasonable demand, the farm-gate prices are expected to increase for the 2011/12 season.

This season, favourable climate and pasture conditions have increased carcass weights and meat production in New Zealand. Longer term, sheep and beef grazing land is expected to continue to be converted to dairy farming and, to a lesser extent, forestry. For this reason, sheep and beef inventory numbers are forecast to fall slowly over the coming seasons. However despite this fall in forecast export revenues over the next two years, revenues are forecast at \$7.9 billion in the year ended 30 June 2016 (MPI), with projected beef export value at \$2.52 billion for 2016 as a result of increased prices.

Forestry

While not a major revenue stream for the region, the forestry sector has experienced rapid growth, particularly in response to 18 months of strong growth in the Chinese market. This is shown by an MPI export revenue forecast of \$4.5 billion for the year ending June 30 2012. Log volumes have fallen slightly from their early 2011 peak, and prices have responded to this lower demand, falling from a record high of \$132 (NZ\$ per m³) in June 2011 to \$128 (NZ\$ per m³) in June 2012. This is primarily due to weak demand for sawn timber, mainly as a result of the weak housing market performance in the traditional US and Australian markets. The March 2011 earthquake in Japan bolstered panel, pulp and chip exports to the Japanese market. China is expected to remain the key market for New Zealand forestry exports although Australia and the US are also expected to increase demand as their economies continue to recover. Supply is expected to be limited in the future, with limited growth in the New Zealand production, and Russia's continued export restrictions. Overall growth is expected to continue in this sector. This provides opportunity in the region, for conversion of some land to forestry. The long term nature of forestry, however, means it is especially difficult to predict the economic viability of conversion, due to the need to predict long term future prices for wood to grow.



Regional Growth

Many growth opportunities have both positive and negative aspects and as such it is important to fully analyse opportunities as they arise. As previously mentioned, there has been considerable growth in parts of the agriculture sector. There has also been decline in some areas and a redistribution of land use accordingly. The global economic climate remains a major catalyst on the patterns of growth in New Zealand.

A major support to agriculture growth is the research and development hub located in Palmerston North. An example of relevant research is Massey University's research into the viability of herd homes. While they are relevant for the wider country, it also provides a very good case study and information to other farmers in the region that may consider this option now or in the future.

The Manawatu is well placed to benefit from a strong dairy industry. The Manawatu is not currently a leading dairy region, with lower than (national) averages for factors such as cows per hectare (2.69 compared with the national average of 2.76) and 326kg of milk solids per cow, compared to a national average of 334kg. The Manawatu has relatively young soils, reliable rainfall, and relatively low nutrient loss compared to other regions such as the Waikato (DairyNZ). This suggests room for the region to increase both production (e.g. milk solids per cow) and productivity (e.g. cows per hectare). Increases in productivity in dairy will provide increased incomes and expenditure in the Manawatu. There are also regional constraints as explored in the next section.

Increased national and global environmental awareness has both positive and negative facets for agriculture in the region. The Manawatu has recently received some press around the state of the environment, and particularly the Manawatu River. This would be considered a constraint to growth as society and key industry players begin to demand better environmental practices such as increased riparian planting and retirement of erosion prone hill country. Such measures would impact upon farm profit margins in the short run. Yet in the long term improvements could provide New Zealand with the continued use of its 'clean green image'. This image is a potential growth enabler as it can provide a level of differentiation in food safety, which may lead to price premiums. An example of this is high income families in China preferring to use New Zealand milk for infants over Chinese milk due to New Zealand's food safety and environmental reputation. Many of Fonterra's key customers, however, are further food manufactures e.g. Kraft and Denome, who are less concerned with the environmental footprint of a product and more so with the most efficient production methods. This shows there is a need to maintain both lower value agriculture products (e.g. traditional farming) and higher value products (e.g. organics) to ensure New Zealand is not as exposed to income elasticities in importing countries.

Technology continues to increase faster than ever before. It is essential therefore, to remain up to date and incorporate these advances into agriculture to maximise growth opportunities. An example is nutrient budgeting; with technology and software, such as OVERSEER, farmers have free access to information that can help them create and implement fertiliser plans to maximise growth and minimise costs. Another example is increased national animal identification systems. These systems, such as NAIT (National Animal Identification and Tracing) tags, are designed to ensure herd traceability in the case of a biosecurity event, and safeguard the New Zealand brand and farmers' incomes. NAIT is now compulsory for all cattle and deer. This and other systems like it, are useful ways of tracking quality in agriculture products to maintain New Zealand's good reputation, and as such can be considered catalysts for growth if embraced by all agriculture industry participants and further levels of the supply chain (e.g. processors and retailers).

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Constraints to Growth

Possibly the biggest potential constraint on growth in the Manawatu region is the Horizons Regional Council One Plan. This is a regional planning document that defines how the natural and physical resources of the region will be cared for and managed by the Regional Council in partnership with Territorial Authorities and the community. The One Plan combines the requirements for preparation of a Regional Policy Statement and a Regional Plan. It is created against a backdrop of the Resource Management Act (1991). It has been compiled by Horizons Regional Council with the intention of striking the ideal balance between using natural resources for economic and social wellbeing, while keeping the environment in good health within the Horizons region. The One Plan is a blueprint for finding a satisfactory way to make this seemingly conflicting challenge a reality for the community. Work began on the One Plan in 2003 and it has a lifespan of 10 years from when the final version is released (expected in 2012/13). The Environment Court released its decisions on the points unresolved through the hearings process on the 4th of September 2012 and after Horizons has made these adjustments, the One Plan could be operating from February 2013.

The One Plan aims to focus Horizons' environmental enhancement efforts on four key issues; water quality, water demand, hill country land use and threatened habitats. All have potential impacts on agriculture. As Horizons' region is larger than just the Manawatu region, water quality and demand are often identified as the top two issues for this region. The actual impact on growth in the region remains to be seen and can only be accurately measured as the One Plan becomes operational. It is a document with both supporters and opponents, who each claim different stances on the expected economic impacts. Opposition to particular parts have included individual landowners and conservationists, other councils, government departments, large advocacy organisations like Federated Farmers, and businesses like Fonterra, fertiliser manufacturers and forestry companies (although many submissions were addressed in the 2010 version of the One Plan, or through mediation).

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An example of a contentious issue within is the introduction of nitrogen leaching targets, which have been attached to Land Use Capability Classes (in specified water management zones). These targets could constrain growth by requiring that new dairy farms comply with nitrogen leaching rates set out in the One Plan (constraining the potential intensity of production). In many cases these constraints will mean that land considered appropriate for dairy farm conversion cannot be developed at all. In these cases the One Plan will have a significant depressing effect on land values. However the full implications of these issues are not yet known. Technological development could be incentivised by the constraints in the One Plan and help to offset these impacts.

Existing dairy farms in targeted catchments are required to prepare a nutrient budget, nutrient management plan and implement reasonably practicable farm management practices to minimise nutrient leaching. There is stringent stock exclusion rules, in targeted catchments, and a large number of stock will be required to be excluded from all permanent water bodies. These rules involve costs to farmers; for example some farms will require measures such as destocking to achieve nitrogen leaching limits and may become economically unviable. There is no definitive figure of the cost to farmers of implementing the One Plan, as it depends on what areas they need to address to be compliant, what rules are applicable in each situation, and the additional costs of compliance with other industry policy, such as the Dairying and Clean Streams Accord. Costs could include fencing, and the cost of undertaking a nutrient management plan. But again this depends on individual farm situations. There are many details and costs that will only become clear once the rules, as specified by the Environment Court rulings, start to be drafted and the One Plan is put into operation. However there are some industry groups that are appealing to the High Court, including Federated Farmers and Horticulture New Zealand.

The potential impact of the One Plan on growth is significant, though it remains to be seen how constraining it is compared to policies developed in other regions. Many other Regional Councils are watching this process carefully to see if parts are effective, as well as whether various pitfalls can be avoided. It must also be noted that while provisions in the One Plan, such as the complete stock exclusion from water bodies on hill country farms have been relaxed, topics like this one are being discussed in many forums around the country and such rules may start to emerge in future years.

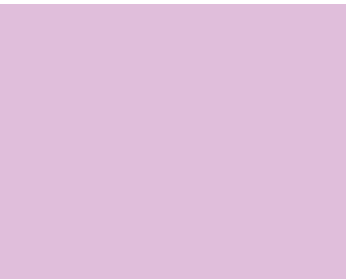
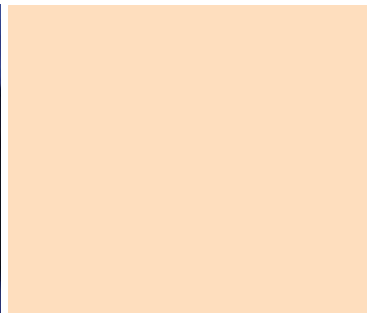
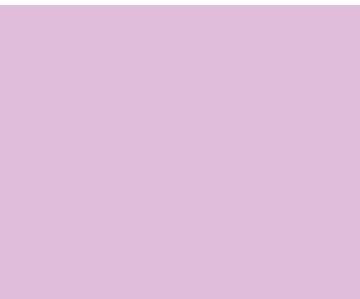
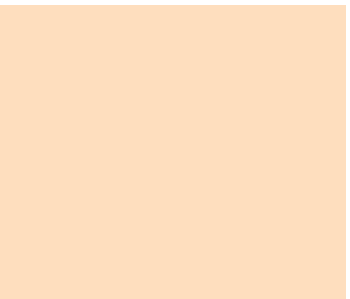
Other constraints to growth include the expected continued increase in farm input prices. Crude oil is expected to continue its slow but steady increase. Phosphate and urea prices are growing more rapidly following marked drops in price between 2008 and 2010. The price of urea has climbed to a record high, followed by a lesser, but still significant, increase in the phosphate price.

The entry of agriculture into the emissions trading scheme (ETS) in 2015 is to be reviewed in 2014. Voluntary reporting began in 2011, with compulsory reporting of emissions beginning in 2012. The New Zealand ETS (Agriculture) accounts for two of the greenhouse gases closely associated with pastoral agriculture, horticulture and arable production; methane and nitrous oxide. With some exemptions, participants for agriculture are meat processors, milk or colostrum processors, exporters of live animals, fertiliser importers and manufacturers, and egg producers. Farmers and growers are not required to register and participate directly in the ETS. This means that the ETS and its associated costs will not directly impact the basis of the agriculture sector (except for the cost increases all New Zealanders will experience, such as, gas and electricity), but will affect its linkages. Parts of these costs, therefore, are likely to filter back to farmers in some form, depressing incomes. From January 1st 2015, when agriculture is scheduled to fully enter the NZ ETS, farmers and growers are likely to face more direct costs associated with their livestock emissions and fertiliser use. These costs can be reduced by using resources more efficiently. Investment in forestry could also offset some of the costs. New Zealand is one of the most efficient in the world for biological emissions in agriculture production. If the ETS (or a similar scheme) was global, and treated emissions on an intensity basis, then this cost could become a positive. However, without this global approach, the ETS for agriculture emissions is just a cost for New Zealand farmers.

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Zoning regulations are currently under review in Palmerston North. This has the potential to impact upon agriculture in the region. Many land owners on the edges of urban areas find themselves subject to changing zoning laws over time. Zone changes can provide opportunity for agriculture land around towns to be subdivided for residential development, or turned into lifestyle blocks. This will change the economic make up in the Manawatu, as agriculture incomes are transferred to a home owner with income coming from urban jobs. Often the land marked for subdivision on farms tends to be higher quality production land, for example, the flatter areas. The zoning rules are aimed at controlling this urban growth and directing it to areas with lower productivity and for example, poorer soils.

Despite prices being relatively high for most agriculture based activities, there is still a lack of personal capital, and therefore investment, due to the previous economic downturn in New Zealand. While increased prices provide short term benefits, successful agriculture must manage short-term volatility well to enable long-term profitability. This makes it essential for investment and debt repayment in times of high commodity prices and farm returns to decrease liabilities and debt levels when prices and farm returns are low. There has been foreign investment interest, particularly in dairy land. The high profile 'Crafar Farms' sale includes two farms located just outside of the district, across the Rangitikei River. There has also been foreign investment interest in farms in the Manawatu (as detailed by the Overseas Investment Office), for example, in Napier Road, Whakarongo, and Hewitts Road. Countries with a greater amount of readily available funds (for example China) are more likely to inject a higher quantity of capital investment leading to increased growth and economic returns. The potential downside of such investment, however, is if profits are taken outside of New Zealand.



Diversification and Intensification

Land is a fixed input and because of this agriculture land is being used more intensively and in more diverse ways in an attempt to increase profit margins, or to maintain profit while experiencing increasing costs. While farmers have been receiving relatively higher incomes from the land, costs of farming have increased, as has the cost of living. Farming more intensively refers to the increased use of inputs, e.g. irrigation, knowledge and capital, in an effort to produce more from a fixed land area. Many see this as a component of, or linked to 'farming smarter', where farmers attempt to increase productivity. Dairy farmers have been consolidating farms and increasing average herd size (an increase in average herd size in the Manawatu region from 269 cows in 1999/00 to 359 cows in 2010/11) in an attempt to increase productivity through an increase in milk solids per effective hectare and per cow. This is due to a standardised product with little or no differentiation that a farmer could pursue to increase returns. Sheep and beef farmers have been trying to increase carcass weight per animal, and therefore profit per hectare. Red meat and wool products have a greater ability to be differentiated on value, wool grades (e.g. greasy or clean, and micron level) and meat grades (e.g. prime beef steers and fat levels). Horticulture has the highest ability to differentiate its products and as such can focus on producing higher quality rather than volume of output. In the broader picture intensifying production globally is likely to be the only way to continue to produce enough food, given the current population growth, although as an exporting nation New Zealand is likely to benefit from this. There was .44 hectares of arable land per person on the planet in 1960. Currently this is at 0.21 hectares per person.

Intensification has been made possible through technological and knowledge advances. Fertiliser use has increased, in particular urea (a nitrogen based fertiliser) use per hectare has increased 162% between 1994 and 2002. Between 2002 and 2009 fertiliser application has fallen per hectare, with an exception for nitrogen applications on dairy farms increasing slightly. This shows that there is a greater understanding of efficient nutrient management; a knowledge advance. Irrigation has increased, allowing conversion to dairy on previously marginal land and better growth on finishing farms and horticulture blocks, such as potato farms in Opiki. Canterbury has seen the largest increase in use of irrigation with its dairy herd size increasing dramatically to 15.4% of the national dairy herd. The Agriculture Census in 2007 reported that the Manawatu-Wanganui region had 11,730 hectares of land equipped for irrigation. The Manawatu region is not one that stands to benefit hugely from increased irrigation, as it normally receives adequate rainfall. Yet it does use irrigation methods to disperse dairy shed effluent, providing moisture and nutrients to the soil, there were 15,579 hectares sprayed with effluent in 2007 in the Manawatu-Wanganui region. Horizons Regional Council research has determined that approximately 62% of total consented water-take volume in January 2009 was for agriculture purposes (including irrigation, stock water and wash-down water) with a further 13% for industry and 25% for water supplies. Combined use for agricultural, industry and water supply has increased by 105% since 1997. Increases are predominately in the agricultural category.

Genetic testing and herd improvement has also helped intensification; for example, ewes with consistently higher lambing percentages, or better quality wool types. This improvement is supported by large amounts of research and organisation, such as that produced by Livestock Improvement Corporation. It is important to remember that intensification can have environmental considerations such as pressure on surface and ground water systems due to increased irrigation and nutrient application.

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Other agriculture system changes are occurring as a result of intensification. For example, dairy farms are now often seen using sheep and beef farms as dairy run-off, grazing heifers to weight before they are returned to begin milking, and winter grazing. This can be profitable for both sides, and has been led by a changing farm system that sees, for example, hill country farms (traditionally sheep and beef) using fertiliser to grow more grass and then supplementing their incomes by supplying dairy grazing. Dairy farmers are able to take advantage of this as prime grazing land can be managed over winter for better condition through the milking season.

Another example of agriculture system changes is the increase in maize silage production. Maize silage is now the largest crop grown in arable sector as intensification requires extra feed inputs. Palmerston North had 283 hectares of maize harvested in 2007, and there was 3,423 hectares in the Manawatu-Wanganui district. Cereal and pasture/lucerne cropping covered 1,892 hectares in Palmerston North, and 50,167 hectares in Manawatu-Wanganui. Another example is the beginning of the use of herd homes. While these are currently very scarce in the region (one in the region, and one just outside), Massey University is in the research stage of trialling one. They are also in use in parts of the South Island. Covered feed pads are more common than herd homes, but are still not in widespread use. Herd homes in particular have opponents who maintain that, while they may work well in some farm systems for protecting soils and managing environmental risks, there are significant animal health, environmental and economic risks associated with their use which have limited their uptake to-date.

Reduced profit margins have also led to diversification in an effort to supplement incomes. Farmstays are an example of this, and include activity based enterprises such as guided rural walks, horse treks, fishing and four wheel drive adventures, as well as general accommodation options to support traditional farming incomes. A good example of this is the Manawatu 'Country Road', a publication run in conjunction with Destination Manawatu. This is aimed at promoting scenic trips, local farmstays and businesses. Tourism remains the largest industry in New Zealand. There has been a slight fall in international visitors, but an increase in domestic visitors, due to the global economic climate. The only regional increase in international guest nights was Taranaki-Manawatu-Wanganui, up 1,000 (3.1%) between February 2001 and February 2012, domestic guests in Taranaki-Manawatu-Wanganui, were also up, by 14,000 (9.3%). As the agriculture sector diversifies, there is real potential for the country, and the region, to take advantage of an additional revenue stream. New Zealand is known for its natural environment, so the agriculture sector is perfectly placed to take advantage of visitors looking to encounter a 'New Zealand' experience. Hiwinui Country Estate near Palmerston North is one example of 'agriculture tourism'. It is one of only two Qualmark 5 star accommodation options in the region. Through diversification, Hiwinui offers a range of activities including weddings, meetings, accommodation, spa facilities, and farm tours. With this type of growth, an important consideration is the opportunity cost of what is given up to achieve this additional revenue. For example, the annual income for a tourism based job may be lower than an agriculture income, and growth may in fact be constrained by this diversification.

All of these diversification options lend the agriculture sector potential as a more broad-based industry that is less susceptible to slow world growth, changing exchange rates and commodity price fluctuations.

Along with diversification many rural households are beginning to consist of multiple job holdings. This can be for a variety of reasons and is not necessarily limited to increased incomes. Lifestyle and social factors are becoming more prevalent drivers as a flow-on effect from increased car ownership, and better road ways. If only one person works the farm, their partner often chooses to work, often part time, in local communities as a lifestyle choice, and to socialise, as well as supply additional income. In the Manawatu region, Feilding is a good example of an urban centre providing opportunities to rural people as its surrounds are relatively rural but within commuting distance. It is not as common for rural people to commute to work in larger cities, for example Wellington, as there are longer travelling times to from rural to urban areas.

Wind farms are another example of diversification. Te Āpiti wind farm consists of 55 turbines located on 1,150 hectares of farmland above the Manawatu Gorge. Meridian Energy is one of the four landowners of the land the wind farm is located on. The construction of wind farms on suitable land provides income for the cost of the land, often 'rented' to the energy companies. For example farmers are paid an annual sum for the continued use of having the wind turbines located on their farm and can often continue farming around the turbines. Also factored into these payments is 'compensation' for noise, and visual pollution. However many of these issues are not clear cut, and there is debate about this form of diversification in regards to animal health and stress.

All of these diversification options lend the agriculture sector potential as a more broad-based industry that is less susceptible to slow world growth, changing exchange rates and commodity price fluctuations. They also contribute to the economic growth in the region in ways that are not solely agriculture based.



The sector profiles for the Manawatu have been developed by the Palmerston North City Council to provide a better understanding of the different components of the Manawatu economy and the contribution each sector makes to the demographic and economic growth of the region. Even within each of the broad industrial sectors of the Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 there can be a diverse range of activities undertaken. It is useful, therefore, to understand which sectors are growing and are likely to grow in the future, and their overall contribution to jobs and incomes in the region.

This profile has been compiled by Carla Muller. At the time the profile was written Carla was a student at Massey University Palmerston North studying a Bachelor of Applied Economics in her final year. Carla worked with the Palmerston North City Council during 2012, through a Massey University internship to provide her with experience relevant to her economics degree.

The data in the profile is drawn primarily from Statistics New Zealand and from the organisations that helped in the creation of this report. The organisations which contributed to the preparation of this report are Beef and Lamb New Zealand Inc., DairyNZ, Federated Farmers, Fonterra, Horizons Regional Council, Jon Morgan from the Dominion Post, and Massey University.

Jon Morgan is the Dominion Post farming editor. He joined The Dominion in 1988 as a news editor and has been farming editor of The Dominion and then the Dominion Post for the past 10 years. He has won 25 journalism awards, including the supreme award for excellence in agricultural journalism, and the Landcorp Agricultural Communicator of the Year in 2011.

The Manawatu Region covers the area of Palmerston North City Council and Manawatu District Council. In June 2011 the region had an estimated population of 112,100 people a workforce of 54,580 people and a land area of 2,960km².

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