

Assessment of rural productive potential in the Greater Ōtaki area: Scenarios and options for a sustainable food future

Final Report



Landcare Research
Manaaki Whenua

Assessment of rural productive potential in the Greater Ōtaki area: Scenarios and options for a sustainable food future

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1 Executive Summary

The Greater Ōtaki area, that part of the Kāpiti Coast District north of Te Hapua Rd, has a long history of food production with a significant endowment of good soils and favourable climate. For over 160 years it has supplied the Wellington region with food, and – with its proximity to the city of Wellington – it has recently become attractive as a rural retreat for city-dwellers. Recent years have also seen a decline in horticultural production in the area, for a number of reasons, among which are increased costs such as compliance and land, competition from larger operations and imports, and changing consumer expectations and demands with respect to food. Kāpiti Coast District Council has received feedback from the community of Greater Ōtaki expressing concern for this decline and a desire for supporting a local-food economy and more ‘resilience’ in general. In addition, there is concern that lifestyle blocks and ‘urban sprawl’ are occupying more and more land with quality soils, effectively locking them away from potential future horticultural use. This report investigates these issues by drawing on a community survey, focus groups, conversations with producers and industry bodies, and available secondary data from a range of sources.

Food production

Greater Ōtaki has significant production of eggs, chickens, raw milk, olive oil, and a range of vegetables. Dairying has been declining in the area over the last ten years as farmers subdivide land for lifestyle blocks, and older farmers scale down their production. Production of tomatoes and berries has declined markedly, with most production shifting to glasshouses south of Auckland. Vegetable production has also declined, with some farmers moving north to Horowhenua where costs are lower and the soils and climate are of similar quality to those of Ōtaki. Residents have a range of aspirations for food systems: cultural, economic, social and community, health, and environmental well-being. Often people agree on the benefits of improving different aspects of well-being, but disagree on how to prioritise these.

In addition to purchased foods, the survey and focus groups indicate increasing efforts by residents to grow their own food in home gardens, and evidence for considerable gifting and sharing networks. While these networks are not part of the formal economy, they generate considerable community benefits including contributing to well-being and resilience. There is also evidence of a small amount of food gathering for personal consumption.

Food consumption

The 8300 residents of Greater Ōtaki spend about \$22m on food and consume about 6500 tonnes each year. By weight, about a quarter of this food is imported from overseas, but this increases to about half if measured in calories because New Zealand imports much of its high-calorie foods such as sugar, wheat, and vegetable oils. The survey indicates that the breakdown of food consumption in the area by category is similar to the national average.

Origins of foods

Origins of foods are difficult to determine, partly through lack of data but primarily because of the nature of centralised processing and distribution systems. While Greater Ōtaki produces about ten times as much raw milk as its residents require, the milk consumed by residents is probably processed in Hawera, some 225 km distant. Depending on the season,

fruit may be sourced locally, from elsewhere in the North Island, from the South Island, or from overseas. The origin of fresh foods can also be affected by the weather. The focus groups indicated considerable interest in the establishment of a farmers' market to help them proactively support locally produced food.

Environmental issues

The food consumed by residents of Greater Ōtaki comes with a 'carbon footprint' of about 22 000 tonnes of carbon dioxide equivalent (tCO₂e), mostly associated with meat. The international transportation of imported food contributes about 600 tCO₂e to this total, or less than half a percent of a typical New Zealander's total carbon footprint. High use of fertilisers in vegetable growing results in high levels of nitrate leaching into groundwater, and the use of pesticides is particularly high in the horticulture industry. The use of nutrient budgeting tools by farmers and growers has the potential to reduce fertiliser applications by better targeting to soil and weather conditions. Similarly, pesticide use is being driven down by the increased use of integrated pest management systems, primarily in response to demand from export markets. No data were available on the use of fresh water for horticulture in the area, but this has been identified as a potential concern by the Council and by participants of the focus groups.

Prospects for the future

As with most of the country, the proportion of older people in Greater Ōtaki is expected to increase, which means the population will grow faster than the number of people in the workforce.

While there is evidence of consumers becoming more discerning in their food purchasing decisions, there is still a wide gap between what people say and what they do. As in most of the developed world, more often than not consumers' purchasing decisions are based on price and convenience. There is a considerable literature on this that might be used by the Council to identify ways to minimise the conflict between reasons for purchasing decisions.

In the report we present two scenarios chosen to explore a range of possible futures: a regional/local-food economy and the establishment of a nationally significant raspberry enterprise. The local-food economy scenario envisions a world that addresses many of the concerns raised by the community in the survey, the focus groups, and our conversations with growers. In contrast, the raspberry scenario responds to market gaps and trends presented by industry representatives and data. While potential paths to either world are not obvious, there are a number of measures the Council can take to make them more likely. Key among these are the expression of a strong vision through the Community Plan, logistical support for both existing and new community initiatives, and further consultation with the community. While the selection by the community of a single, simple goal for food production in Greater Ōtaki is unlikely due to the range of motivations of both producers and consumers, the scenarios presented here are intended to aid on-going community engagement as the Council develops a district plan that will protect future options for food production.

2 Acknowledgements

We thank all the community members who completed questionnaires for us and all those who attended, and helped to organise, the four focus groups that we held. We greatly appreciate their many contributions to the work presented here. We also acknowledge the assistance of a number of representatives of primary industry bodies. We have talked with a large number of people in all steps of the supply chain both in Greater Ōtaki and neighbouring regions, and nationally.

We appreciate the contributions and advice of Anthony Hume for discussions on life-cycle assessment, Sarah McLaren for input on sustainable consumption, Peter Newsome for assistance with land use, Janice Willoughby and Anne Sutherland for GIS support, Anne-Gaëlle Ausseil for land-use impacts, Robyn Sinclair for review, and Anne Austin for editing.

3 Introduction

This is the final report by Landcare Research for the Kāpiti Coast District Council (KCDC) in the project “Assessment of Rural Productive Potential in the Greater Ōtaki Area.” Kāpiti Coast District Council has received feedback from the community of Greater Ōtaki¹ expressing concern for this decline and a desire for supporting a local-food economy and more ‘resilience’ in general. In addition, there is concern that lifestyle blocks and ‘urban sprawl’ are occupying more and more land with quality soils, effectively locking them away from potential future horticultural use. This report investigates these issues by drawing on a community survey, focus groups, conversations with producers and industry bodies, and available secondary data from a range of sources.

With increasing community interest in the concept of a ‘local-food economy’, the Council wants to explore the inter-related issues of food consumption and production, particularly with respect to resource needs and flows, economic development opportunities, social infrastructure needs, and innovative land-use management systems and regulation. Key drivers of a desire for a local-food economy are recognition of the lack of resilience² in a globalised supply chain and reversal of the trend towards abstraction from nature. While today’s globalised supply chains provide a vast range of food choices over ever-expanding seasons, they also leave communities vulnerable to fluctuations in world markets and reduce influence over how food is produced and distributed.

The Ōtaki area has a significant resource of high-quality soils, and horticulture and dairying have contributed to the local economy for over a hundred years. With more food being sourced from outside the region and land being subdivided for rural lifestyle living, there is a danger that these high-quality soils may effectively be locked away or at least that the range of uses to which they might be put is diminished. By considering the protection of these soils, the Council hopes to retain options for the community’s future.

Complete local self-sufficiency with existing lifestyles and diets is not possible (e.g., Greater Ōtaki will never produce sufficient oil or bananas), but a move towards greater local self-sufficiency may be desirable for a range of reasons. These include environmental concerns (e.g., reducing carbon footprints), cultural reasons (e.g., supporting traditional production methods, maintaining indigenous culture, supporting friends and neighbours in the community), individual health concerns (e.g., pesticide residues), and economic interests (maintaining and growing the local economy for jobs and well-being).

In this study we have consulted widely with the local community through focus groups, a postal survey, many telephone conversations, and talking with people on the streets of Ōtaki. Consultation is important not only to confirm Council’s understanding of community sentiment, but also to use the wealth of knowledge held by the community.

¹ The location of Greater Ōtaki is shown in Figure 12.

² By ‘resilience’ we mean the ability to weather both internal and external shocks that might otherwise significantly disrupt economic, social, and environmental states.

Council intends to use information from this report to guide some aspects of the revision of the District Plan, including issues of rural subdivision, and the promotion of local food production and consumption.

3.1 Self-sufficiency and resilience

The concept of self-sufficiency in a globalised economy can fall anywhere between two extremes. At one extreme, strict self-sufficiency could entail each household consuming only what they produce themselves on their own land. At the other extreme a household might purchase entirely imported food. While each extreme is possible for an individual household, they are very unlikely for larger numbers of households, and not necessarily desirable. Strict self-sufficiency precludes the option of exchanging surplus food with neighbours. A household's position on this spectrum balances their values in relation to many issues, including: reliance on others, resilience, trust, awareness of production methods, convenience, seasonality, expansion of options, etc.

Figure 1 conceptually shows the major flows of a food economy focused on Greater Ōtaki. The concept of 'net' self-sufficiency allows for processing outside the area of locally produced foods, which then return to the area, and also to the exchange of food with other areas (regions, countries), making use of comparative advantage. Note that in this figure the local 'economy' includes non-market transactions such as gifting and bartering.

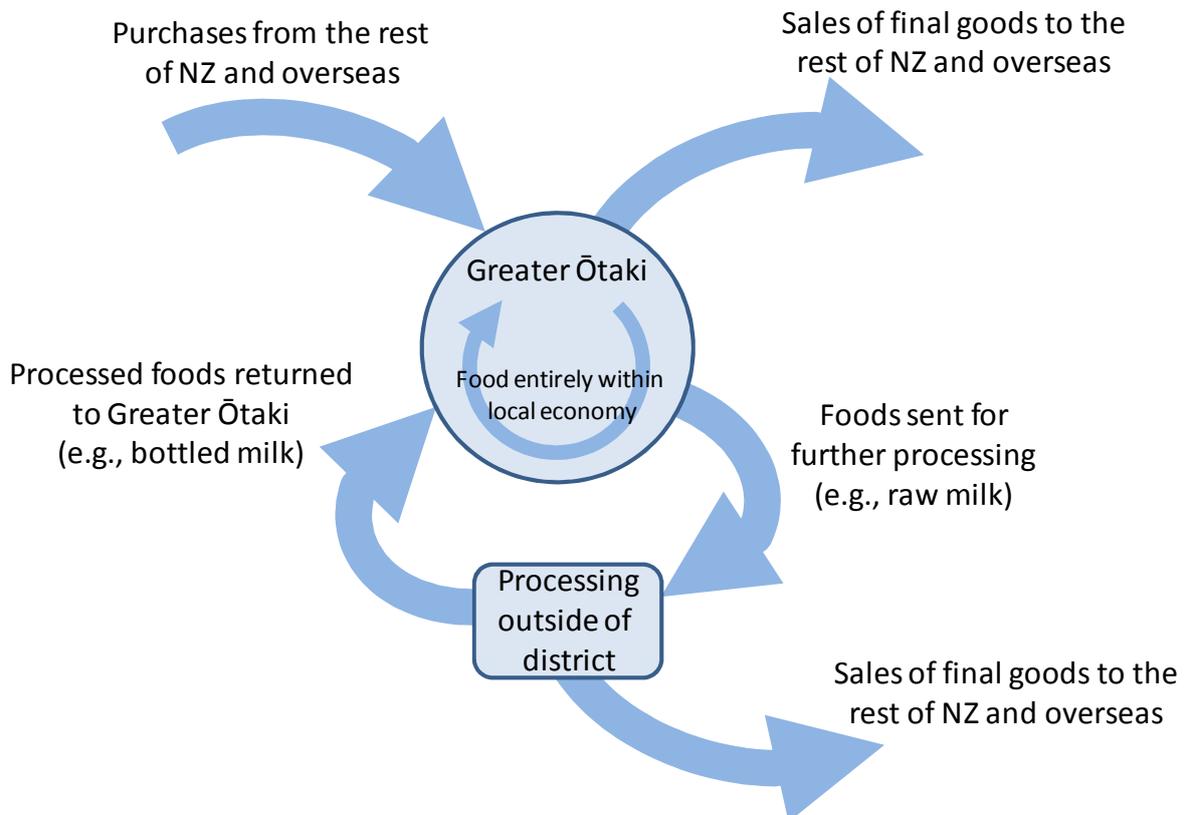


Figure 1 Conceptual diagram showing major flows of food in relation to Greater Ōtaki.

Milk and meat are examples of products that are grown in the area, processed outside the area, and then returned for sale in the area. Efficient, low-cost production of these processed goods requires large facilities with economies of scale, and these are consolidated in relatively few locations around the country. The location of these facilities is usually based on hub/spoke distribution requirements and historical factors. While it would be possible to establish milk processing (homogenising, drying for powder) facilities in Greater Ōtaki, the existing on-farm returns and margins on these goods are insufficient to absorb the additional costs. In contrast, boutique cheese production, for example, would be feasible in the area because of higher margins.

3.2 Early history of commercial food production

Ōtaki has a long and proud history of food production based on a natural endowment of high quality soils and good climate. On return from a month-long journey with the Surveyor-General in 1841, the New Zealand Gazette and Wellington Spectator reported the following (New Zealand Gazette and Wellington Spectator 1841, p. 2):

At Waikanai and Ōtaki the vegetation is most luxuriant. At the latter there is a large quantity of wild oats measuring six feet in height, and wild wheat having ears six inches long. At Waikanai there is excellent Cape barley in considerable quantities. A circumstance which affords good proof of the productive powers of the climate of this island may be witnessed at Waikanai. At that place a large quantity of potatoes are growing in mere sand. On enquiry, Mr. Jenkins, who has lived there five years, stated that during his residence good crops had been obtained from the same soil annually by the natives. Would any person in England venture to take five successive crops of potatoes from the same piece of ground – without the aid of an abundant supply of manure?

During the 1840s the Rev. Octavius Hadfield built a church in Waikanae (Davis & Dollimore 1966).

Hadfield taught the Maoris to cultivate wheat, and by 1850 several hundred acres at Waikanae and Otaki were being used for that purpose. During the early 1850s water-driven flourmills were erected at Otaki and, for a time, the industry flourished. Flour was sold to the Wellington market (Davis & Dollimore 1966).

In 1845, one correspondent, on return from a visit to Ōtaki and neighbouring districts, wrote (New Zealand Spectator and Cook's Strait Guardian 1845, p. 3):

I was delighted with the land at Otaki, which is of the very first order of fruitful soils, and there are many thousand acres that seem to invite the plough and the seed.

In 1849, the Reverend J.F. Lloyd made a journey to Ōtaki, primarily to ascertain the progress and prospects for Christianisation of local Māori, but in his letter to the editor he notes the following (New Zealand Spectator and Cook's Strait Guardian 1849, p. 2):

This is a rich and sunny district, and must one day, when brought into proper cultivation, rival in luxuriance the most fertile parts of the south of Europe.

In 1850, Ōtaki was reported to have “extensive native cultivations” (New Zealand Spectator and Cook's Strait Guardian 1850, p. 2), apparently mainly grain and flax.

Following the decline of the gold industry in the late 19th century, many in the New Zealand Chinese population resettled in areas with high quality soils and climate suitable for

vegetable growing, for which they had considerable skill (Young 2003). With wording apparently reflecting the competitive tensions between European settlers and the Chinese population at the time, the Wanganui Herald reported in 1897 that “[t]welve Chinamen have swooped down upon Otaki to start a market garden” (Wanganui Herald 1897, p. 3). So began a long history of Chinese market gardeners in Ōtaki.

By the late 1890s, the creamery in Ōtaki was supplying 10 000–12 000 litres of milk per month to the New Zealand Farmers’ Dairy Union (Feilding Star 1897, 1898), and by 1916 dairying in Ōtaki was well established (Evening Post 1916, p. 11):

Just now Otaki is a dairying centre, but it would be wrong to say that dairying is progressing rapidly, or even likely to progress much more. Of course, it is carried out more extensively now than was the case ten years ago; but it has probably reached its height. Already some of the dairying lands have given place to orchards and gardens, and it is likely that this transformation will go on and on. Just now there is a mixture of all sorts of land activities, which proves the worth of the holdings in more ways than one.

The impartiality of this quote may be questionable, considering that it is extracted from a four-page special section devoted to Ōtaki in a 1916 edition of the Evening Post that extols the virtues of Ōtaki as a potential vegetable production area. The paper is glowing in its praise for the district’s production potential, and hints at existing tensions between productive land uses (Evening Post 1916, p. 11):

IDEAL DISTRICT FOR VEGETABLES. One thing that strikes a visitor to the Otaki district is the splendid quality of the soil, and the truly remarkable growth on the cultivated areas. The soil is reputed to be about the richest in New Zealand; at least that is the opinion held by practically all the market gardeners, who should know it best. As for climate, the place is unequalled. Is it not strange, then, that so little of the ground is cultivated, and so much of it taken up by dairy farms? The district is only 47 miles from Wellington, where there is a market which is never completely satisfied. The demand for more vegetables always exists, and there is a great opening for more extensive market gardening.

The article notes urban sprawl has displaced vegetable production from the Hutt Valley to Ōtaki (Evening Post 1916, p. 11):

OTAKI VERSUS HUTT VALLEY. Up to date, Wellington has depended to a large extent on the Hutt Valley for its vegetable supply, but Taita is so close to Wellington that it is gradually being cut up for residential sections. Gardeners have already been driven out of this portion, so the city must look elsewhere for its market supplies. In this direction a large trade has been built up with Nelson, but fruit and vegetables coming by steamer across Cook Strait are liable to more delay and greater handling than is the case with such products from Otaki. So, it would seem, Otaki must become Wellington’s principal kitchen garden. That it is capable of supplying the whole of Wellington’s wants should not be doubted in the least.

Further liberal praise is heaped on Ōtaki’s current and potential production of small fruit and vegetables (Evening Post 1916, p. 11):

SMALL FRUIT. Otaki is also an ideal spot for the growing of raspberries, though the fact has not yet been realised by many. Raspberries grow wonderfully well, and it is a wonder more land is not utilised for them. But the people in Otaki have not yet learnt fully the resources of their land and climate—the immense possibilities which are before the place as a supplier to the principal markets all the year round.

VEGETABLES. Very large areas are given over to the growing of vegetables of every class. Each year sees a greater area put out in vegetables, and it is plain that the district is developing in the direction in which it is destined to go. Both European and Chinese keep their gardens in beautiful condition, and while the land is kept judiciously manured, there is no prospect of its productivity suffering. Gardens are to be seen in every direction, and the supply of vegetables from this centre is enormous.

The warning of the Evening Post reporter in 1916 about the sheer hard work required to operate a market garden seem equally relevant today, and are echoed by several of the growers in the district with whom we talked (Evening Post 1916, p. 11):

HARD WORK. Market gardening calls for hard and continuous labour. Unless a man is prepared for that he can never make a success of commercial growing. By himself he can work ten acres, and make good money, but he must be systematic and must know something about the calling he has favoured. Market gardening by itself is no good for a novice, and nobody should be drawn into it by glowing accounts of the success achieved at Otaki. Of course, it is different if he is prepared to stand a loss for the first season or two

3.3 Natural resource endowment

As identified by early visitors to the region, the Ōtaki area is endowed with excellent soils (Figure 2) and climate³ suitable for horticultural and agricultural production. This rich endowment provides the area with the potential to be a significant food producer, and indeed it has been one for many years. However, there is also potential for effectively irreversible loss of access to these endowments if patterns of land use are not managed well. It is the sunk cost of infrastructure investment that can lock in land use, whether that be rural-residential subdivisions with valuable houses and landscaping or dairy farms with high-value milking sheds and other facilities. Of course these land uses do not permanently reduce options for future land use change, but they do significantly reduce the likelihood.

One key consequence of the reduced availability of quality soils is that lower quality soils must then be used for food production, with consequent increases in requirements for fertiliser, pesticides, and irrigation.

Resilience in a community is partly about retaining options for the future, but clearly a balance must be achieved between keeping options open and taking options now. Without perfect foresight it is not possible to optimise such decisions. The community must discuss and debate the range of options so that a balance that best suits the community is found.

³ For details of climate, see Mackay et al. (2005).

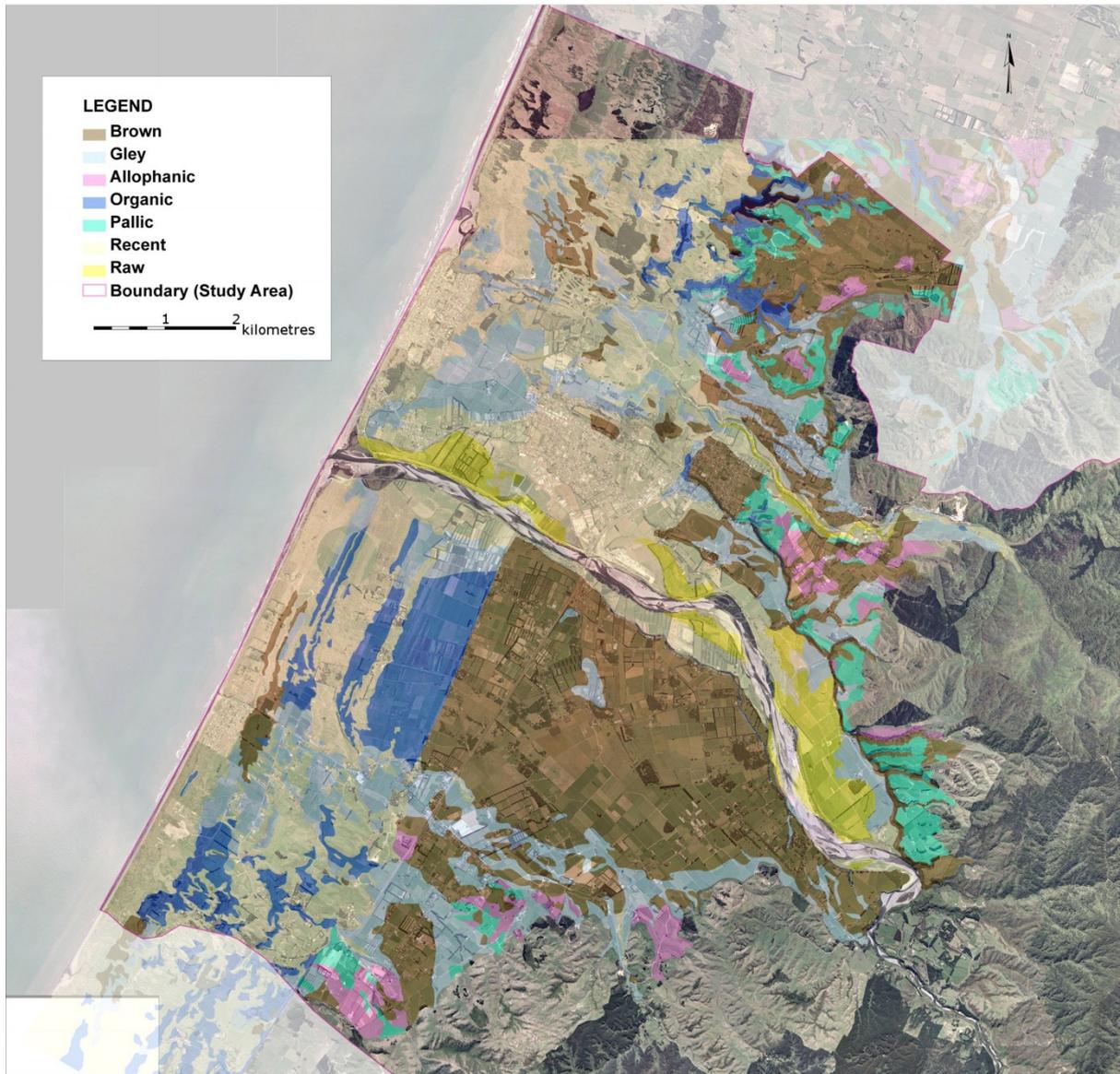


Figure 2 Soils of Greater Ōtaki (source: S-Map, Landcare Research).

4 Data and information sources

This report incorporates findings from a range of sources including secondary data sources, conversations with local food producers, a survey of members of the public and a series of focus groups. The findings from all of these sources are presented alongside each other throughout the report; this section provides a short introduction to, and explanation of the data collection to allow information from the different sources to be viewed in an appropriate context. Further information is provided in the Appendices as indicated throughout this section.

4.1 Existing data

A wide range of sources have been used for secondary data, and these are referenced throughout the report. In addition to academic and grey literature, key sources of information used are:

- Statistics New Zealand: Household Expenditure Survey, Agricultural Production Census and Surveys, Census of Population and Dwellings, External Trade data, customised employment data
- Food and Agricultural Organisation of the UN: Food Balance Sheet
- Databases of National Significance held by Landcare Research: Soils, Land-Use Capability
- ASUREQuality: AgriBase

4.2 Producer conversations

To gain a wide range of information and enable us to discover the topics to which they wished to draw attention, food producers were interviewed by telephone.

As the interviews progressed, we also added significantly to an original list of businesses provided by Nature Coast with references provided by the producers themselves. In addition, a letter about the research and requesting participation was dropped in letterboxes at many properties where we could identify food production on site but for which we did not already have an identified contact.

Food producers interviewed included:

- Orchardists
- Vegetable growers
- Dairy farmers
- Meat producers
- Food processors

While professional food producers (those for whom it was their business/primary income) were targeted for these interviews, we became aware of a wide range of part-time growers on lifestyle blocks who continued to work in paid employment.

All food producers were helpful and happy to share information and opinions. However, with just a few exceptions it was difficult to obtain quantitative information about their production, with many claiming simply not to know the quantity produced, value created or measures of inputs such as water or fertilizer.

Relevant grower and service organisations were also contacted including the newly amalgamated Tararua District Growers Association, MG Marketing, local farm supplier Farmlands, Ravensdown, Horticulture NZ, Dairy NZ, Poultry Industry Association of NZ, and NZ Pork.

4.3 Household Survey

A questionnaire-based household survey was developed to collect information on a range of topics relating to local food systems. In particular the questionnaire focused on

- Individual food consumption
- Where individuals obtained food
- Household food growing (particularly in home gardens)
- Key issues and thoughts about the local food economy

Four hundred questionnaires were sent out and 50 useable responses were returned. While the response rate was lower than anticipated, the data returned provide useful insights into local food systems.

The questionnaire methodology is described in detail in Appendix A and the demographics of the responding cohort are described in Appendix B. The questionnaire itself is provided in Appendix C.

Due to the small number of questionnaires returned, the results given here must be treated with some caution. In particular, the respondents to the questionnaire do not fully represent the population of the Greater Ōtaki area. The following points about the questionnaire respondents should be particularly noted:

- The respondents came from a range of rural and urban settings. Individuals living in peri-urban areas were slightly underrepresented in the sample.
- The majority of respondents live on sections that would be considered small in terms of food production potential: 70% live on sections less than 1500 m² in size.
- 92% of respondents own their own home.
- A large majority of the questionnaires returned came from members of the European Ethnic Group. The Māori Ethnic Group was particularly underrepresented. No respondents considered their ethnic group to be 'Chinese'.
- The questionnaire cohort over-represents those on incomes of \$20,000 or less and under-represents those on incomes between \$50,000 and \$100,000 per annum.
- Households without children are overrepresented in the sample, as are females, and older adults.

Appendix B contains discussion of each of these points, including some comments on the reasons for biases in the sample and the impact these may have on results. While the sample for this questionnaire does not fully represent the population of the Greater Ōtaki area, it does

include a wide range of individuals from different socio-economic groups and the information provided by respondents can give useful insights into local food issues. A particular focus was placed on ensuring that groups of people who were under-represented in the questionnaire sample were included in the focus groups so as to incorporate the voices of a wide range of the residents of the Greater Ōtaki area in the exercise as a whole.

4.4 Focus groups

Following on from the analysis of the data provided in the survey responses, four focus groups were held. These groups were designed in a manner that would supplement both the sample, and the data collected, in the questionnaires. A total of 36 individuals were involved in the focus groups, including urban and rural residents, older and younger individuals (including some students from two local schools), adults both with and without children, and individuals of different ethnic origins, particularly Māori and European.

The focus groups averaged around an hour and a half in duration and broadly covered five topics:

- The food you eat and where it comes from
- The importance (or otherwise) of sourcing food locally
- Food production and growing
- Home gardening
- Envisaging a food future for Greater Ōtaki

The topics were covered in different levels of depth by groups according to their different levels of experience and interest in the issues arising in the discussions.

It should be recognised that any social research exercise in which participation is voluntary will struggle to elicit detailed responses from individuals who are not engaged with, or do not feel able to contribute to, the topic under discussion. While efforts were made to engage with as wide a range of individuals as possible it should be acknowledged that responses are biased towards those already thinking about food systems in the Greater Ōtaki area.

5 Community aspirations for the local food system

Naku te rourou nau te rourou ka ora ai te iwi
With your basket and my basket the people will live

Māori proverb

It is rare that an individual will have only one aspiration for the future for any particular topic. It is more likely they will have several aspirations, to which they attach different priorities. Imagine a grocery basket with some small items in it and some larger ones, some expensive goods and some cheaper ones, some items that the shopper considers essentials and others they consider luxuries they will leave at the bottom of the basket to buy only once the essentials on top have been successfully purchased. This is a useful analogy for thoughts about a local food system: individuals in the community have different baskets in which they keep different sets of aspirations, with different costs and different priorities. Managing the different baskets of aspirations different individuals hold is a challenge.

This research engaged with members of the local community particularly through a series of focus groups and a postal questionnaire (described in more detail in Section 4). Throughout the focus group research, and to a lesser extent in the questionnaire responses, participants expressed some very clear views on what they would like to see from a local food economy.

A large number of the views expressed by participants can be related to notions of well-being (or sustainability in a broad sense). In particular five different areas of aspiration for the local food economy can be identified:

- Cultural well-being
- Social and community well-being
- Economic and financial well-being
- Personal well-being and health
- Environmental sustainability

Each of these will be explored in detail below.

Many participants expressed very similar views on these different topics. Critically, however (and in line with the basket analogy explained above), participants gave different weight and emphasis to different aspects of their views. Some participants pointed to possible tensions between residents of the area who value different types of well-being more highly than others. For example,⁴ ‘Participant A’ may prioritise notions of economic well-being and business prosperity, while ‘Participant B’ prioritises cultural well-being, and prosperity in terms of heritage. Often both A and B will agree that both types of well-being are valid, and will include them in their basket of aspirations, but they see them as being of hugely different

⁴ The labels ‘Participant A’, ‘Participant B’ and ‘Participant C’ are used throughout this section to enable comparisons to be made between different points of view and to delineate quotes including contributions by more than one participant. Throughout this section several real people are referred to as ‘Participant A’, and several are referred to as ‘Participant B’. The person who is represented by the label ‘Participant A’ in one quote may be a different person from the person represented by the label ‘Participant A’ in a different quote.

importance and urgency, and this can lead to conflicting views on which well-beings should be targeted first and which should be left at the bottom of the basket until the priorities are successfully secured. Some of the potential conflicts between well-beings are described later in this section.

As a general rule, with regard to well-beings, participants see the Council as having a role in facilitating their ability to achieve the well-beings they prioritise themselves, but some strong views were expressed against the Council restricting what can be achieved and which well-beings the community can choose for itself.

From the focus group and questionnaire research it would seem that participants would like the Council to support initiatives launched by members of the community and to minimise the number of restrictions on the activities that they are able to pursue. Freedom of choice, when choices can be conflicting, is clearly problematic. But hope for a successful, and inclusive, local food economy may be drawn from the fact that there are many areas of common ground and many common aspirations, even if the priorities for these are currently unclear.

Recent years have seen the development of a number of different methodologies for working collaboratively with groups with divergent interests⁵ towards a shared vision for progress. A continuing and wide-ranging discussion of the viewpoints described below, and others that may emerge, would facilitate the successful development of a local food economy that meets the needs of the different members of the Greater Ōtaki community.

The principal types of well-being that were discussed are described below.

5.1 Cultural well-being

A number of the participants in focus groups expressed a view that local food futures need to be such that the cultural well-being of the area is maintained and enhanced. While this view was particularly put forward with reference to Māori culture, Chinese culture was also commonly mentioned (particularly with reference to market gardens). The more general, and historical, culture of food production in the area was also cited.

Food has been shown to be central to individual and group identities: what a person eats says a lot to themselves and to others about who they are, where they have come from, and what they believe in (Fischler 1988; Mortimer & Abrahamse 2010). The ability to behave in a way (including consuming food in a way) that reinforces one's personal and group identities can have a marked effect on personal well-being. In addition to personal well-being, where food practices are central to a culture, their preservation may help to enhance the resilience of that culture in the face of external shifts and shocks. As Mortimer and Abrahamse explain, shared

⁵ The website <http://learningforsustainability.net/> contains a number of pages and references that may be useful here. The site <http://icm.landcareresearch.co.nz/> includes descriptions of a highly acclaimed project that successfully engaged stakeholders with divergent interests to improve the management of the Motueka River catchment. While neither of these refers specifically to food economies the learnings described in each may be highly relevant to other collaborative projects.

group symbols or rituals, including those around food, “enable people to hold onto a form of shared and constant identity when the world around them is rapidly changing” (Mortimer & Abrahamse 2010, p. 152).

In each focus group participants were asked what they had had to eat at their last meal. Many of the answers included not just details of the foods eaten, but also comments that say something about the values, identity and lifestyles of the participant as well as about their choices of food. For example, the following quotes go much further than identifying food types.

“I had – I sort of picked at vegetables when I was making tea for the kids, you know? Because it’s in between going to gym, hockey, making tea, you know? Doing all that. I had half a sausage in the car.”

“And for dinner I had fish and chips tonight. Took my wife, we went out to the beach. We had fish and chips in the sunlight, wriggled our toes in the water and walked along the beach. Had a couple of beers, and it was very nice.”

These kinds of quotes show quite clearly that participants associate the food they eat with the other things going on in their lives and with their priorities for how they spend their time and what is important to them. In particular, it can be noted from the conversations in the focus groups that a culture of ‘busy-ness’ has a strong influence on the way in which people eat. Probing a little deeper into participants’ thoughts about food reveals more about the connection of personal identities to food systems.

One Māori participant, when asked about local food, explained her connection to a food culture saying:

“You know where it comes from. That food has a whakapapa too. I mean, it’s like with your seeds, you know, I know my kamokamo seeds were my grandfather’s kamokamo seeds. So I know what they taste like...seeds have whakapapa too.”

In this way this participant described the importance, to her, of knowing where food comes from and she illustrated how her food’s whakapapa may be linked to her own whakapapa. She then proceeded to situate food in her own personal history, explaining that:

“[P]robably it’s the food that’s comfortable for me, because it’s the kai I recall enjoying as a child”

She finished by highlighting the importance of the continuity of the food culture in which she is embedded by emphasising her desire to share it with her son:

“I want to give my son – I want him to enjoy those sorts of kai.”

Food cultures commonly include the types of foods that are eaten but also the ways in which foods are obtained and prepared. One participant explained his own personal history of gathering food, and put this in the context of a food gathering culture of which he was not a part, showing empathy for a culture which is connected to, but not the same as, his own experience:

“As a kid we used to go and get crawlies from the stream and eels from the stream and whitebait by the bucketful. And there’s a whole...and you think of the Maori population. It affects me a little bit, but you think of Maori people who used to live on that. That was their kai. Every day. And they’ve been forced now to – will be forced or have chosen to go into the workforce to earn on a 40-hour week. But that used to [be] their right – was

that natural food and I think if we want to move anything from this meeting would be to look at restoring natural food sources.”

Similarly, a Māori participant explained some of the difficulties faced by some of the former Chinese growers in the region:

“And they would like to be able to grow. But as they said, they were exited out of the market – they couldn’t compete against the big multinational growing companies like Turners and Growers. They just couldn’t compete on that scale, once we went global.”

This cross-cultural concern for the welfare of other groups may indicate that, despite different food cultures, there is the potential for inter-group resilience building through food systems that support different cultures.

Recognition of the most basic connection between food and resilience (through secure access to sufficient food) comes particularly from several of the Māori participants:

“My concern is that we don’t have a pātaka [storehouse]. There’s no pātaka for our iwi, so if there’s any situation, we can’t feed ourselves. And that was evident – there was an issue here, maybe one or two years ago, when we had a power outage for three or four days. This Wānanga couldn’t look after its students. So – and being aware that the supermarkets aren’t open – that was a short period even there, where people couldn’t rely on supermarkets for food and kai, and for our whānau that don’t have the means or wherefore to be able to go and gather kai, or have kai in their own whenua, they’re not going to be able to take care of themselves. So to me, I think that’s something that the iwi and ... individual whānau ... need to start seriously considering about building our pātaka kai, because as Māori, that’s what we’ve always done.”

In an extension of this, one participant talked about the dangers of environmental pollution threatening his family’s traditional food sources.

“[If] there was an oil spill, say out here. For me ... and for my kaumātua that would mean no whitebait, which meant no kahawai, which meant no pipi, no toheroa. A lot of our food sources are here – would be gone. And a lot of the food that my children have grown up with wouldn’t be here anymore. We would be buying noodles and crap.”

“I think there’s a history with my family, and probably a lot of our families around here. Kai moana has been a staple diet. It might not be so much these days, but you know, since our tribes sort of moved down here, the same sort of kai’s been available in our rivers and all that. I mean, whatever happens out to sea is going to affect what’s going to happen in the rivers, and that’s going to have an effect of what’s going to happen for our lands.”

Concern for environmental sustainability is discussed in more detail in section 5.5, but this quote illustrates the nature of an external threat to a cultural food practice.

Sharing networks appear to be one commonly used way to improve resilience, particularly, but not exclusively, in the Māori culture. Participants in three out of four focus groups talked about sharing, swapping or gifting food, for example:

“I enjoy giving the produce away, to various different people. Yeah, it’s good.”

“The kahawai were running the other night and my mates caught way too many fish, so they just went dropping it off all around the place. I was happy.”

One participant commented on the decline of sharing networks:

“[D]ifferent whānau had different expertise.... [T]hat whānau, they were the ones that were the fishermen, they were the ones that did the tuna, those were the ones that did the pigs, you know.... [T]here was a speciality in whānau, and you knew you were going to get looked after, so all our kaumātua got looked after. Kai was always turning up.... I think a lot of whānau just are too busy just having to look after themselves now, that’s an economic reality.”

While sharing networks may be in decline, the prevalence of comments on sharing both in the focus groups and in the questionnaires, and quantitative evidence from the questionnaires that a great deal of home grown produce is gifted or shared (this is presented in Section 8.1), illustrate that sharing is still a significant part of the local food economy. The association of sharing with positive terms, such as ‘I enjoy it’, ‘I was happy’ and ‘we all benefit’ show that the sharing networks in the community are valued and make a significant contribution to well-being.

Cultural well-being is of prime importance to some of the participants and forms a large part of these participants’ aspirations for the future food system.

5.2 Social and community well-being

Closely related to cultural well-being, social and community well-being is about ensuring that members of the community are looked after and that the community is a vibrant and supportive place. Participants in one focus group in particular commented on the need to take care of all the members of their community:

“[P]eople are struggling to just get by. [A]s a single parent ... I’ve been one of them too. You’re just struggling to survive, sometimes. And you know, if we could take care of each other, it would certainly be a lot more beneficial for our children, and ourselves.”

For this group, the sharing of food was an important way to ensure that everyone is looked after:

“Oh, we’ve got nice, lovely old lady neighbours that do their gardens, fruit trees [laugh]. And we give her whitebait. [T]hat goes back to looking after each other, eh? You know, we’re always raiding her lemon tree. But when we get something like Christmas we would send her a hamper, or [during] whitebait season, we give her whitebait or pipis or something like that.”

While participants in other focus groups were less explicit about this others mentioned community spirit:

“[L]ast night we did a big group planting of spuds with five other families, too. So we’re really into community and food, working together.”

A number of participants across the different focus groups also referred to wanting to support local business so as to support the local community and local people. For example when asked about local food sources one participant said:

“I’d like to see priority go on local, [as] opposed to the supermarkets or something, you know? ...and then to support them, and the profits then get kept within the community for them to prosper as opposed to [supermarkets] that profit goes back to head office in Auckland or wherever”

Another participant in a different group made a similar comment, but this time based more on the national origin of the products rather than the retailing corporation:

“[I]f you’re paying for it, your money is staying local – it’s not going to some bloody country in America that makes billions and billions every year and nothing comes back here. It’s supporting locals and helping to develop the community, hopefully.”

This concern for supporting local producers was echoed in comments made in the questionnaire responses; the most commonly cited reason for choosing locally grown food was to support the local growers, economy and community (this finding is presented in more detail in Section 9.2). A feeling of care and support in the community may greatly facilitate the development of a successful locally based food economy such as that described in one of the scenarios (see Section 12).

5.3 Economic and financial well-being

A common theme in focus groups was around the need to achieve economic and financial well-being. This theme was particularly common in discussions around increasing food production in the area and the ability of food producers to earn a living. As one participant explained:

“Basically you need money. The bottom line is money.”

And another said:

“It comes down to the fact that you’re living in a profit-oriented society. Market forces rule.”

Another participant, in a group that largely prioritised self-sufficiency in food, when asked about the possibility of selling food commented that some income generation through food sales may be beneficial:

“[W]e might be able to swap this and that and that with ten different growers in the area, but really I don’t know if that gives you a good standard of living – it gets you kai to live on. But then, you know, we have other needs – we have medical needs, we have – might need to travel sometimes. We need to clothe ourselves and it’s thinking through the mechanics of that.”

Some participants highlighted a distinction between earning a little money from sales of surplus food compared to selling enough to make a living. Those who talked about making a living from food production commented that this can be really difficult.

“If you want a subsistence living, then you can make a go of it. But if you want to have a good lifestyle, forget it.”

“There’s a difference between surviving and thriving, isn’t there?”

These participants also emphasised that the difficulty of making money is driving people out of food production:

“[Y]ou don’t see kids growing anymore because their parents funded them into varsity, and said don’t come and grow cabbages because you’ll never make any money. Go off and be a doctor, a dentist or a lawyer....”

Other participants talked about selling food as a means of generating a little surplus income rather than as a sole means of subsistence. For example, a conversation between two participants about the economies of scale in food sales went like this:

Participant A: I don't think we need to think big in the way of markets at all. And I don't think anyone needs to think they can make money at the market. You can sell your surpluses and you can spend your cash – the cash that comes in – at someone else's stall, and go home with something that you didn't have. I think it's more like on that level.

Participant B: Well that's when you don't have to live.

Participant A: But when I was doing that it was fantastic. It was a wonderful feel[ing] and it was a bit of cash.

Participant B: But how are you paying your mortgage, though? You've got another job?

Participant A: No, we're retired.

Participant B: Right. That's nice then, isn't it?

Another participant, in a different group, made a similar point asking:

"[A]re we talking here about people ... making a living out of growing stuff? Or flicking off another couple of, you know, kilos of beans, if they've got a surplus? Because it's miles apart."

Economic well-being is clearly an important part of the equation on what future food systems look like, and the question of food production being a sole source of income, compared to being a supplement to another source of income is a pertinent one, and one to which participants paid significant attention.

5.4 Health

A number of questionnaire respondents and focus group participants referred to the health value of foods and how the quality and safety of food is very important to them. The discussion on health incorporates the types of foods that people eat, how they can be encouraged to eat a healthier diet and also the personal health benefits of activities such as gardening. The vast majority of comments, relating to food and health, however, focus on growing practices that impact on the health qualities of foods (such as organics, sprays, and the nutrient qualities of soils). In particular, there are a very large number of comments expressing concern about the use of sprays during crop growing and a smaller number on the use of hormones and different animal feeds in livestock raising. These views were also reflected in some of the comments made by questionnaire respondents.

There was a clear message that participants would choose to eat food they perceived to be healthy (and often for the focus group cohort that meant spray-free) wherever they could, but there was some disagreement about how to tell which food sources were most likely to sell safe (and spray free) food. The concerns and dilemmas are evidenced by the following quotes from different focus group participants and questionnaire respondents:

"You know, we have relationships with the market gardeners and all of that lot. My family, anyway – we've grown up working for them and with them and so I'm pretty confident that there's no crap in the food."

"My father's just battling cancer at the moment, and he saw a programme about the kai that goes into the chickens that are not free range, and he was really concerned about that. You know, that – maybe that's why there's an increase in the cancer rates – because of what we're actually putting into our food. And I don't know what testing's been undertaken there."

“I spoke to somebody who’s working with food – the Food Safety Authority – at the moment, who said that she, after understanding what’s happening with the legislation, she said that it’s actually safer to buy stuff from the supermarket where it’s been screened, than from the roadside stalls.”

While a number of participants referred to the testing regimes and food standards applied by some food growers, retailers and standards agencies, some focus group participants indicated a high level of distrust of these schemes:

“Well these local gardeners won’t have a proper spray programme, so they could just be spraying and you’re meant to have a withholding period from spraying, and they’ll be selling it at the gateside. So you know, there’s a residual – a high residual – there.”

The following conversation further illustrates this distrust:

Participant A: There’s lots of people getting the Green Party email that goes out, but in the one last week, Sue [Kedgley, Green Party MP] was talking about in the latest food survey ...the levels of pesticides in a lot of foods was well beyond what’s...even allowed by the government.... Endosulfan, which has been banned for two years in New Zealand, was present, on cucumbers.... And you know, Food Standards Safety Authority, which is supposed to have our well-being in mind...

Participant B: Don’t trust them.

Participant A: Just don’t. Yeah, they just don’t care, really, about it. They weren’t concerned... they’ve just reassured everyone that it’s okay... that the levels are safe, even though they’re things that are banned and they’re things that exceed the allowable levels.

Section 10.7 of this report describes the use of agrichemicals including pesticides and herbicides in the New Zealand food industry. It indicates that, although the use of these products has been decreasing substantially in some parts of the industry there is wide variability across different growers and widespread use of broad-spectrum fungicides predominates. The extent of concern about this issue, demonstrated by participants in all four focus groups and by respondents to the questionnaire, suggests this is a widespread community concern. Providing the community with confidence that their food is truly safe to eat would be likely to increase their sense of well-being with regard to food. Given the low levels of trust in standards and quality schemes, this may be difficult for a government body to achieve. Suggestions exist, however, of consumer confidence generated by personal contact between growers and consumers, for example, one participant said of farmers’ markets:

“[I]f the producer of the good’s there, people can ask them how they can produce their food.”

While not all consumers will have faith in the information provided to them directly by growers, facilitating improved connections between growers and consumers may help to provide confidence in the foods that people eat. This may improve the feelings of health and well-being of the local community, as well as supporting businesses that add value to their products through the use of what customers perceive to be responsible growing practices.

5.5 Environmental sustainability

Alongside the more personal and social well-beings that participants saw as important, was a thin undercurrent of concern about environmental sustainability. This type of well-being was less often specifically mentioned than those described above, but participants in three out of four focus groups referred to a need to protect the natural environment or to concerns about its degradation and the effects of that on food. For example, one participant said:

“[T]here’s a winery been put up ... near our marae, where our river level has dropped at least a metre, which means there’s a metre less water flowing through our rivers.... Then you’ve got all the other farmers that are pumping thousands of cubic litres out a second, or whatever it is. That affects the food that we’re use to – there’s not as much tuna around any more. There’s hardly any freshwater crayfish.”

Another participant in the same group commented:

“It would be really sad ... if all our local produce and stuff got polluted.”

And one participant in a different group explained:

“[W]e’re here to kaitiaki te whenua [look after the land] for our lifetime and to ensure that – and that’s really important. I take that really seriously, that responsibility. Because I know that’s what my grandparents did and great grandparents did and you know, we’re the seventh generation here in Ōtaki. So yeah, that’s really important to me. I’m interested in having the green belt retained, which runs all the way through this coast. And to not see any commercial development on this green belt. And looking at ways that we can sustainably manage the land.”

A third focus group, in which environmental sustainability played the largest part in discussion, devoted a short amount of time to discussing options for encouraging productive and responsible land use and focused on a suggestion of a local financial incentive:

Participant A: [Y]ou subdivide the land and people can just put a house and a ride-on lawnmower on and they’re away. Or they could put a house and put an olive grove or a winery, or something like that. And yet they don’t get any more credit for that than the person who sits on their ride-on lawnmower and mows their lawn every weekend.... And it just seems wrong that they can sit on class one or two land and do that with it. And yet another person who might actually be struggling to provide some food gets no credit for doing so.

...

Participant B: I guess part of the question is how amenable the council might be to some sort of [rates] rebate if you’re growing something on your land.

Participant C: Or even further, if you’re actually nurturing your soils and keeping the water well, you know? So if ... you are managing your land sustainably. [T]hat to me is the thing that gets the kudos.

There was some debate on local government’s ability to implement such a system and how practical and workable it would be, but the principle behind the idea was supported by a number of participants.

While environmental sustainability was not a topic raised in the focus groups as frequently as some of the other topics discussed above, it was still mentioned in three out of four focus groups. Environmental sustainability sits alongside the other well-beings discussed here as a participant aspiration for future food systems.

5.6 Tensions between different well-beings

As explained at the beginning of this section many of the participants in the focus groups expressed a range of aspirations that they think the local food system should, or could, address. These ranged across helping to preserve cultures, particularly Māori culture, helping to support the local community and ensuring community well-being and prosperity, generating income for local growers, on a full, or supplementary income basis, providing healthy food and using the land in a productive and sustainable manner. Different participants, however, included these aspirations in different combinations and gave them different priorities.

For example one participant said:

“Basically you need money. The bottom line is money.”

While another, in a different focus group, said:

“[I]t’s got to be not just about making money. That’s not the be all and end all, and where’s that going to get us really?”

And yet another (in a different group) said:

“I think the bottom line is the use of the land. The future use of the land. This is the whole purpose of this exercise, isn’t it?”

A vision for the food future of the area can contain elements of the different types of aspirations that focus group participants expressed. This combination of aspirations is already reflected in the ‘Greater Ōtaki Vision’ (KCDC 2007) which makes reference to a similar set of community aspirations to those described above:

- Healthy natural systems
- Local character within a cohesive District
- Growth appropriate to community goals
- Resources used wisely
- Increased choice to work locally
- Place that works for young people
- Strong, healthy and involved community

The pre-existing recognition of this range of priorities will be helpful, but particular care will need to be taken to ensure that, where aspirations conflict, the community and the Council work together to acknowledge and prioritise the different aspirations.

Of particular concern must be the conflict between a vision of local subsistence food growing as compared to a vision of economic growth driven by larger scale food production and export. While several focus group participants commented on potential for significant economic growth through food production, others, particularly from the Māori community, noted that they felt that community self-sufficiency should come first, and that they were concerned that some economic developments may compromise the well-being of some members of the community. For example, one participant said:

“...the reality is it’s often those who have the money and the education who benefit. ... And it’s always those at the bottom of the heap who don’t benefit from the change. And dare I say, in this town, that’s the haukāinga [people of the local marae].”

Speaking of the Greater Ōtaki region as a ‘food destination’ for outsiders to visit specifically to take advantage of the produce available:

“...as long as it doesn’t make it a destination that they want to come to so then the people who actually reside here can’t afford to live here. Because that happens – that’s a reality.... It’s like, “Oh cool, the grass is greener on the other side”. This is a romantic notion – we have this romantic notion of Ōtaki – what a wonderful place. Then they all want to come and live here. They buy all our houses, put the prices up, and they price the haukāinga out of the market.”

The participants in this focus group discussed the need for the haukāinga to be active in taking responsibility for themselves and their development while asking that conditions that make this difficult for them to do, such as very uneven economic development, be avoided.

The idea of complementary, competing, and even conflicting aspirations for communities is not a new one, and existing documents show that the presence of different types of aspirations is already acknowledged in the Greater Ōtaki area (e.g., KCDC 2010). This section has served to highlight some of the aspirations most commonly cited by focus group participants and questionnaire respondents with regard for a holistic notion of the food future of Greater Ōtaki. Other concerns and aspirations relating to more specific areas of this work are located in relevant sections throughout this report.

6 Current food consumption

There are a number of ways to measure food consumption, each providing a different perspective. For example, consumption may be measured in monetary terms, in physical weight, or in calories. In this section we discuss all three measures, but we recognise that there are other valid methods of quantifying food consumption. We also discuss current food consumption

6.1 History and current trends in food consumption

New Zealand has a shorter human history than any other major land mass. However, food consumption in the country has changed considerably since the days of the early Polynesian settlers in the 13th Century. Brian Murton describes broad food trends through New Zealand's history in *The Cambridge World History of Food* (Murton 2000), and we draw heavily on his work in the discussion here.

Early Polynesian settlers obtained food through raising domestic animals, hunting (particularly for birds), fishing, gathering shellfish, and collecting uncultivated and semicultivated plants. These immigrants also kept gardens to grow food, but in their new, temperate home this involved some adaptation of their own traditional practices. Of particular note was the adaptation of the kumara, which became an important food source. Following contact with Europeans, Māori were quick to adopt some European vegetables, particularly the white potato, which was easier to grow than the kumara.

Many of the early British settlers in New Zealand (from the late 18th century) were from Britain's lower socio-economic urban groups and were habituated to a diet characterised by bread, potatoes, tea, sugar, milk, and occasionally bacon. Some of the settlers, however, were from wealthier or more rural backgrounds, and were accustomed to more variety in their diets, including dairy produce, more meat, and vegetables such as peas and turnips. A now flourishing Māori agriculture supplied the newer settlers, and it wasn't until the mid 19th century that the British settlers began to produce much of their own food. With the success of pastoral farming New Zealand became a nation of meat eaters.

Advances in technology, and particularly refrigeration and transport developments, radically transformed the food economy of New Zealand towards the end of the 19th century as the practical distance from world markets appeared to shrink. New Zealand began exporting meat, dairy products, and later fruit back to Europe. At the same time, processed and imported foods began to be more available in New Zealand, as elsewhere, and a wide range of goods like biscuits, dried pasta, confectionery, pickles and snacks were available for purchase. The 1920s saw the arrival of big international food companies such as Heinz, Kellogg, Kraft, Nestlé and Cadbury in New Zealand and extensive advertising pushed early 'convenience' foods that needed little or no home cooking. The process of globalisation and promotion of convenience foods continued throughout the 20th century and, with the advent of affordable automobiles and home refrigeration, food access shifted from local home food deliveries to supermarket shopping. Supermarkets promoted foods with long shelf lives, such as canned, dried and frozen goods, and prioritised their supplies from large-scale operations which could guarantee regular supply at reliable and low prices.

In recent years evidence of a new international trend of localisation and simplification of food has emerged. Internationally popular television programmes and personalities, as well as previously unknown individuals, have spread a message advocating the purchase of local goods rather than ones shipped from far away, the preparation of food in the home rather than the purchase of convenience foods, and appear to have prompted a resurgence in home gardening. While there is little evidence, as yet, on the impact, or likely longevity, of this new trend, particularly in New Zealand, it is openly acknowledged by residents in the Greater Ōtaki area. For example, participants in several of the focus groups mentioned connected issues such as:

“[T]he history of the country plays a big part in this too. And Joe – the Working Joe ... goes to the supermarket. Bang, bang, bang, bang – home. Have a McDonalds on the way home.”

“I think now, though...our grand-daughter...she said that her – she’s changing – she’s going to the farmers’ markets.... She’s getting up now at six o’clock, seven o’clock and going to the farmers’ market, so I think – and she’s only, what – in her early twenties. So it’s changing.”

“Television probably has a big lead now, because the cooking programmes are so prominent. Plus Jamie Oliver, plus River Garden [sic].”

“I think another food fashion at the moment is the vege gardens. Like all these kura have got their own vege gardens. We never had vege gardens when we were at school. You know? Like it’s very much a fashionable thing at the moment. You see it on cooking programmes, and you know, all of the programmes on TV – everyone’s having their own little stylish vege garden now, which is a positive thing.”

Some participants also commented on changing patterns of shopping, the recent history of supermarket dominance of food markets, and a potential resurgence of smaller, local shops. This is discussed in more detail in Section 9.

Despite comments acknowledging a current fashion for local, home-prepared food it is fascinating to note that the school students involved in one of the focus groups identified instant noodles as being the most significant food fashion evident at their schools at the moment. They commented that instant noodles are quick and easy and as one participant said:

“Easy to get. Just grab it out of the pantry and just take it to school.”

While a food fashion of locally produced, home prepared food is evident, it is not yet a dominant food paradigm. Whether it becomes one may be influenced by the way the local food economy is allowed to develop as well as by wider national and international trends.

6.2 Household expenditure on food

Statistics New Zealand carry out a detailed survey of household income and expenditure every three years, the most recent being for the year ended June 2007.⁶ This Household Economic Survey (HES) “provides a comprehensive range of statistics relating to income and

⁶ A new full Household Economic Survey, for the 2009/10 year, was released in late November 2010. The proportions of expenditure on different food groups are largely unchanged from the survey we have used.

expenditure, as well as demographic information on households and individuals” at a national level (Statistics NZ 2007). According to the HES, food accounted for 16.3% of all household expenditure in 2007.

By combining data from the HES with demographic data for Greater Ōtaki from the 2006 census (Statistics NZ 2006), we can estimate the expenditure on food in the area (Table 1). However, these data are limited to privately occupied dwellings and exclude food purchased for schools, retirement homes, hospices, and so on.

Importantly, Table 1 gives estimated expenditure on food by Greater Ōtaki households, but does not indicate that those households spend all that money in the area; people of the area will sometimes spend on food in other areas. In addition, the figures exclude expenditure by visitors to the area. The table is a measure of consumption rather than revenue. The table also excludes free food such as that gifted, grown for own use, or foraged.

6.3 Household consumption of food

The previous section discussed the expenditure on food in the Greater Ōtaki area. This section shifts the focus to the physical quantity of food consumed in the area, again using surrogates and approximation from available data sources.

6.3.1 Secondary data sources

The Food and Agriculture Organization of the United Nations (FAO) produces annual national Food Balance Sheets collated from a very wide range of sources (FAO 2010a). These balance sheets estimate the food supply in each nation based on data and/or estimates of production, trade, use as livestock feed, non-food uses, stock changes, and waste. The breakdown of food supply by weight given in the New Zealand Food Balance Sheet is shown in Figure 3, noting that these figures exclude waste in the household, which could vary significantly by food type.

Table 1 Estimated annual expenditure on food in the Greater Ōtaki area, year ended June 2007

Food category	Annual expenditure
Fruit and vegetables	\$2,670,000
Fruit	\$1,100,000
Vegetables	\$1,570,000
Meat, poultry and fish	\$3,410,000
Meat and poultry	\$2,950,000
Fish and other seafood	\$460,000
Grocery food	\$10,090,000
Bread and cereals	\$2,410,000
Milk, cheese and eggs	\$1,790,000
Oils and fats	\$340,000
Food additives and condiments	\$570,000
Confectionery, nuts and snacks	\$1,360,000
Other grocery food	\$3,620,000
Non-alcoholic beverages	\$1,180,000
Coffee, tea and other hot drinks	\$380,000
Soft drinks, waters and juices	\$800,000
Restaurant meals and ready-to-eat food	\$4,950,000
Restaurant meals	\$2,070,000
Ready-to-eat food	\$2,770,000
Other food services	\$110,000
All Food	\$22,310,000

Note: Figures may not add due to rounding.

Source: Own calculations from customised data provided by Statistics NZ.

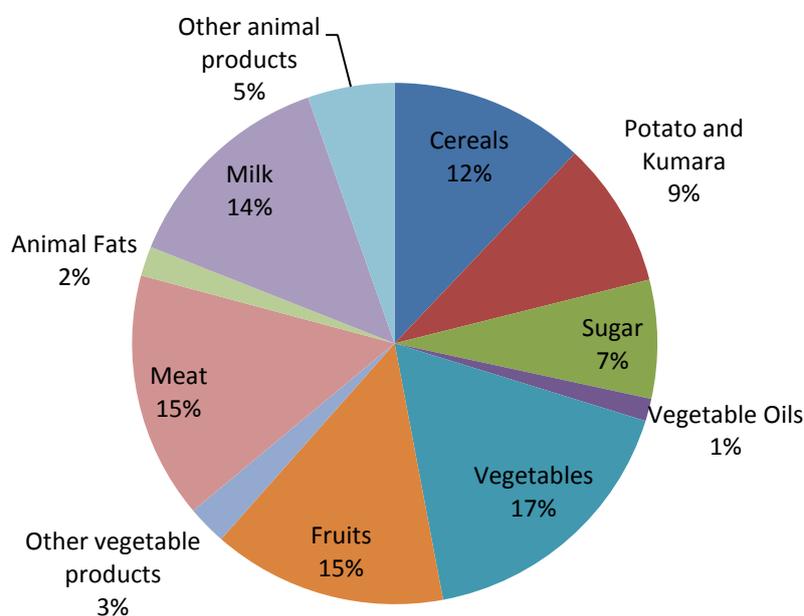


Figure 3 Food consumption by type, by weight, 2007 (source: FAO 2010a).

The Food Balance Sheets also provide consumption in per capita terms, and these can be multiplied by the population of Greater Ōtaki to estimate consumption of food in tonnes/year (Table 2).

Table 2 Estimated food consumption in Greater Ōtaki (derived from FAO 2010a)

	NZ (kg/capita/year)	Greater Ōtaki (tonnes/year)
Cereals	92	760
Potatoes and kumara	69	574
Sugar	56	466
Vegetable Oils	11	88
Vegetables	132	1092
Fruits	110	915
Other vegetal	19	154
Meat	117	969
Animal Fats	14	115
Milk	104	862
Other animal products	41	339
TOTAL	763	6334

The figures in Table 2 exclude food wastage in the household and food service industry. The amount of this waste is not known in New Zealand, but in the United Kingdom it has recently been estimated that 28% of all food purchased by households was wasted, with this figure rising to 40% in households with children (Ventour 2008), and in the United States average household wastage was estimated at 27% in the mid-90s (Kantor et al. 1997). The US study concluded that food wastage in the household and in the food service industry combined was about 17 times as large as that in the retail industry.

6.3.2 Dairy and Eggs

With an estimated resident population of 8300 in 2010, and average annual milk consumption of about 185 litres/person (including dairy products and processed goods containing milk),⁷ the expected demand is currently about 1.5 million litres per year.

According to the Egg Producers Federation of New Zealand, about 1 billion eggs were commercially produced in New Zealand in 2009 (EPFNZ 2010), equivalent to about 230 per capita, although many of these eggs are consumed via processed foods, such as baked goods. Egg imports and exports are minimal. Almost 90% of eggs are produced by caged hens, with the remainder being barn-housed and free-range hens (EPFNZ 2010). At 230 eggs per capita, we estimate that the people of Greater Ōtaki consume approximately 2.0 million eggs per year.

6.3.3 Meat / Poultry and Fish

Meat consumption in New Zealand by meat type is shown in Figure 4. Consumption of meat has decreased in the last two years because of increasing retail prices (Meat and Wool NZ

⁷ In 2009, total New Zealand production of milk was 16 billion litres (Livestock Improvement 2009), of which about 5% was for domestic supply (Stringleman & Scrimgeour 2009), and New Zealand's population was 4.32 million (Statistics NZ 2010c).

2010). Using these per capita figures, we estimate annual consumption of meat in Greater Ōtaki as shown in Table 3.

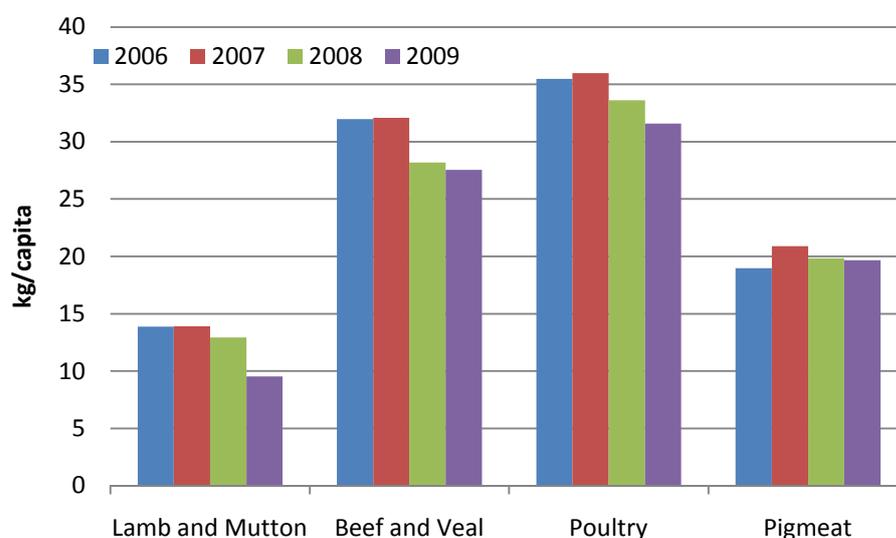


Figure 4 Per-capita meat consumption in New Zealand (source: Meat and Wool NZ 2010).

Table 3 Estimated meat consumption in Greater Ōtaki, 2010

	Lamb	Beef and Veal	Poultry	Pigmeat
tonnes/year	79	228	262	163

While there is no discernible long-term trend in total meat consumption per person in New Zealand since the 1960s (FAO 2010b), poultry consumption in New Zealand has increased from about 1 kg per capita per year (MAF 2003, p. 53), to 14 kg in 1986 and to 36 kg in 2007 (Meat and Wool NZ 2010). This increase in poultry consumption has mirrored a decline in consumption of both beef and sheepmeat (FAO 2010b). Between 2007 and 2009, however, total meat consumption declined by 14% (Meat and Wool NZ 2010), possibly as a result of higher prices and the recession.

Just under half of New Zealanders eat fish at least once a week (Colmar Brunton 2007). There are no clear figures for quantity of fish consumption in New Zealand, with the FAO figure of 26 kg/person/year estimated from ‘apparent consumption’ (that is, a top-down estimate), the calculation of which appears to have neglected non-consumption uses in New Zealand such as pet-food manufacture and stock feed, but also excludes self-caught fish. The NZ Seafood Industry Council uses a figure of 18 kg/person/year, without indicating a source for this nor whether this includes self-caught fish (NZSIC 2007). Based on these figures, we estimated residents of Greater Ōtaki consume about 150 000–220 000 kg of fish per year.

6.3.4 Survey responses

Respondents to the survey undertaken as a part of this work were asked to detail how much food of different types they threw away over a 7-day period. Respondents were asked to

include in this figure all food that they had intended to eat but did not eat (e.g., a banana would be included but not its skin); they were also asked to include food that was composted or fed to animals as wasted food. Overall, 60% of respondents reported no food waste during the 7-day period.

As reported above, international research on food wastage has shown that significant amounts of food are wasted at the household level. It seems likely that the questionnaire responses significantly underreport household food waste. Under-reporting can occur using a diary style approach because respondents may forget to record items, they may choose not to record some items, and the act of participating in the research may result in a behaviour change in respondents (WRAP 2009). A waste audit can be a relatively expensive alternative to survey research, but given the likely level of underreporting here such an audit may reveal a considerably more accurate picture. For the purposes of this study it should be acknowledged that not all food in a household's possession will be eaten; however, reliable estimates of the volumes of food waste in Greater Ōtaki, or New Zealand as a whole, are not available.

6.4 Dietary energy sources

Figure 5 shows the proportions of total dietary energy (i.e. calories or joules) from each food source. If the residents in Greater Ōtaki were to move from this typical New Zealand intake to a more healthy diet, this would have an impact on the sustainability of food in the area. In particular, almost all sugar in New Zealand is imported, and the New Zealand diet shows a high proportion of energy from sugar and sweeteners, 17%,⁸ which is the fourth highest in world (FAO).

New Zealand-sourced consumption data are available for some food categories, and these might be considered of superior quality to those provided by FAO.

To add to the New Zealand data presented above, and to check for any specific local variations to the national diet, questions on food consumption were included in the questionnaire sent out to a sample of community members. Specific information on catering and food consumption was also collected from two local institutions, Te Wānanga-o-Raukawa, and Ngāti Raukawa Marae. Information from these sources is presented below.

⁸ Note the chart excludes alcoholic beverages, which contribute calories to the diet. The figure of 17% is the overall calorific contribution of sugar and sweeteners; they contribute 18% of the total from food sources.

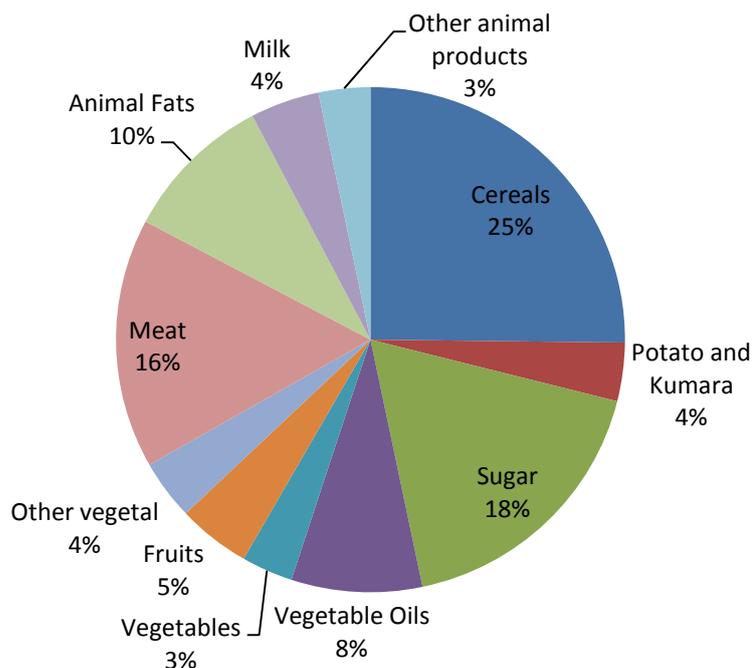


Figure 5 New Zealand annual calorific intake by food type (source: FAO 2010a).

6.5 Local data and information

6.5.1 Surveys

Of the 50 survey responses received, 37 (74%) included useable data on food consumption volumes. Eleven included detailed descriptions of the food eaten by the respondent even though this information had not been sought.

Respondents were asked to report the amount of food from different food groups⁹ they ate over a seven day period. Amounts were reported in ‘servings’ and a serving was defined as the amount of food that would fit in a standard-sized tin can (which was pictured in its actual size in the questionnaire, and the volume of which is about 2 metric cups). This method, in line with the supermarket carrier bag method used to measure food production, was designed to provide quasi-quantitative data where standard measures are unlikely to be available. In a study of different dietary assessment methods Bingham et al. (1994) found unstructured 7-day food diaries to be an accurate and flexible method for recording food intake but commented that a significant disadvantage to the method is the time required to code the resulting data. We used a pre-coded method, asking respondents to report amounts of food from certain food groups, to minimise the coding required. Some respondents did, however, provide detailed descriptions of the food that they ate and these can be used to add detail and confidence to the pre-coded results.

⁹ The food groups used were broadly the same as (although less detailed than) those used in the Household Economic Survey (HES) described above. Some brief guidelines on which foods are included in which food group can be found on p. 4 of the questionnaire included in Appendix C.

It should be noted that some food consumption, especially that of fruit and vegetables, is likely to vary according to the seasons and to the availability, quality, and price of different types of produce.

Table 4 shows the mean number of servings of each food type eaten per week by the respondents to the survey. Six individuals of the 37 who answered this question did not complete the section on ‘Other foods’. It is thought that ‘other foods’ may be under-reported and this is the only category from which some respondents reported eating no food.

Table 4 Mean number of servings per week of survey respondents, by food category

Food	Mean servings per week
Fruit, vegetables and nuts	13.4
Meat, poultry and fish	6.5
Milk, cheese, yoghurt, cream and eggs	6.5
Bread, bakery goods, pasta, rice and cereals	10.2
Other foods	3.9
Total	40.5

While it is difficult to compare these data to recommended servings of different food types (because of differences in measurement and food groupings) some broad comparisons can be made. The Ministry of Health publishes recommendations on the daily consumption of different types of foods (MOH 2009); Table 5 shows a comparison of the daily recommended intakes and the reported intakes of survey respondents for all food groups except ‘other foods’ (for which The Ministry of Health does not provide a recommendation).

While the comparison of the different measures presented in Table 5 is not straightforward, it appears respondents may be eating about the right amount of fruit, vegetables, nuts and dairy products but considerably more meat, poultry, fish and eggs, and less breads and cereals than the Ministry of Health recommends.

Table 5 Comparison of daily recommended food intake to survey respondents’ average food intake

Food	Survey respondents’ mean servings (can) per day	Ministry of Health recommended intake	Notes
Fruit, vegetables and nuts	1.9	At least 3 servings of vegetables per day (where one serving is equivalent to half a cup of cooked vegetables or salad) plus at least 2 servings of fruit (where one serving is equivalent to an average apple or banana or to two kiwi fruit or plums)	The Ministry of Health does not include nuts in this category, while the survey did. Information provided by survey respondents on nut consumption suggests this is low and its inclusion in a different category will have a minimal impact on the figures.
Meat, poultry and fish	0.9	One serving of lean meat, chicken, seafood, eggs, nuts or dried beans (where one serving is equivalent to 100 grams or 1 egg)	The Ministry of Health includes eggs, nuts and dried beans in this category, while the survey did not. Information provided by survey respondents suggests that consumption of nuts and dried beans is low and their inclusion in different categories is likely to have a minimal impact on the figures. Consumption of eggs is high, however, and it is likely that this leads to a mismatch in the data.
Milk, cheese, yoghurt, cream and eggs	0.9	Two servings of milk and milk products (where one serving is equivalent to one pot of yoghurt, two scoops of ice cream, or two slices of cheese)	The Ministry of Health includes all milk products in this definition, while the survey excluded ice cream and egg based puddings. In addition, the survey included eggs in this category, while the Ministry of Health does not. Survey information indicates that the consumption of eggs is high and this, in particular is likely to lead to a mismatch in data.
Bread, bakery goods, pasta, rice and cereals	1.5	At least 6 servings of breads and cereals (where one serving is equivalent to one slice of bread, or two weetbix, or one cup of cooked pasta)	

Figure 6 shows respondents’ food consumption in pie chart format, indicating the composition of the diet of an average survey respondent. Although measured in different units (weight or number of servings), and in slightly different categories, the breakdown of

food groups shown here is similar to the national breakdown shown in Table 2. The proportion of bread and cereals shown in the diet here (25%) is, however, considerably higher than the proportion shown in the national data (12%). A large part of this difference may be accounted for by the different measurement techniques used (and particularly by the low relative weight of a serving of bread compared to other foods). This conclusion is supported by the comparison of the Ministry of Health daily intake recommendations to respondents' reported intake. Respondents' intake (in servings) appears lower than Ministry of Health guidelines but higher (in proportional weight of all consumption) than the national average. This suggests that the consumption of bread and cereals in Ōtaki is not considerably different from elsewhere but rather that it is more affected by the measurement techniques used. It seems likely national consumption of foods from different food groups and consumption of these in the Greater Ōtaki area are very similar.

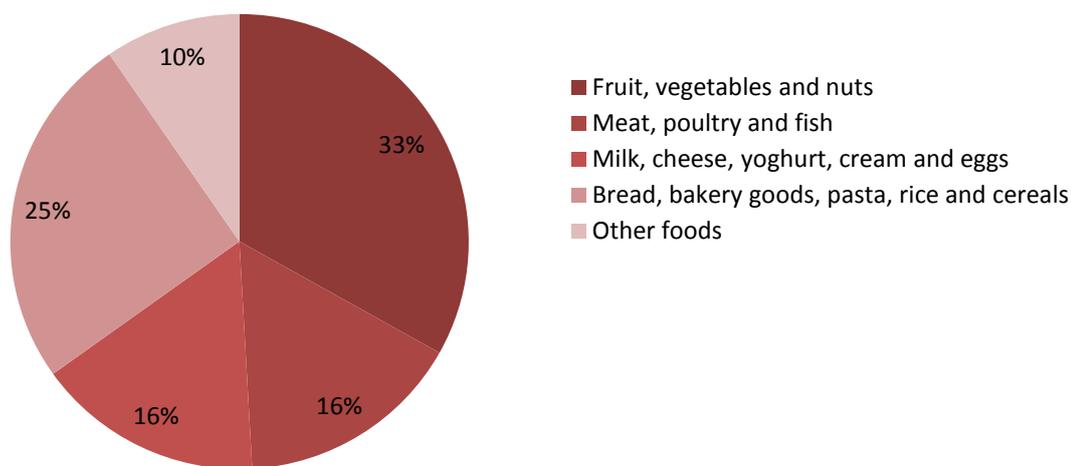


Figure 6 Average composition of respondents' diets, by volume.

Food intake studies commonly suffer from under-reporting of the consumption of foods considered to be 'unhealthy' (e.g., Becker & Welten 2001), and it is unknown to what extent that is the case here.

While respondents were not asked to provide detailed breakdowns of the food that they ate, eleven respondents did so. The information they have provided helps flesh out the chart above with the most popular foods in each category. As only eleven people provided detailed descriptions of their foods these data are provided for context only and should not be considered representative of all residents in the study area. In some cases some respondents wrote descriptions like 'fruit', 'vegetables', or 'meat'; these responses have been excluded from the following analyses (except where specifically described) as they provide no further detail in addition to the broad data on food groups provided above.

Meat, poultry and fish

All respondents ate some meat, poultry or fish during the 7-day food diary period. The average number of different types of this food per person (excluding 'meat' but including processed foods such as 'sausages' and 'cottage pie' where these are specified) was 3.5. The most popularly specified food type was 'fish' with eight of the 11 respondents mentioning this – although none specified the type of fish they ate. Some focus group participants also mentioned fish, and kai moana was discussed in some detail in both of the focus groups composed predominantly of Māori participants. Kai moana has a significant place in Māori

cultural food practices, and fish can be expected to be a larger part of Māori diets than of the predominantly European cohort responding to the survey. The types of kai moana most commonly mentioned in focus groups included whitebait, pipis, tuna (eels), kahawai and oysters.

Ten out of 11 respondents ate some kind of meat (including specified foods such as ‘lamb’ and ‘beef’ but also including non-specified ‘meat’). The specific types of meat most commonly mentioned were lamb, bacon, pork and beef. Seven out of 11 respondents ate some kind of poultry; for most of these respondents the poultry eaten was chicken.

Fruits, vegetables and nuts

All the individuals who provided details of what they had eaten reported that they had eaten some vegetables (including non-specified ‘vegetables’) during their 7-day food diary period. However, three individuals did not report having eaten any fruit during that period. The average number of different vegetables eaten per person over the 7-day period was 5.0, the average number of different fruits was 2.7.¹⁰ Two individuals reported eating nuts.

Of the eleven respondents who provided detailed lists of the food they ate, potato was eaten by more respondents than any other fruit or vegetable, and only two respondents in this group did not report eating potatoes during the week. The other most commonly cited vegetables were peas, carrots, kumara, broccoli, pumpkin and spinach. The most commonly cited fruit was banana, with four of the eleven respondents mentioning that they had had at least one banana during a 7-day period; this broadly reflects national statistics showing the popularity of bananas. Kiwifruit were also popular but all other fruits were eaten by only one or two respondents.

Dairy

Nine out of 11 respondents reported drinking milk, and nine also reported eating eggs during the 7-day diary period. All respondents who gave detailed descriptions of their food consumption ate some dairy produce during the period and the average number of different types of dairy food eaten was 4.1. Only six different dairy items were specified and most of the respondents had eaten at least four of these during the week.

Bread and cereals

All the eleven respondents who provided detailed descriptions of their consumption reported eating bread or cereals and all of them ate either bread or toast. The next most popular foods were porridge, which was eaten by five respondents, and rice, which was eaten by three respondents.

¹⁰ These figures exclude those individuals who either reported a generic term such as ‘veg’ and those individuals who reported eating no fruits or no vegetables.

Other foods

Some respondents also reported eating ‘other’ foods that do not fit neatly into the categories given above. The most commonly given ‘other’ food was soup, eaten by four respondents, followed by baked beans and margarine, each eaten by three respondents. Some of the foods reported as ‘other’ are composites of foods from other groups (such as bacon and egg pie).

6.5.2 Te Wānanga-o-Raukawa

Te Wānanga-o-Raukawa is a significant institution in Ōtaki, with about 100 residential tertiary students. Based on a conversation with the manager of the kitchen at the Wānanga, we estimate annual food consumption as presented in Table 6.

Table 6 Estimated food consumption at Te Wānanga-o-Raukawa

Food Group	Quantity per year
Vegetables and Fruit	6,000 kg
Meat, Fish, Poultry	6,000 kg
Eggs	9,600 eggs
Milk	3,600 litres
Yoghurt	2,000 kg
Bread	4,000 kg

In addition, the kitchen bakes muffins, biscuits and cakes every day.

While traditional foods (e.g., pork bones, mussels, Māori bread) are served regularly, most of the food purchased by the Wānanga is from national food service suppliers, except for fruit and vegetables, which are sourced from Manakau. For special occasions staff will collect kai moana, and puha is served occasionally. Herbs are grown by the kitchen. Food waste, which is variable, is provided to a local pig farmer.

6.5.3 Ngāti Raukawa Marae

The manager of the Ngāti Raukawa Marae was interviewed by telephone. This provided insights into the changing expectation around food for events hosted at the marae, pointed to significant changes in diet, food consumption and food culture in the Māori community.

He lamented the reduced participation in food provision and assistance in the kitchens. As a result, more convenience and pakeha foods are served, sourced from a local supermarket.

Functions catered at the marae are predominantly funerals and community meetings, with the latter being a useful source of income. Weddings and birthday parties tend to be held in other licensed locations, and this represents a loss of involvement and income for the marae.

Eels have traditionally been an important food for Māori, generally collected locally and shared. While there was once an abundance of eels, numbers have declined and it is no longer possible to fish for a feast; eels are caught over a period and stored in the freezer until required. The marae manager considered commercial fishing for eels to be the main cause of the decline in stocks rather than changing land use.

7 Current commercial food production

The Greater Ōtaki area covers approximately 40 000 ha, of which about 11 000 ha is in productive agriculture. The area includes the majority of all food production area in the Kāpiti Coast District (approximately 70 000 ha excluding Kāpiti Island).

While there are several existing sources of data for food production in the study area, none of them provides a complete overview alone. The Agricultural Production Census carried out in 2007 (Statistics NZ 2008) provides data by territorial local authority, but confidentiality restrictions significantly reduce the information available for the KCDC area, and there is no information in the census at a more detailed spatial level from which to determine production in the Greater Ōtaki area.

Because of this lack of available data, we approach the estimation of current food production from a number of angles, detailed in the sections that follow.

7.1 Land use

Mackay et al. (2005) estimated the areas of horticultural crops in Greater Ōtaki, and these are reproduced in Table 7.

Table 7 Horticultural activities in Greater Ōtaki, 2005 (Mackay et al. 2005)

Activity	Area (ha)
Berries	27
Flowers & Herbs	25
Vegetables	230
Nursery	35
Olives	127
Pipfruit	83
Viticulture	42
Other horticulture	104
Total	672

A map of land use for 2010 has been derived from AgriBase (the ‘farm type’ field), KCDC zoning, LCDB2 (indigenous forest and scrub), and ground truthing (Figure 7). The areas of each land use identified are presented in Table 8.

Table 8 Areas of each land use in Greater Ōtaki, 2010

Land use	Area (ha)	Land use	Area (ha)	Land use	Area (ha)
Arable cropping	18	Horse farming	226	Residential	478
Beef	1385	Horticulture	175	Road	172
Commercial	13	Indigenous	26638	Shelterbelt	9
Conservation	43	Industrial	38	Sheep	147
Dairy	2775	Lifestyle	1626	Shrubland	433
Deer	674	Non Productive	461	Mixed sheep & beef	1086
Drystock	666	Nursery	16	Unknown Pastoral	223
Emu	4	Open Space	93	Vegetables	172
Exotic Forestry	1706	Other planted types	10	Viticulture	50
Cut flowers	3	Other enterprises	19	Water	142
Fruit growing	90	Other Livestock	53	Wetland	50
Grazing	204	Poultry	24		
				Total	39918

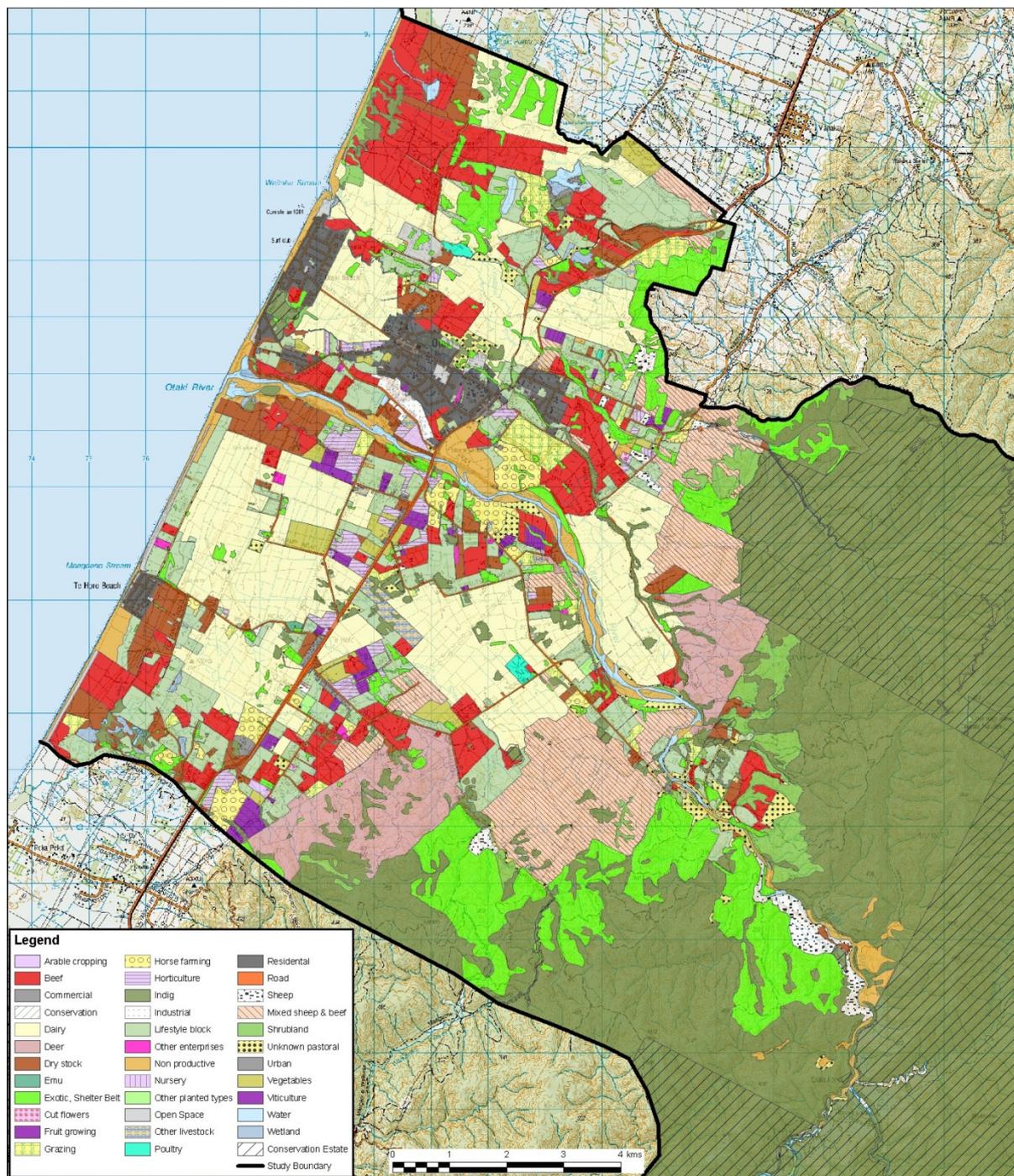


Figure 7 Land use in Greater Ōtaki, 2010.

7.2 Recent changes in land use

7.2.1 Pastoral farming

Since the late 1990s there has been a significant drop in the number of dairy cattle, from a high of about 7600 in the 1999/2000 season to about 5400 in 2008/09, and a reduction in dairying area¹¹ by one third (Figure 8). The number of herds has dropped from a peak of 33 in 2000/01 to 19 today. Note that these figures exclude dry stock and replacement stock.

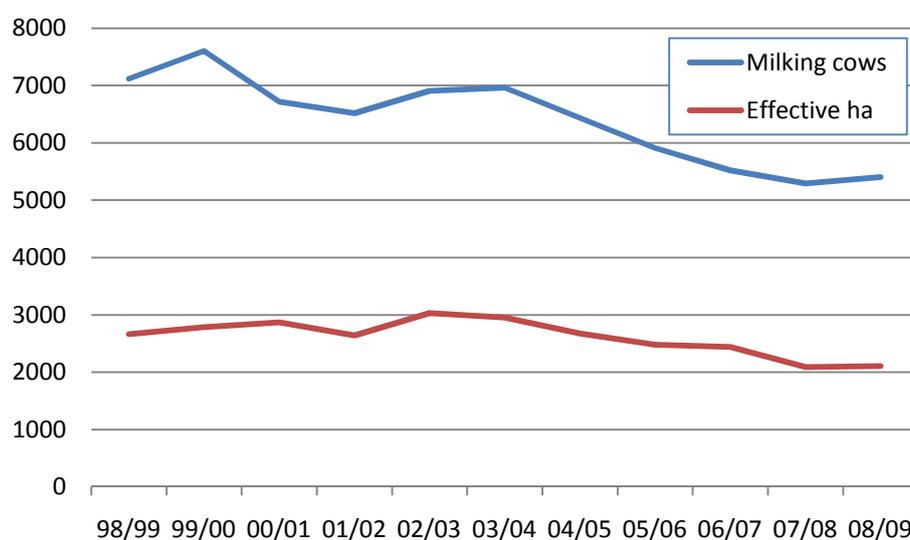


Figure 8 Milking dairy cows and effective hectares in the Kāpiti Coast District¹², 1999–2009 (source: Livestock Improvement *various years*).

This reduction in dairying has a variety of causes, but is primarily driven by economics. On the demand side, there has been increasing demand for lifestyle blocks in the area, with its proximity to Wellington and its desirable rural character. On the supply side, the profitability of some dairy farms in the area has reduced with lower premiums for winter milk (‘town supply’) in the last 10–15 years, others having insufficient herd sizes to manage increasing costs. The combination of low profitability of some dairy farms and strong demand for lifestyle blocks has naturally resulted in sales and conversion of farms. However, some land on lifestyle blocks in the area is leased back to dairying as grazing land, and therefore subdivision does not necessarily entail loss of productive land (DairyNZ, pers. comm., 3 August 2010).

By comparing results from the Agricultural Production Surveys and Census of 1996, 2002, and 2007, we see some significant changes in numbers of livestock in the Kāpiti Coast

¹¹ ‘Effective hectares’ is a measure of the area actually grazed by dairy cattle, excluding infrastructure, wasteland, rivers, etc. This area also excludes the area grazed by dry stock.

¹² Very little dairying occurs in the Kāpiti Coast District outside Greater Ōtaki, which means data for dairying are directly obtainable from Livestock Improvement’s annual dairy statistics reports for the district (Livestock Improvement *various years*).

District (Figure 9). Sheep numbers have apparently swung dramatically, with greatly reduced numbers in 2002 compared to the other years shown.¹³ Dairy cattle numbers, which here include replacement and dry stock, show the same decline as seen in Figure 8.

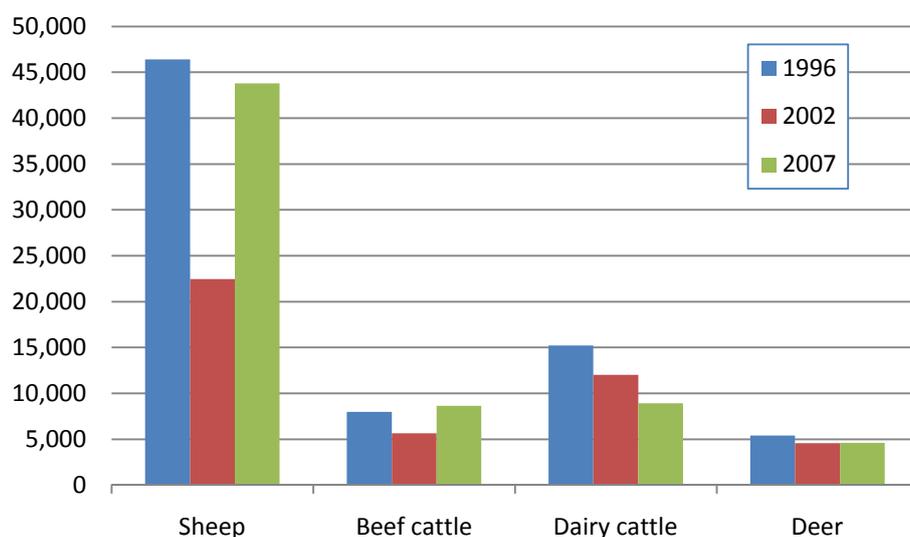


Figure 9 Livestock numbers in Kāpiti Coast District (Statistics NZ 1998, 2003, 2008).

Statistics NZ provides data on the areas of productive land use in Kāpiti Coast District for 2002 and 2007. However, these figures cannot be used to investigate land-use change because of uncertainty in the 2002 data (Statistics NZ, pers. comm., January 2011).

7.2.2 Subdivisions

Over the last decade, new subdivisions have primarily been created out of existing parcels larger than 40 ha, with about 70 ha per year subdivided out of this category (Figure 10). Many of the new subdivisions are less than 5 ha: about 40 ha per year are added to this size range (Figure 11), and these are most likely lifestyle blocks.

¹³ These changes in sheep numbers are extreme, and no clear explanation has yet been found, but reporting errors are one possibility.

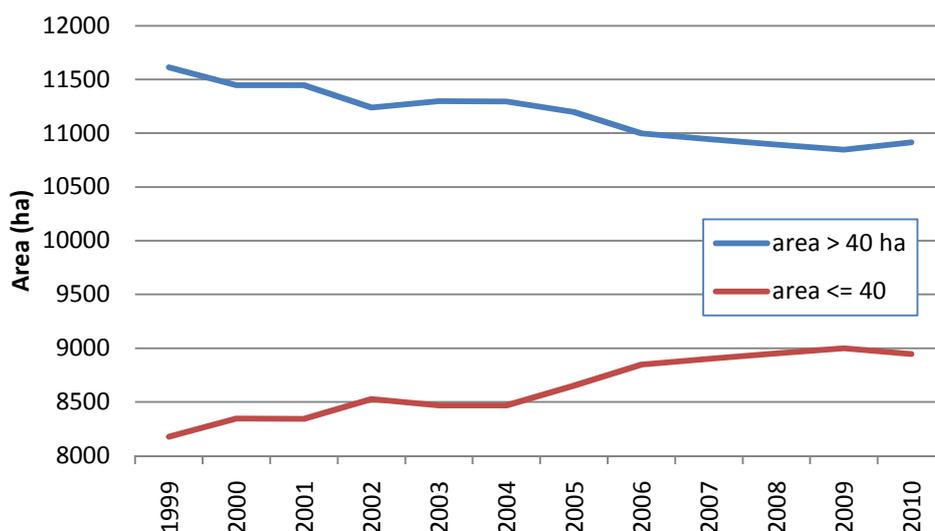


Figure 10 Changing land parcel areas from 1999–2010, highlighting the source of new subdivisions as being parcels over 40 ha (Source: KCDC cadastral data).

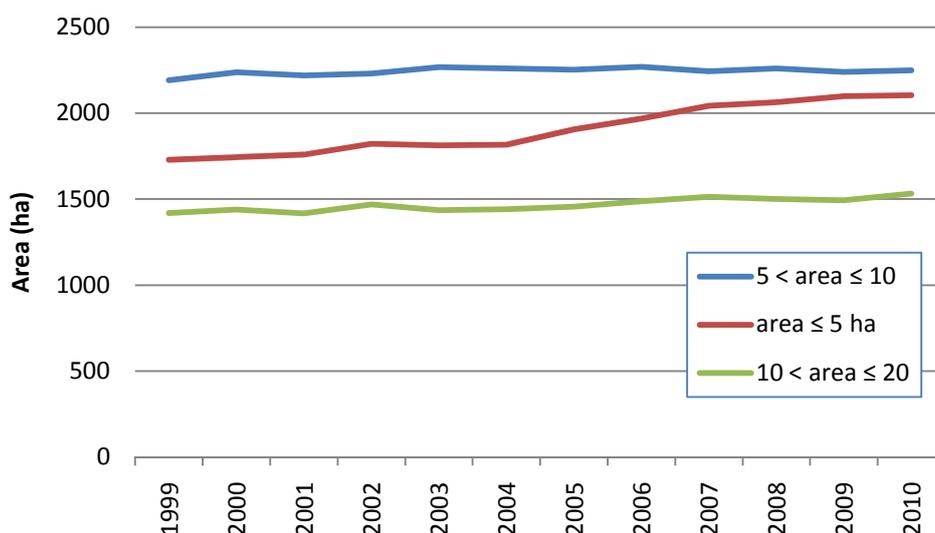


Figure 11 Changing land parcel areas from 1999–2010, highlighting the growth in area of new subdivisions of ≤5 ha (Source: KCDC cadastral data).

Growers we spoke to raised concerns about the increase in “lifestyle” and part-time residents who often work in Wellington. These concerns included:

- Changes to community cohesion as lifestyle block owners are often only resident in the area at weekends and/or evenings
- Shorter residency time: moving on after 3–5 years
- Block owners planting with unsuitable crops, and experimenting
- Inability of lifestyle blocks to provide a living, and the wasted opportunity to grow food on those good soils

Non-productive use of good growing land was a concern to many growers and farmers who feel that a ‘community’ of food producers provides greater local market opportunities – as a destination or farmers’ market supply. While building houses on good growing land was raised as an issue by almost all the growers, some were also quite disparaging about the horse and pony grazers. When asked about changes in the productivity of the area overall, several admitted they had no direct knowledge of the productivity of the smaller blocks (or what it would be once established).

7.2.3 Commentary from local producers

Growers and farmers take a natural interest in land use change. Their comments when questioned on their observations and attitudes to changes in the area are summarised here.

Ōtaki has been known for many years as producing a number of particularly summer crops that were sold in regional and national markets and also directly to consumers from the Wellington region. The ability of Ōtaki growers to deliver a ‘basket’ of fresh fruit and vegetables for Wellington consumers – whether shipped to Wellington stores or purchased by day-trippers on weekends – was an important market position for Ōtaki. In 2010 the Ōtaki Growers’ Association was amalgamated into the Tararua District Growers’ Association because of a significant drop in membership. In general, the recent decline in production in Ōtaki is due to economic factors (competitive pressure from other regions, larger businesses with significant investment, imported product), rather than the ability (soil, climate, water) of Ōtaki to produce the crop.

Ōtaki was once an established tomato production area, with 1–2 acres of tomatoes being sufficient to be profitable, but the production of tomatoes has largely shifted to glasshouse operations, many sited around Auckland, and the number of producers continues to decrease as operations increase in size. Glasshouse growing insulates the crop against the vagaries of the environment, facilitates controlled pollination, allows the use of carbon dioxide to enhance growth, and allows year-round production of a highly consistent product. The majority of tomatoes grown for sale fresh in supermarkets is produced in glasshouses, with outdoor crops primarily grown for processing into paste (Tomatoes NZ 2010). One of the supermarket chains stated that its entire supply of tomatoes nationwide comes from a single grower in Auckland.

There were once many strawberry growers in Ōtaki, but only one remains (offering pick-your-own (PYO) and some local market product), with another just north in Horowhenua. The majority of strawberries are now grown south of Auckland in glasshouses.

Kiwifruit were planted widely during the kiwifruit boom in the 1980s. Most vines have now been removed and only a small area of neglected vines was sighted during our visits to the area. This again is attributed to the economies of scale and infrastructure developed around the better growing areas such as the Bay of Plenty and Nelson, which left Ōtaki growers disadvantaged in the local and export markets.

A number of growers have recently rationalised or changed their production in response to market changes. For instance, six of the growers to whom we spoke are dedicated to one or two crops – these include both the largest grower and the smallest. Five growers focus on diversification and attempt to read the market to determine the most profitable option season by season.

Land previously used for market gardening has been:

- divided into urban subdivisions and lifestyle blocks
- returned to pasture for dairy farming (sold or leased), which has become more profitable
- used for hay production
- sold/ leased to expanding market gardeners

7.3 Employment in the food industries

About 90 residents of Greater Ōtaki currently work in the horticulture industry in the area, with a further 36 working outside of the area (Table 9). In addition, about 30 residents of other areas come to the area to work. Potentially those residents working outside the area could be called on relatively readily to work in the area if more jobs became available locally, with the benefit of lower commute times for those residents.

The overall proportion of residents working outside of the area, at almost 60%, is particularly high. This has two sides: (i) labour potentially available in the area is not used in the area, and (ii) labour might gain greater income outside the area than they might otherwise, thus bringing important revenue into the area.

Table 9 Employment in food-related industries in Greater Ōtaki (GŌ) and by residents of Greater Ōtaki (2006)

Industry	Anyone, in GŌ	Residents of GŌ, in GŌ	Residents of GŌ, elsewhere	Residents of GŌ, anywhere
Horticulture	120	93	36	120
Dairy	57	54	9	63
Non-dairy pastoral	75	54	21	84
Ag services	18	18	12	27
Food mfg	18	6	30	51
Specialty food retail	36	30	12	39
Supermarkets	93	84	42	126
Cafes and restaurants	120	57	48	105
Other	1617	1146	1884	3024
Total	2154	1542	2094	3639

Numbers may not add due to multiple levels of rounding error.

Source: Statistics NZ.

In the district as a whole, employment in the agricultural sector has declined from 330 in 2006 to 290 in 2009, or about 4% per year (KCDC, pers. comm., 25 November 2010).

7.4 Production

Vegetable growing land parcels vary dramatically in size, reflecting the volume produced, the type of product, and the number of products. While several growers had spare capacity in terms of land, others were leasing land. Most reported that the land is almost fully utilised

when packhouses, roads/access, etc., are included. The smallest operation we talked with simply uses one glasshouse while the largest is 20 ha. Several report they have adjusted their land ownership as their business has changed – either through changing markets, products or intensification. Some grow both vegetables and fruit – 6 growers focus on one or two crops only, while 5–6 took a deliberately diversified approach. Vegetable growers to whom we spoke are generally full time – this is their main income and occupation.

Greater Ōtaki had about 130 ha of olive plantations in 2005 (Mackay et al. 2005), almost all of which is pressed for oil, either for personal consumption or commercial sale. Most of these plantations are small, weekend growers who send their olives to one of the two local olive presses. Kapiti Olives has two larger groves with a combined area of 8 ha, and send their olives out of the region for pressing in commercial quantities; their oil is mostly sold in the supermarkets of Waikanae and Ōtaki. No information is available on production of olive oil in the area, and it cannot be easily estimated because of very high yield variability between years as a result of bird strike, weather events, and other uncontrolled influences.

Almost all dairy farming in the district occurs in Greater Ōtaki, so we can use the district figures directly. In the 2008/09 season there were 19 dairy herds in the Kāpiti Coast District, with a total of 5405 milking cows, and producing 21.3 million litres of milk (Livestock Improvement 2009). All milk is sold to Fonterra for further processing.

There are very few pigs in the whole Kāpiti Coast district, with only 65 reported in 2007 (Statistics NZ 2008).

Tegel operates a chicken farm on Hautere Cross Rd, with six, 100-m long sheds. This farm might have as many as 160 000 birds at any one time,¹⁴ and 1 million each year. This represents in the order of 1% of New Zealand's total chicken population.

There are six egg producers with more than 100 laying hens in the Ōtaki area, and these produce 5–10% of all New Zealand eggs (Vanessa Wintle, EPFNZ, pers. comm., July 2010).

Ōtaki has a producer of specialist bread products which are sold nationally via a supermarket chain. Raw materials are generally sourced nationally.

A local jam producer supplies the national market via supermarket chains, and has capacity for more production.

There is one major caterer in the area, which tries to source locally but finds it difficult to get consistent supply and service.

¹⁴ Based on figures at <http://www.pianz.org.nz/farming/housing/shed-housing>.

8 Home Gardens

As well as potential for increased commercial horticultural production in Greater Ōtaki, we investigated the potential for increased production of fruit and vegetables in home gardens in both urban areas and on lifestyle blocks, firstly using the survey results, then through quantitative estimation.

8.1 Current food production in home gardens: survey results

Of the 50 respondents to the questionnaire, 41 (82%) grew¹⁵ some food for their own consumption. One of these respondents also grew some food for commercial sale, although commented that this activity is about to cease. The remaining nine respondents (18%) grew no food in the year before the survey.

Respondents were asked to report how many supermarket carrier bags they could fill with the produce they had grown over the preceding year. While a ‘supermarket carrier bag’ is not a standard measure, and we are not able to guarantee that everyone has used it in exactly the same way, it was employed in line with a technique used by John Gibson (Gibson 2001) of the University of Waikato in measuring household food production in Papua New Guinea. This method is thought to be useful when people are unlikely to be able to provide standardised measurements, like weight or monetary value, of their home produce. This kind of measuring provides quasi-quantitative data, which give an indication of the quantities in question but is not appropriate for use in detailed quantitative analyses.

Table 10 summarises the food grown by the respondents to the survey.

Table 10 Foods grown in home gardens (in units of shopping bags)[†]

Food	Number of respondents growing	Total amount grown	Eaten	Gifted	Sold	Wasted
Fruit	27	612	174	369	1	64
Veg*	35	729	357	171	9	192
Nuts	4	17	11.4	3	0	2.6
Meat	3	79	61	14	4	0
Eggs	6	15	12	2	0	0

[†] Note: Figures are rounded. Not all figures tally exactly with the sum of their parts due to this rounding and also to small inconsistencies in the data provided by respondents – these inconsistencies are thought to be the result of recall and calculation errors.

* These figures exclude data for one additional individual who reported growing vegetables. This person provided a detailed text description of their produce (details of which are included where appropriate in this report) but did not include volume amounts.

¹⁵ The terms ‘grow’ and ‘grew’ in this section are used to refer to the production of all types of food, including, for example, milk, meat and eggs.

The uses of the food grown in home gardens are shown in Table 11 as percentages of the total amount grown.

Table 11 The uses of home-grown produce (percentage of total amount of food grown)

Food	Food eaten by the household (%)	Food gifted to others (%)	Food sold (%)	Food wasted (%)
Fruit	28	60	0	10
Veg	49	23	1	26
Nuts	67	18	0	15
Meat	77	18	5	0
Eggs	84	16	0	0

Note: Some totals do not sum to 100% due to small data inconsistencies and rounding.

The very high value for fruit gifted to others is strongly influenced by one respondent who grew and gave away a very large amount of produce. If that respondent's figures are excluded, the percentage of fruit gifted to others is 38%. Similarly, the high value for vegetables wasted is influenced by one respondent who grew a large volume of produce and reported that a very high proportion of that was wasted. If that respondent's figures are excluded the percentage of vegetables wasted falls to 6%.

Despite the data being largely unsuitable for statistical analyses a number of indicative tests have been conducted. The results should be seen as indications of potential relationships that would benefit from further investigation rather than as definitive statements about the production of food.

- There are some indications that, in this limited sample, those growing fruit are more likely to be older than those who are not, and specifically are more likely to be in the 65-or-over age group.¹⁶ While retired individuals may be able to dedicate more time to gardening than people in employment, there is no evidence that individuals growing vegetables (or other foods) are likely to be older than those who are not.
- There is a suggestion that people with incomes greater than \$30,000 are more likely to grow eggs.¹⁷ No reason for this relationship is immediately apparent.

¹⁶ A Pearson's chi square test on age (shown as a categorical variable with two categories, '<65' or '=>65') and fruit growing (as a categorical variable with two categories, 'grows fruit' or 'doesn't grow fruit') gives $\chi^2=5.265$, $p=0.022$.

¹⁷ A Pearson's chi square test on household income (shown as a categorical variable with two categories, '<=\$30,000 per annum' or '>\$30,000 per annum') and egg production (as a categorical variable with two categories, 'produces eggs' or 'doesn't produce eggs') gives $\chi^2=8.428$, $p=0.015$.

- Larger section sizes appear to be related to an increased likelihood of growing fruit and eggs.¹⁸ Interestingly, no similar relationship is seen for other food types, including vegetables.
- Similarly, there is an indication that those who own their properties are more likely to grow fruit and vegetables.¹⁹ This may be due to the investment (in terms of both time and money) required to ensure that land and fruit and vegetable plants remain productive. While this result may seem intuitively correct, the very small number of respondents who do not own their own properties means that this result, in particular, must be treated with caution.

The following sections provide more detailed comments about the production of the different types of food included in the questionnaire.

8.1.1 Fruit²⁰

Of those growing fruit, none were growing for commercial purposes, and the majority grew small amounts of fruit over the year. The median amount of fruit grown was 4 carrier bags per grower, per year. This could reasonably be expected to be the fruit from one or two fruit trees.

Several respondents did grow considerably larger amounts of fruit, including four who had grown over 50 bags of fruit in the preceding year. One of these respondents commented that her household's produce included apples (20 varieties), pears (1 variety), plums (20 trees, 5 varieties), apricots, avocados, figs, tamarillos, feijoas, grapefruit, lemons, mandarins, and peaches. Another respondent, who in the preceding year had only grown one bag of fruit, commented that her household had newly acquired their land and had planted "3 figs, 4 feijoas, 4 apples, 2 raspberry, 1 pear, 3 plums, 1 lemonade, 1 grapefruit, 1 blackcurrant, 2 blueberry, 2 grapes, 3 passionfruit, 1 gooseberry, 1 cranberry, 1 tamerillo" to supplement the one existing lemon tree.

One respondent, although not growing for commercial purposes, did report selling one bag of fruit (and some vegetables) through the Transition Towns outdoor market. She commented that these sales provide her with a little money, which is used to buy seeds, and that any unsold produce is donated to a local charity. Other respondents reported either eating or giving away the majority of the fruit that they grew. With the exclusion of the one respondent mentioned above who gave away a very large quantity of fruit, 38% of all fruit grown was

¹⁸ A Pearson's chi square test on section size (shown as a categorical variable with two categories, 'less than 700 m²' or '700 m² or more') and fruit growing and egg production (as categorical variables each with two categories, 'grows' or 'doesn't grow') gives $\chi^2=11.447$, $p=0.003$ for fruit and $\chi^2=7.584$, $p=0.023$ for eggs.

¹⁹ A Pearson's chi square test on property ownership (shown as a categorical variable with two categories, 'owns property' or 'doesn't own property') and fruit and vegetable growing (as categorical variables each with two categories, 'grows' or 'doesn't grow') gives $\chi^2=5.157$, $p=0.023$ for fruit and $\chi^2=10.597$, $p=0.001$ for vegetables.

²⁰ We have left it up to respondents to use their own definition of 'fruit', and presume that most will follow the colloquial rather than the botanical definition.

given away, while 43% was eaten by the producing household. The large proportion of fruit being given away suggests the existence of a significant informal food gifting system within the community.

Eighteen percent of fruit grown was wasted. Several respondents commented that ‘wasted’ fruit is composted, fed to worms, or left on the tree for birds to eat.

8.1.2 Vegetables

A larger total volume of vegetables than fruit was grown by respondents to the survey. While it is apparent that most fruit growers grew small amounts of fruit and a few grew much larger quantities, the volumes of vegetables grown by vegetable growers were more evenly spread, with a median amount of 8 bags of vegetables per grower over the year. Only two growers of vegetables grew more than 50 bags of vegetables in the year (compared with four fruit growers) but 10 grew between 20 and 50 bags (compared with only two growers growing between 20 and 50 bags of fruit).

Three respondents provided details of the kinds of vegetables they grew, which included beans, broccoli, cabbage, carrots, cauliflower, celeriac, celery, chives, corn, garlic, kale, kumara, lettuce, onions, parsnips, potatoes, pumpkins, and silver beet.

If the one respondent who reported a very high volume of wastage is excluded, 60% of the vegetables grown were eaten by their growers and 33% were gifted to others. Of the vegetables grown, a very small amount was sold and that was through the Transition Towns surplus food stall. Again, the large proportion of vegetables given away suggests the existence of an informal food gifting system operating within the community. One respondent (who grew both fruit and vegetables) commented:

“Have a large section grow a variety of produce – give to neighbours & friends throughout the years according to the different seasons.”

This respondent also added that they find the amounts they gave away very hard to count, thus reinforcing the caution with which the actual figures in this section need to be treated. However, thoughtful comments like this suggest the respondent has tried to reflect the reality of their growing and gifting activities, and although the actual figures may not be completely accurate, the story they tell (for example, about the existence of significant gifting relationships) is likely to be accurate.

Six percent of vegetables grown were wasted, and one respondent commented that from her total of 13 bags, one was kept for seed.

8.1.3 Nuts

Four respondents reported growing nuts and one further respondent added a comment about having planted a macadamia nut tree in the last year. The volume of nuts grown ranged from half a bag to 10 bags, with the median falling at 3.25 bags per grower. Two thirds of the nuts grown were eaten by the growing household and the majority of the rest were gifted to others. Three of the four growers reporting wastage of around one fifth of the nuts grown; the fourth grower reported no wastage.

8.1.4 Meat, poultry and fish

Only three respondents reported growing any meat, with volumes grown being quite different for each: 1, 28 and 50 bags. None of this meat was reported as wasted and most was eaten by the growing household, with each respondent reporting that between 70% and 100% of the meat they grew was eaten by their household. Two households reported gifting some of the meat they had produced to others, and one household reported selling four bags of meat to friends within the Ōtaki region.

8.1.5 Milk, cheese, and eggs

No respondents reported growing any of their own milk or cheese.

Six respondents reported growing some eggs for their own consumption. The volume of eggs grown per household ranged between half a bag and six bags, with a median of 1.5 bags per household. Of the eggs grown, 84% were eaten by the growing household and 16% were gifted to others. No eggs from these respondents were either sold or wasted.

One respondent also commented that he currently produces eggs on a commercial basis but is not intending to continue this activity. Information on his production is not included in the figures shown here but may be included in the information provided separately on commercial food production in the area.

In addition to the food types above, three respondents reported growing some herbs, most of these were eaten by the growing households, but a small quantity was gifted to others.

9 Origins of food consumed

This section discusses the likely origins of the foods consumed in Greater Ōtaki using information drawn from a range of sources. A partial picture is built up of the major food flows, and reference should be made to Figure 1. Information about the non-market trade of foods (gifting, gathering, and bartering) is not readily available, although some limited information was provided in survey responses.

9.1 Food trade

For thousands of years goods have been traded to match supply and demand: production surplus to own requirements whether through specialisation or through fortunate bounty means that surplus can be traded for other goods to fulfil real or perceived needs. The scale of this trade has grown dramatically from trade within a village, to regional trade, to the Phoenician traders who traded throughout the Mediterranean a thousand years before Christ, to the spice and silk trades that spanned Asia and Europe, to today's highly globalised supply chain.

Trade occurs because of comparative advantages held by different parties, nations, etc. These advantages include a wide array of factors, such as climate, soils, water availability, natural resource endowments, education, infrastructure, wage levels, subsidies and taxes, border tariffs, trade agreements, environmental regulation, etc. Comparative advantages result in some regions and countries being able to produce certain commodities more efficiently or cheaply than others. Economic theory states that making use of comparative advantage via global trade increases global welfare (WTO 2010), but clearly there are certain caveats on this conclusion.

In today's globalised world, demand in one country can more easily than ever before be met by supply in other countries. This is primarily a result not only of reduced barriers to trade through tariff reductions and free-trade agreements, but also of significantly reduced freight costs (WTO 2010). It is also a result of the development of complex supply chain logistics, whereby the component parts of a product can be sourced from a large number of companies in a large number of countries. A global supply chain can provide goods at lower cost (e.g., tinned tomatoes), and that are otherwise unavailable (e.g., bananas), and lengthen the seasonal availability of domestically produced goods (e.g., kiwifruit). These all serve to provide greater choice for consumers, and contribute to many people's sense of a richer, more complete life.

However, there is growing concern among some people that increased global trade creates more problems than it solves. The response of an individual to these issues will depend on that individual's own set of priorities, and there will always be disagreements on these matters. Here we outline some of the issues raised in discussions about global trade, particularly the food trade.

A large number of individual issues are wrapped up in the idea of choosing food based on location of production. Many consumers like the idea of purchasing local food, without necessarily giving voice to the reasons for this. Views on the issue of local production are informed by the media, by industry, and by conversations with acquaintances, among others. Some people see an inherent wastefulness in same-commodity reciprocal trade (e.g., the UK

exports chocolate to Europe and Europe exports chocolate to the UK). Reasons for consumers stating a preference for local production include (Kemp et al. 2010):

- Supporting local producers/local economy
- Environmental/carbon footprint/food miles
- Health concerns
- Animal welfare concerns
- Maintaining self-sufficiency in case of serious events
- Quality
- Biosecurity: protecting a country's primary industries.

9.2 Importance of food origin in Ōtaki

In relation to food origins, the questionnaire asked:

Are you interested in whether the food you buy from food retailers (including supermarkets and restaurants is grown locally? Do you prefer locally grown food? Why? Why not?

Almost all (49) respondents provided a response to these questions and 39 of those expressed a clear preference for locally grown food. Of the ten respondents who did not show a preference for local food, two did specify that they preferred their food to be grown in New Zealand rather than overseas. Several also commented that the origin of their food was unimportant as long as the food itself was fresh, and of good quality and value.

Many respondents gave reasons for preferring locally grown food. The most commonly cited reason (given by 18 respondents) for choosing locally grown food was to support the local growers, economy and community. Comments such as these below were common:

"I prefer local. If I buy local ... [it] keeps locals employed & businesses open."

"I like to support local businesses and growers."

"I prefer to buy locally produced products and support my town where possible."

These comments were echoed by participants in the focus groups, some of whose comments on supporting the local economy can be found in Section 5.2. Fifteen survey respondents commented that local food is likely to be fresher than food from further afield, for example:

"Yes would prefer produce locally grown as it would take less time from grower to the table."

"I would prefer local food because it should be fresher."

Comments echoing this came from several focus group participants who demonstrated a preference for fresh food and a perception that this was more likely to be available from local sources. Other reasons given for preferring local food included that it may be of better quality (five respondents), that it's better for the environment and results in lower food miles or lower carbon footprints (5), that it's good to know where your food comes from (3), that it is (or should be) cheaper (2), that it allows continuity of skills (1), and continues the food growing tradition of the area (1).

Four respondents also mentioned sprays, chemicals and genetic modification in connection with local food. These issues are discussed, alongside similar comments from focus group participants, in section 5.4; quantitative figures on the use of fertilisers and other agrichemicals are presented in sections 9 and 10.7 respectively.

Respondents were also asked whether there were any products that they would like to be able to get locally but that were unavailable. Thirteen respondents responded to this question. Seven said they would like to be able to get more fruit, vegetables or nuts – and specified products included avocados, berries (especially blackcurrants), Brussels sprouts, chestnuts, figs, Jerusalem artichokes, potatoes, tomatoes, and walnuts. (None of these was mentioned by more than one individual respondent.) Four respondents said that they would like to be able to get more meat (pork was specified by one respondent), three said they would like more poultry (and between them mentioned duck and chicken), and two mentioned seafood (fish and oysters). Cheese, milk and eggs were mentioned by a total of four respondents, and two respondents mentioned honey.

While this indicates there may be some demand for further local produce there is no standout demand evidenced for any particular food. The survey responses also show in some cases a lack of awareness of locally available produce (e.g., eggs).

9.3 Food miles

The concept of ‘food miles’ as an indicator of environmental impact gained currency during the 1990s, particularly in Europe. The idea is simple: food transported greater distances is more likely to be bad for the environment. However, the facts do not support this argument. Already in 2005, the UK’s Department for the Environment, Food, and Rural Affairs concluded that food miles was not an appropriate indicator of environmental impact (DEFRA 2005). That report found that, for food purchased in the UK, 77% of all transport emissions occurred in the UK. Coley et al. (2009) report that consumers driving to purchase food can offset any transport emission benefits of local production. Saunders et al. (2006) demonstrated that several of New Zealand’s major export commodities had a lower carbon footprint than their UK-produced equivalents, even when international transport was taken into account. The issue is further blurred when one considers seasonality, sea freight vs air freight, and wide variations in production methods. Furthermore, it has been shown that changing purchasing behaviour based on food miles can have strong negative effects on welfare in developing countries, where trade can be critically important (e.g., Ballingall & Winchester 2009).

In a recent study of consumer attitudes in the UK, Kemp et al. (2010) found that the stated preference of UK consumers to base purchasing decisions on factors such as food miles did not translate into changed purchasing behaviours (known as revealed preferences). The authors found there was a strong desire to be seen doing the ‘right thing’ by professing a level of care for the environment, but that price almost always determined the final purchasing decision.

While the idea of food miles resonates with people because it is intuitive, it is also conflated with other ideas of local consumption such as freshness, support for the local community, quality, etc. However, ‘food miles’ are often only cited with respect to purchased goods, and not with respect to sold goods. Two opposing views are simultaneously held: at home the

food miles theory is a reason to purchase local food, whereas when exporting, the food miles theory is debunked and exports should be defended. Country-of-origin labelling is one such issue: it is desired in the domestic market to encourage consumers to purchase local goods, but it is undesirable that trading partners also implement such a policy, as this would be detrimental to our local industry. Country-of-origin labelling is not mandatory in New Zealand; rather it is being used voluntarily by some manufacturers and distributors for marketing purposes (NZFSA 2010a).

Clearly there are other important factors to consider in this context of buying local, among which community spirit and pride and reduced reliance on non-local goods as a kind of insurance policy are both completely valid. However, we argue that the reasons for buying local should be untangled and clarified to prevent potentially perverse outcomes that end up being contrary to other values held by a community.

9.4 'Local' in the Greater Ōtaki context

Origins of food may be grouped into four ranges: Greater Ōtaki, within 100 km of Ōtaki, within New Zealand, and overseas. The area of New Zealand within 100 km of Ōtaki is shown in Figure 12, and the local authority areas that fall within this range are: Wanganui, Rangitikei, Manawatu, Palmerston North, Tararua, Horowhenua, Masterton, Carterton, South Wairarapa, Kāpiti Coast, Porirua, Upper Hutt, Lower Hutt, and Wellington.²¹ The total land area of the North Island within 100 km of Ōtaki is 1.56 million hectares.

Data provided by Statistics NZ on food production by local authority area²² are incomplete because of confidentiality constraints. In addition, even if such data were available, modern processing and distribution practices are highly optimised for cost efficiency and it is highly likely that foodstuffs produced within this area are also supplied from outside of the area, and, indeed, that raw foodstuffs produced in the area may be processed elsewhere before returning in final form. We therefore emphasise that any analysis comparing production location with consumption location is highly tentative.

Analysis of the production of various fruits and vegetables by local authority area from the 2007 Agricultural Production Census (Statistics NZ 2008) indicates that the following are likely to be supplied to Greater Ōtaki from a distance of less than 100 km:

- Asparagus, cabbage, cauliflower, lettuce, onions, potatoes, pumpkin, squash, apples, pears, feijoas, and barley.

Using the same method, the following meat groups are also likely to be sourced from within 100 km:

- Beef, mutton and lamb, and venison.

²¹ While part of Marlborough also falls in this range, we have excluded it for two reasons: (i) the area of Marlborough within 100 km has very little food production, and (ii) Cook Strait forms a natural barrier that is in many ways equivalent to additional distance.

²² The Agricultural Production Census.



Figure 12 Locations within 100 km of Ōtaki; the darker shading shows the Greater Ōtaki area.

9.5 Secondary data

In this section we discuss some key food groups and their origins based on secondary data sources.

9.5.1 Meat

Due to quarantine regulations, there are only very small quantities of poultry, sheepmeat and beef imported into New Zealand.

The nearest large lamb and beef processing plants are in Levin (sheep and cattle) and Feilding (cattle only). The origin of meat sold in Greater Ōtaki depends on contractual arrangements between farmers, processors, and retailers.

Poultry farms are generally less than 50 km from processing plants. In 2003, supermarkets accounted for 60% of poultry sales, followed by fast-food outlets with 35%, and butchers and

specialty shops with 5% (Cooper-Blanks 2004). There is one free-range poultry operation in Greater Ōtaki, run by Tegel. However, free-range poultry forms less than 0.5% of the market (Wintle & Lepper 2009), so supply of processed poultry to Greater Ōtaki will mainly be from further afield. The next closest operations are Turk’s Poultry, which raises and processes chickens in Foxton, about 40 km from Ōtaki, and Tegel’s large facilities around New Plymouth. Combined, these operations form approximately 20% of New Zealand’s broiler production (Kerry Mulqueen, PIANZ, pers. comm., 5 August 2010).

Almost all pigmeat is imported into the district from elsewhere. One supermarket chain purchases pig carcasses from around the country and butchers and packages all supply for North Island outlets in Auckland (NZ Pork, pers. comm., August 2010). The other supermarket chain purchases carcasses from preferred wholesalers, which may be local, and butchers onsite. There are about 800 pig farms and 50 000 pigs in the lower North Island.

Pork and bacon are the only meats for which a significant proportion of domestic consumption is imported from overseas. About 48% of pig meat consumed in New Zealand is imported (Meat and Wool NZ 2010), and this has steadily increased in recent years (Figure 13). The countries from which New Zealand imports pig meat are highly competitive “because of low-cost feed grains” (MAF 2003, p. 52), but also because of government subsidies, which are absent in New Zealand. Figure 14 shows the origin of *pig meat* imports in 2009, while Figure 15 shows the origin of *all meat* purchased in New Zealand.

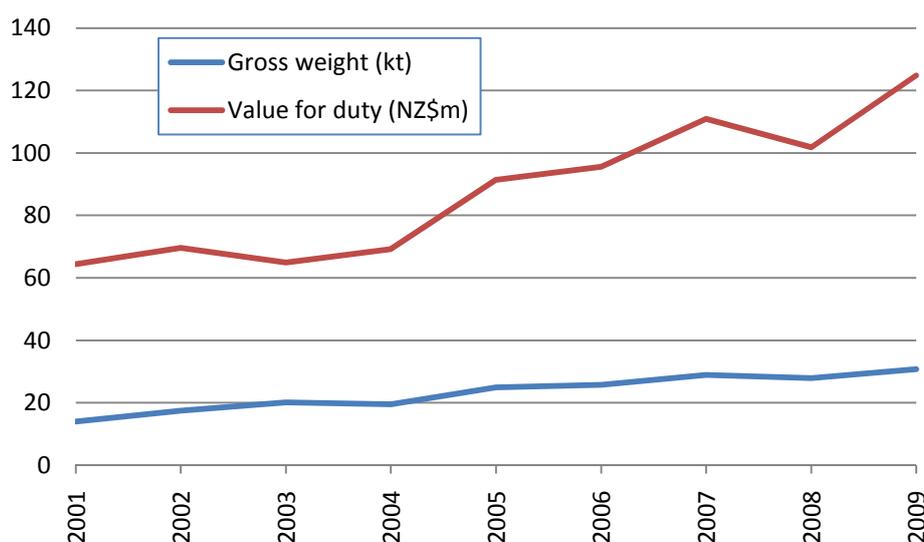


Figure 13 Imports of pig meat into New Zealand, years ended 2001–2009 (source: Statistics NZ 2010d).

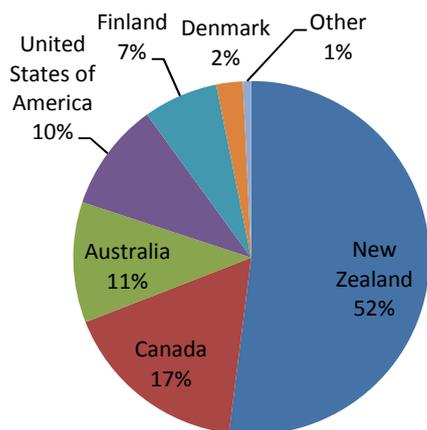


Figure 14 Origins of pig meat consumed in New Zealand, by weight, year ended December 2009 (source: Meat and Wool NZ 2010; Statistics NZ 2010d).

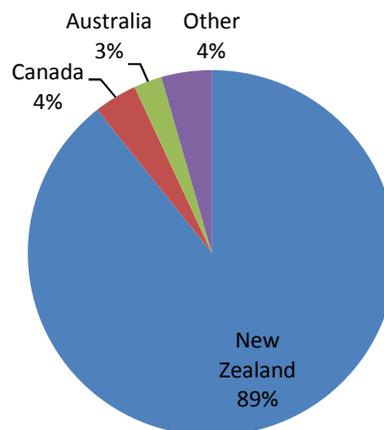


Figure 15 Origins of all meat consumed in New Zealand, by weight, year ended December 2009 (source: Meat and Wool NZ 2010; Statistics NZ 2010d).

9.5.2 Fish

There are no land-based aquaculture operations in the Greater Ōtaki area, but there is a significant catch of marine fish harvest landed in the south of the district.

New Zealand imported about 30 000 tonnes of fish and seafood in 2009, of which imports of tinned tuna from Thailand were 5900 tonnes (Statistics NZ 2010d). A breakdown of these imports by country of origin is shown in Figure 16. In the same year, exports were about 290 000 tonnes. As reported in section 6.3, between 20% and 30% of fish and seafood consumed in New Zealand is imported. Our figure uses the average of these two estimates.

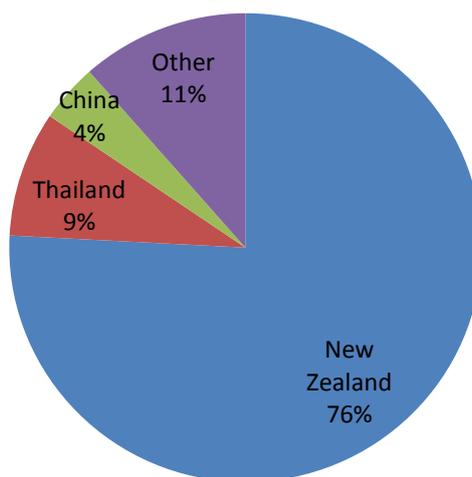


Figure 16 Origins of fish and seafood consumed in New Zealand, by weight, year ended December 2009 (source: Statistics NZ 2010d).

9.5.3 Fruit

New Zealand produces about 1 million tonnes of fruit each year, of which about 70% is exported (FAO 2010a). Most of this fruit production comprised apples and kiwifruit: 450 000 tonnes of apples, 330 000 tonnes of kiwifruit (Aitken & Hewett 2008). There is significant production of pipfruit in Greater Ōtaki, and Hawke’s Bay – one of New Zealand’s major production region for many fruit – is relatively close, although further than 100 km away.

Fruit imports amount to about 180 000 tonnes per year, of which 45% are bananas (Figure 17). Imports make up about half of all fruit consumed in New Zealand, with the top four countries from which New Zealand imports fruit being Philippines, Australia, Ecuador, and the USA (Figure 18).

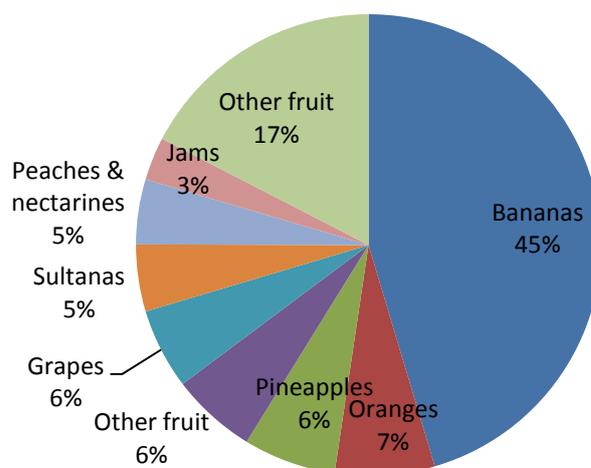


Figure 17 Imported fruit, by weight, year ended December 2009 (source: Statistics NZ 2010d).

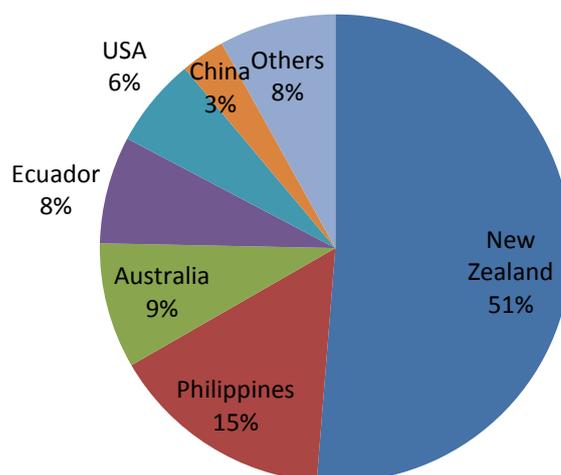


Figure 18 Origins of fruit consumed in New Zealand, by weight, year ended December 2009 (source: Aitken & Hewett 2009; Statistics NZ 2010d).

9.5.4 Vegetables

New Zealand produces about 1.3 million tonnes of vegetables each year, of which about one third is exported (Aitken & Hewett 2009; Statistics NZ 2010d). About 1300 ha of potatoes (c.

13% of national production) were harvested within 100 km of Ōtaki in the year ended June 2007. With an average harvest of 47.6 t/ha (Potatoes NZ 2010), the production within 100 km of Ōtaki was about 60 000 tonnes. Very few potatoes are grown in the Greater Ōtaki area.

About 85 000 tonnes of vegetables were imported in the year ended December 2009, the main types being tomatoes, potatoes, and beans (Figure 19). Imports of 3000 tonnes of fresh tomatoes from Australia in 2009 contributed about 8% of total supply in New Zealand (Tomatoes NZ 2010). There were also 10 000 tonnes of canned tomatoes imported, over 80% of which were from Italy, and about 10 000 tonnes of tomato sauce (not included in Figure 19), over 90% of which was from Australia (Statistics NZ 2010d). Imports of potatoes were mostly from Australia, and 94% of imported potatoes were frozen and most likely in the form of chips. Only a very small amount of fresh potato is imported.

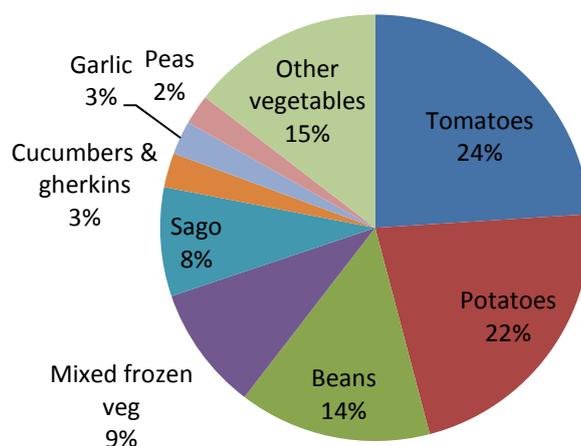


Figure 19 Imported vegetables,²³ by weight, year ended December 2009 (source: Statistics NZ 2010d).

²³ Note that sago is not only used in the food industry, but also in the manufacture of adhesives, paper, and ethanol (<http://en.wikipedia.org/wiki/Sago> 21 July 2010).

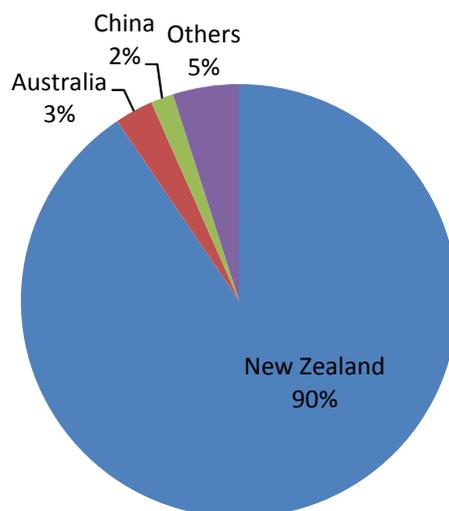


Figure 20 Origins of vegetables consumed in New Zealand, by weight, year ended December 2009 (source: Aitken & Hewett 2009; Statistics NZ 2010d).

9.5.5 Milk, cheese, and eggs

Almost all dairy products and all fresh eggs are of New Zealand origin. However, some dairy and egg are found in processed foods, of which some are imported.

Given that 5–10% of all New Zealand’s production of eggs are produced in the area, fresh eggs purchased in Greater Ōtaki are most likely to have travelled very little distance to the consumer. In addition, most egg producers process and package their eggs on site (Egg Producers’ Federation of NZ, pers. comm., August 2010).

As reported above, Greater Ōtaki produces significantly more milk than the residents of the area consume. Most of the milk produced in the area is probably trucked to Longburn and from there sent to Hawera by road and rail for processing into pasteurised milk, milk powders, cheeses, and butter. The plant in Hawera is 225 km by road from Ōtaki, resulting in a 450-km round trip. Fonterra ceased production of cheese at Longburn earlier this year (Galloway 2010).

9.5.6 Fats and oils

Vegetable oils are almost entirely imported, with very little production in New Zealand (FAO 2010a). A breakdown of countries of origin of imported edible fats and oils is provided in Figure 21. Animal fats, primarily butter, are mostly produced in New Zealand. According to the FAO, there is about 60/40 split between fats and oils of animal origin (butter, lard, etc.) and vegetable origin in the New Zealand diet (FAO 2010a), but about one third of this animal fat is present in purchased meat, rather than purchased separately. New Zealanders purchase about 10 000 tonnes of butter a year from supermarkets, and about 20 000 tonnes of margarine (Statistics NZ 2009). As discussed in the previous section, butter purchased in Ōtaki is likely to have been sourced from Hawera.

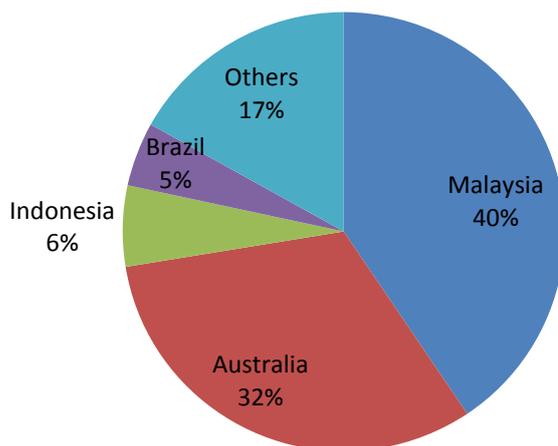


Figure 21 Origins of imported edible fats and oils, by weight, year ended December 2009 (source: Statistics NZ 2010d).

9.5.7 Wheat

In the year ended June 2009 New Zealand produced about 400 000 tonnes of wheat, 95% of which was produced in the South Island and only about 13 700 tonnes produced within 100 km of Ōtaki (Statistics NZ 2010a). According to FAO, about half of New Zealand’s production is used as animal feed. In the year ended December 2009 New Zealand imported 260 000 tonnes of unmilled wheat from Australia (Statistics NZ 2010d).

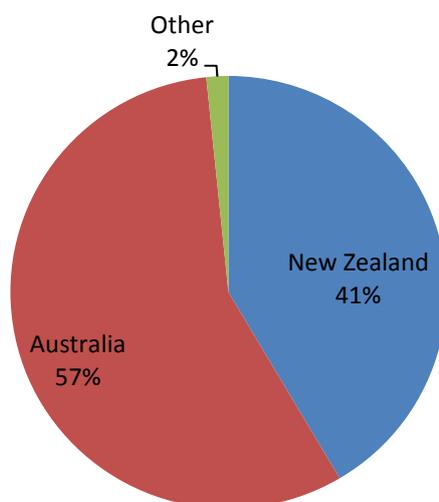


Figure 22 Origins of wheat consumed in New Zealand, by weight, year ended December 2009 (source: Statistics NZ 2010a; Statistics NZ 2010d).

9.6 Where food is purchased

The questionnaire included a question asking respondents to indicate roughly what proportion of the foods they had purchased was bought within the Greater Ōtaki area. Respondents were not asked to give quantitative estimates of the amount of produce attained from within the area (or to differentiate between foods sourced less or more than 100 km from Greater Ōtaki) because it was thought that this would be too difficult for most respondents to do. However,

some rough estimates of purchasing within the area, compared to outside it, can be derived from the data provided.²⁴

For all food groups, purchases within the Greater Ōtaki area considerably outweighed those made outside the area. This was a quasi-quantitative analysis (converting rough proportions to quantitative data in order to allow estimations to be made), and the sample is small, so the exact figures for proportions of food bought inside and outside the area should be treated with extreme caution. However, the analysis suggests that respondents were six times more likely to buy their food within the Greater Ōtaki area than from sources outside the area. Of course the location from which food is purchased does not indicate where it is grown or produced. For example, in the case of milk, questionnaire data indicate that almost all milk is sourced from supermarkets, and those supermarkets are roughly six times more likely to be in the Greater Ōtaki area than outside it – but the milk sold in those supermarkets may include both milk produced in the area and milk produced elsewhere.

The questionnaire also included a question asking respondents to indicate roughly the proportions of their food they secure from different sources, including supermarkets, specialist shops (such as a greengrocer's or butcher's shop), their own gardens, and as gifts or as a result of sharing networks with others.

Some respondents commented that the sources of food can be quite seasonal and that, as the questionnaire was conducted in winter, there was little produce coming from home gardens; it can be reasonably expected that in summer more produce would come from home gardens.

Again, respondents were not asked to give quantitative estimates of the amount of produce obtained from different sources but some rough estimates of the most popular sources for different foods can be derived from the data provided. Figure 23 provides an indication of the number of respondents sourcing food of different types from different sources. As with the above analysis responses are weighted, and the weightings do not take account of differences in the amounts of food of different types consumed by different respondents.

Figure 23 reiterates the importance of food gifting and sharing in the area (as described in section 8.1), with all foods groups apart from dairy products, having a notable element of gifting.

²⁴ Respondents were asked to consider the food that, in an earlier section of the questionnaire, they had reported eating over a 7-day period. They were then asked to note the rough proportions of food from different food groups they had bought from within or from outside the Greater Ōtaki area. They were asked to use the terms 'all', 'most', 'half', 'some' and 'none' to describe how much food of a particular type came from within the area or from outside it. The estimations of overall food sourcing habits are derived by multiplying the number of people using a particular source by 1 for 'all', by 0.75 for 'most', by 0.5 for 'half', by 0.25 for 'some', and by 0 for 'none'. This method yields a very rough estimate of shopping habits and should be considered indicative only. Responses are weighted so that, for example, respondents getting 'all' of their food from a particular source have a higher weight than those only getting 'most', 'half', or 'some' of their food from that source. The weights do not take account of differences in the amounts of food of different types consumed by different respondents.

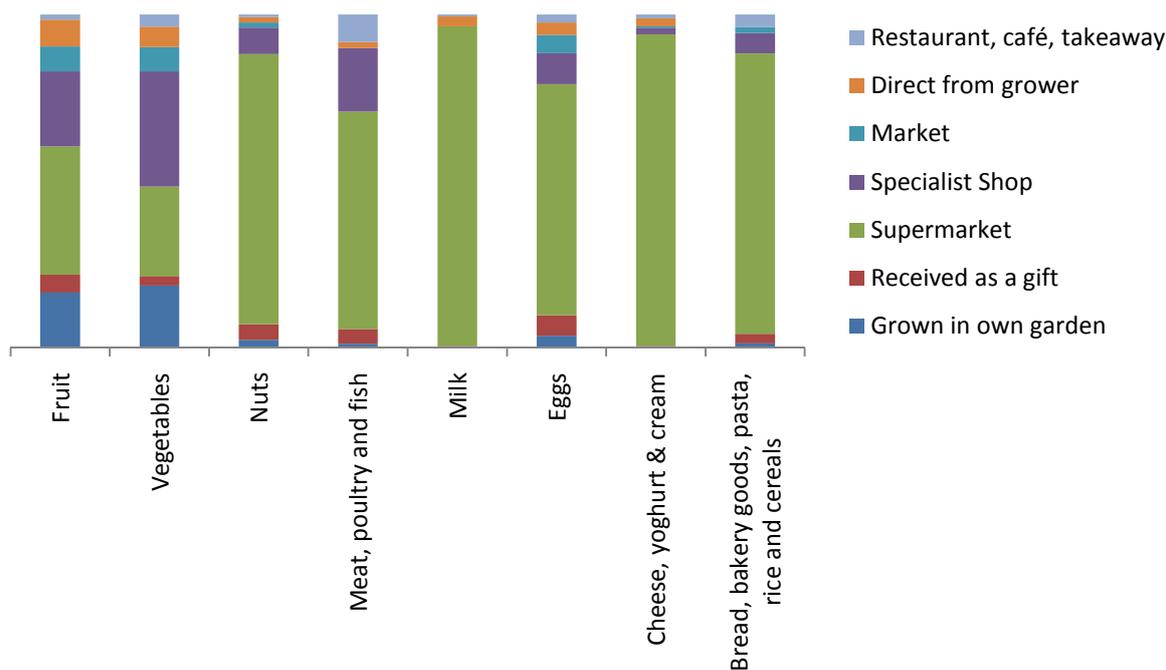


Figure 23 Survey respondents' indicated origins of foods by type.

From Figure 23 it can also be seen that respondents obtain fruit and vegetables from the most diverse range of sources, and, in particular, a number of respondents source food from their own gardens and from specialist shops. In 2005, MAF reported that 72% of all purchased vegetables were bought at supermarkets (MAF 2005).²⁵ Our survey results show a much lower proportion sourced from supermarkets. This may be because the survey cohort exhibits a bias towards individuals who choose to procure their vegetables from sources other than supermarkets.²⁶ It may also be that the prior discussion of food-related issues and the local economy within the Greater Ōtaki area has led to an enhanced awareness of food issues and to purchasing behaviours that favour sources other than supermarkets more than is the case in other areas. Finally, it may be that sources of vegetables (other than supermarkets) are more accessible in Greater Ōtaki than in some other areas (e.g., in densely populated urban areas there may be fewer greengrocer's shops and more supermarkets).

Supermarkets are by far the most popular food source overall, and are very dominant sources for a number of products, particularly dairy products. In the focus groups some participants commented that rules around dairy products, and especially milk, mean it can be very difficult to get these from local sources. One participant said:

²⁵ This figure (72%) is not directly comparable to the information presented in Figure 23 because the chart includes non-purchased vegetables, uses rough estimation to weight the *proportion* of foods that respondents are procuring from different sources rather than measuring food *quantities*, and does not account for differences in the amount of food procured by different respondents.

²⁶ This would be in line with comments made in Appendix B about self-selection of respondents who are engaged with the issues being discussed.

“We’ve got a Trust Board farm right here which is a dairy farm, which has about five or six hundred cows and yet our whole community goes to the supermarket and buy milk. Whereas we’ve got milk right here. Or even the Wānanga ... probably goes through hundreds of litres of milk a week, but we go to the supermarket and buy it, whereas we could just go to [the] vat over at the farm and get it.”

Another in a different group said:

“[T]here’s legislative restrictions which prevent – like for milk for example, you’re not allowed to sell milk from the farm, or collect it for you.... Now because that’s an iwi farm, potentially we could be providing the milk for our people. We could be feeding them fresh milk But, you know, we’re prohibited by legislation.”

And a third, in a different group again, explained:

“We used to sell [milk] to another place in town ... they used to buy 200 litres at a time. But they’re not allowed to now, because they put those things on the vats. You know those things? On your vat you’ve got a thing so that once your milk goes into the vat it doesn’t belong to you, it belongs to Fonterra. So you’ve got to take it out before it goes in. [laugh]... They can tell how much milk you’ve got in there. Yeah, so you can’t just take it out now.... Like we can’t even – we’re not supposed to even take it out for your calves after it’s gone into the vat. You’ve got to take it out before it goes in.”

One questionnaire respondent did comment on getting around the rules by sourcing unpasteurised milk privately through having ‘shares in a cow’.

These participants did not appear to be aware of the ‘Five Litre Rule’, which the New Zealand Food Safety Authority explains “is provided for in Section 11A of the Food Act and allows producers to sell up to five litres of raw milk at any one time from their farm gate to people who intend to consume it themselves or provide it to their family” (NZFSA 2008).

9.7 Choice of food source

9.7.1 Trends in food retailing

As well as being asked where they got their food from, focus group participants were asked to discuss their reasons for choosing those sources. In each focus group, participants talked about the dominance of supermarkets over other food outlets. One said:

“Everything that I ate today came from the supermarket. Everything.”

Three participants in two different focus groups linked their thoughts on the dominance of supermarkets to the history of the development of that dominance and to the way in which they now see it changing:

“Perhaps I could take a step back in time, and our own experience with a roadside stall. We were operating there quite well, and we were there when New Zealand made the transition from five days a week to seven days a week. Supermarkets came on board – became a stronger selling point. People’s leisure time became more important to them. They no longer have weekends off. Shift work came in, and certainly buying patterns in a place like ours which had a seasonal pick-your-own operation for fresh produce – people weren’t going to go and wander through the tomato patch and pick a hundred kilos of tomatoes to make chutney. They would rather go, perhaps to the supermarket –

one stop shop – buy it, and go to the beach with the kids – whatever. And New Zealand itself changed. And this is in the '80s I think. And we've taken a long time to come out of that. And we are coming, I think, with our specialty shops – becoming more and more. Farmers' markets."

"I think that in the last generation or so we kind of went from all having local shops to these big supermarket chains coming in, and they've kind of blown those shops out of the water. Now there's kind of a slow resurgence of those shops that they're coming back. And I'd like to see, in the next few years, our local farms and markets and all that kind of, I guess, strike back against the supermarkets, and maybe even go organic, so we're living off our own land and resources here in Ōtaki, and it's all organic so it's more healthy for the community and you know, for our health – for our long term health as Māori."

"I believe in Wellington somewhere ... there's an old fashioned butcher shop started up again [U]nfortunately the supermarket sort of took over from everything, and we lost all those specialist people. But I would like to see them coming back, because I think people will – not as a cost effective thing, but as a stimulus sort of – I'm interested in food, I'm interested in presenting something good once a week, once a fortnight – I think they will – I would like to see them come back."

9.7.2 Convenience and price

Much of the dominance of the supermarkets is seen as being related to the perceived convenience and low price of supermarket shopping. When asked their reasons for choosing to source food where they do, focus group participants placed significant focus on issues around price and convenience.

Comments like the following on convenience were common in the focus groups:

"Convenience is the other thing too, isn't it? You know, like it is price, but it's also convenience. So – and that's what the supermarkets – you know, that's how they work. You know, that they provide everything for you, and you only have to go down once a week or twice a week and you can get everything you need."

"[S]upermarkets – you go in there, and in half an hour you've got everything you need for a week. I do it myself, eh?"

"I quite enjoy going to the fruit shop, going to that place, going to that place – but it's not so convenient."

"Oh, I love it – restaurants and takeaways. I mean just because of its convenience. I mean, I'm real busy. I'm just being honest."

"The supermarket's in the middle of town, and you drive past every day, so that's the easiest place to get it [food]"

While other food sources were sometimes connected with convenience, the majority of comments of this nature related to supermarkets. In contrast, comments on price were more varied, with many participants noting the low price at supermarkets, but others challenging this or highlighting low prices at other food outlets:

"[I]f you want to be realistic, price does pay a part in how the average person lives their lives today. I will shop around. I will get the best price for my dollar, and if that's wherever it is, then if that's the best deal, then I'll do that."

"That Porirua market is not a farmers' market, but it is very cheap. And they sell stuff off very, very cheaply. And so that's why it's so popular, and that's why it's grown."

“But yeah, the supermarket, again it’s just convenience and price.”

“Well, like, we go into the butcher’s to buy all the meat and all that, and there’s like, a vege shop across the road. So we go there and get our vegetables.... My mum says that’s because the veges are organic or something. And they’re cheaper.”

“I mean, for me, the supermarket – the prices are just becoming more and more prohibitive. I just don’t buy veges in the supermarket. They’re too expensive. When I can go up the road and get them ... locally at the Chinese shop, or even I’ll make a trip to Levin to the gardens up there, and buy my weekly groceries. Because it’s just too expensive [at the supermarket]. And meat I get from my brother, off the farm. Again price – I couldn’t afford meat in the supermarket.”

“But there’s a huge section of the population, nevertheless [following a discussion on organics], in Ōtaki, who go to the supermarket to buy the cheapest food they can buy.”

“[S]urely if you’re buying direct from the grower, it’s got to be comparable in price to something that’s ... at the supermarket”

“If you want cheap food, you go to the supermarket.”

These quotes illustrate there is some disagreement about the cheapest sources of food. While convenience and price were often mentioned together, and were discussed more than any other reasons for choosing particular food sources, perceptions of them are quite different. There is broad agreement that supermarkets are convenient and a large part of the convenience comes from the ‘one-stop’ nature of supermarket shopping. In contrast, while perceived price is an important determinant of food shopping choices, there is little consensus about which food sources are cheapest. A number of the participants referred to struggling financially, when it comes to sourcing food, but even among those who consider their choices seriously constrained by lack of money there is no obvious consensus on the cheapest sources of food. Some participants did, however, make reference to non-market food sources in the context of financial poverty

“[Y]ou know, [some of the whānau] can’t afford to go to the supermarket, they can’t afford to go to Wellington, they can’t afford to go to restaurants, but they do know how to grow kai, they do know how to gather kai.”

However, it was also recognised, in the context of a recent supermarket shutdown, that not all vulnerable community members have access to non-market food sources.

“[P]eople couldn’t rely on supermarkets for food and kai, and for our whānau that don’t have the means or wherefore to be able to go and gather kai, or have kai in their own whenua, they’re not going to be able to take care of themselves.”

9.7.3 Quality

Other discussions about the reasons for choosing food sources included issues such as food safety (see also section 5.4 on health well-being), freshness and support for local business (see also section 9.2 on local food), suppliers of organic produce, knowledge of what foods are available from which diverse sources, and quality. On quality, one participant explained:

“The supermarkets, they don’t understand about food and flavour or any of those things”

Another said:

“[I]f we want to do all our shopping in one spot, yeah, [the supermarket is] more convenient. But ... I get a lot of our meat from the local butchers. Just because some of

the butchers [at supermarkets] are useless really, and they leave heaps of meat on the bones.”

And another commented:

“[B]read is something I have every single meal. It’s bread that we bake, on a daily basis, but when I think of the source of the grains and flour – in particular the wholemeal flour, for example, I know is sourced ... for me from the South Island areas that are more suitable for growing grains.”

On the whole, the comments about quality suggest that those participants who are very particular about the quality of the food they eat choose to procure food from sources other than supermarkets. This may reinforce the suggestion already made that people who have selected themselves into the questionnaire cohort, or focus groups, because they are particularly engaged in the topic are likely to have different food sourcing habits from those individuals who are more influenced by convenience (and therefore may have less time available for participating in exercises such as this).

9.8 Potential for change

Given the interest in the possible future dynamics of the local food system, respondents were also asked whether, and why, they would be interested in buying food (or more food) from places like farm gates, roadside stalls, or farmers’ markets. It was hoped this information would help highlight some of the barriers and opportunities to more local food supply chains.

Many of the issues raised by respondents when asked about purchasing from farm gates, roadside stalls and farmers’ markets were the same as those raised when respondents were asked about their preferences for local food or their reasons for their current food sourcing preferences. Freshness was a primary concern with 18 respondents giving freshness as a reason for wanting to use these sources more. Supporting local growers was also mentioned, although only by six respondents (compared with the 18 respondents who mentioned it when asked specifically about local food). This suggests that supporting local growers is important for people but the particular channel through which this is done may be of less concern.

Many of the other concerns raised elsewhere in the questionnaires and in the focus groups were also raised here, including price, quality, spraying, and knowing the grower and the source of the food. In particular, a number of points were raised here about the convenience of the kinds of food sources mentioned in the question, particularly location and access of these sources. Two respondents commented on having to make several stops if shopping was carried out this way and four commented on the importance of the location, citing issues such as needing to go by car, not wanting to drive on the main highway, finding appropriate stopping places, and not wanting to go out of their way. Convenience and the availability of Eftpos facilities or small change were also mentioned by several respondents.

Despite the concerns mentioned by some respondents, 38 of the 46 respondents who answered this question said that they would like to use these sources more and four said that they might but that this would depend on convenience or assurances about food quality.

In addition to questionnaire respondents’ interest in other food sources, focus group participants talked a great deal about possibilities for a farmers’ market for the Greater Ōtaki area. While the focus of the discussion differed in each group, attitudes to the idea (which was always raised by participants themselves and not by the facilitator) were largely positive.

Several participants in the focus groups commented that they were not sure they were typical of the entire population of the area, and it must be acknowledged that the enthusiasm many of them showed for the development of a farmers' market may not be shared throughout the community. However, the emergence of this topic in all four focus groups suggests there is significant support for this idea in the community.

In the first focus group the idea was first raised by one participant saying:

"[Y]ou've just got to cater for the market that's actually interested in health and well-being. And to do that in this area, you know, we grow ... and produce some fantastic product here. To have a market here, I think would be a fabulous idea."

This suggestion was greeted with initial nods and exclamations of support from other participants and the group returned to discuss the idea in more detail later.

In the second group participants were discussing the benefits of local food when one participant said:

"Coming back to supporting the farmers. If we're all going to go and get our veges from the farm gate, maybe the farmers could actually come to a market place. We're redoing Ōtaki, apparently, next year. Make a market place in here where they can come. And give them a – create some sort of standard, you know, like the organic growers have that – they always have those triangles outside their gates with the green whatever the thing is. You know, you give them something to work towards to say, well we've – maybe they're not doing it to the organic standard, but maybe it's a sort of standard of excellence that can tell us, ah yeah, these people grow good kai, we want to get their food because we know it hasn't been – you know, they don't use roundup on the farms and those sort of things."

The third group focussed largely on growing food for self-sufficiency, but when asked by the facilitator if they saw a role for selling any surplus food that they had grown a participant replied:

"I think it would be quite good to be able to sell – like to have the old stalls – roadside stalls – would be good, or if they're collectives locally, have a local market, where all the producers come together. So it's identifiable as Ōtaki grown produce. Preferably it's Ngāti Raukawa grown produce, but it's Ōtaki grown, so if people want to come into Ōtaki and buy our Ōtaki vegetables, I mean, it's like, traditionally Pukekohe, which – and Levin – have been known historically for being horticultural producing areas. And this area. So already there's a historical basis for people wanting our kai. Now we want to make sure that it's quality kai. So, you know, we've already got a history to lever off. You know, local between the Tararua and the sea, so you know, what better place? Why not get your veges from here? I'll sell it for you."

In the fourth group the topic of a farmers' market was raised by a participant when she was introducing herself right at the beginning of the session before the discussion proper even began:

"I've been working at farmers' markets for years, and I'm floored why we don't have one here. I'm really keen to see something like that happen, but that's part of the discussion."

As with the first group, this one went on to have a more detailed discussion about farmers' markets later in the session. Two of the focus groups had detailed discussions on farmers' markets that covered a range of sub-topics.

Consideration of the costs associated with establishing a farmers' market led to some discussion. Costs range from developing the necessary facilities at the venue (which may include improved access, and covered areas) to advertising the market to attract sufficient initial clientele for the market to be successful. Several participants noted that a market has to be advertised sufficiently well to get both enough vendors, and enough shoppers, to the first few markets to make it worth attending for both groups. Any imbalance may lead to the market petering out as people decide that their attendance would not be worthwhile.

In terms of clientele, both local shoppers and visitors (particularly from Wellington) were discussed. While it appeared to be accepted that some locals would use a farmers' market, much of the focus was on attracting 'foodies' from further afield, or providing an additional attraction for visitors to the nearby outlet shops. Both focus groups who discussed markets in detail saw a role for the Kāpiti Coast District Council in supporting the establishment of a market both through financial support and through providing a location for the market to be held. The potential siting of a market prompted some discussion with participants weighing up the pros and cons of different locations. Collaboration between the Council and community would be needed to establish access to a suitable venue.

The focus groups also covered topics around the quality of the produce and the types of produce available. Most participants appeared to agree that the focus of a market should be on high-quality produce rather than on very low prices. Several also mentioned that the area has a history of selling high-quality produce and this is a reputation on which a market could build. Others talked about the need for a variety of produce, and for high value-added draw products, such as salami, cheeses or liqueurs. One Māori participant talked about whether surplus traditional Māori foods, or foods that are not commonly grown or produced any more, could be sold in such a market, but questioned whether visitors could be encouraged to develop a taste for these foods, and also qualified that priority must be on feeding the local people before selling to visitors.

In both focus groups where detailed discussion of farmers' markets took place there was some consideration of the kinds of rules that would be needed to ensure the market met the standards being discussed. Rules suggested included requiring produce to be local, limiting the number of suppliers of particular types of goods and requiring quality standards or organic certification. The existence of rules for the production of goods, such as jams, in non-commercial kitchens was also raised, but the majority of the discussion focussed on commercial food production and while some participants mentioned selling domestic surpluses comments on encouraging commercial production (and thereby promoting productive use of the land through the provision of a market for its products) were more common. Several participants also mentioned how much work would be involved in establishing and maintaining a market with such regulations.

Alongside the market idea a number of participants discussed possibilities of bringing visitors from elsewhere to the region to visit the individual premises of growers. This may take on a dynamic similar to wine trails in other regions with a map of producers available. There was also some discussion about producers providing regular information to a central coordinator (perhaps at Nature Coast) on what produce they have available so that this could feed into a database and provide consumer information to match producers with potential clients. This idea resulted in only minimal discussion but may be complementary to the establishment of a market.

9.9 Summary

Greater Ōtaki produces significant quantities of vegetables, meat, and milk, and these three foods form about half of a typical New Zealander's diet by weight (but less than 40% by calorific value). However, this does not translate into a diet with high locally sourced content. The vegetables grown in the area do not match in proportion the types typically consumed: potatoes, carrots, and tomatoes are mostly sourced from outside of the area. Recalling Figure 1, which showed conceptual flows of food for Greater Ōtaki, most of the meat and milk grown in the area is transported outside the area for processing and mixed with meat and milk grown in other areas of the North Island.

Currently half of pigmeat, mostly that used to produce smallgoods including bacon, is imported, primarily from Canada, Australia, and the USA. Other meats are mostly sourced from New Zealand. Almost all vegetable oils, both for cooking and in table spreads, are imported, largely from Malaysia and Australia. A high proportion of wheat, used primarily in breads, is imported from Australia, and perhaps half of all fruit consumed in New Zealand is imported. Overall, we estimate that about 30% (by weight) of the average New Zealander's diet is sourced from overseas.

Some foods that are currently significant components of a typical diet cannot be produced in Greater Ōtaki, with an obvious example being tropical fruit, including bananas. Other foods (e.g., tomatoes) can be produced in the area but generally at a higher price than in other areas of New Zealand or overseas. Any shift to more local food consumption involves two key elements:

- Intentionally choosing locally produced foods, even if the price is higher
- Changing diet to reduce consumption of foods that are not locally available

Figure 24 shows a very approximate estimation of the proportions of food consumed by origin according to the weight of the foods, while Figure 25 shows the same proportions weighted by calorific value. A number of very important assumptions have been made in deriving these proportions, key among which are:

- Consumption patterns of residents of Greater Ōtaki are similar to those of the whole of New Zealand
- Raw produce grown in the area but processed outside of the area (e.g., milk and meat) is still considered to be local (i.e., within Greater Ōtaki). Without this assumption, the majority of the local food shifts to the '<100 km' and 'Rest of NZ' categories
- Retail distribution optimisation and logistics are ignored: normally if supply cannot be met from local production at certain times of year then it will be sourced from elsewhere. We have assumed that if sufficient supply is available in total on an annual basis, then the same good is not required from outside the area
- The main foods that account for local supply are milk, meat (except pork), eggs, and vegetables
- The high imported calorific value is a result of sugar, fruit, cereals, and vegetable oils

Because of the high uncertainty in these estimates, we do not provide percentages, and the proportions in the charts are rounded.

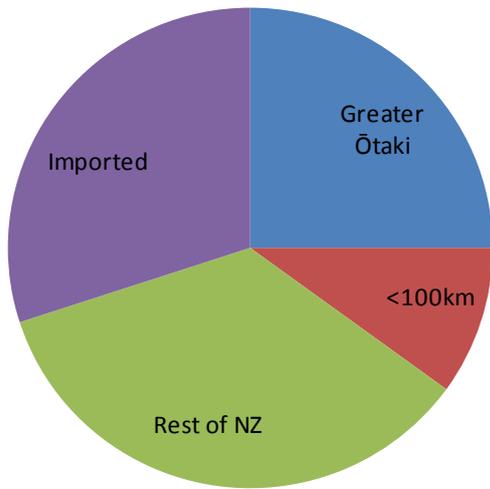


Figure 24 Very approximate origins of food consumed in Greater Ōtaki, by **weight**.

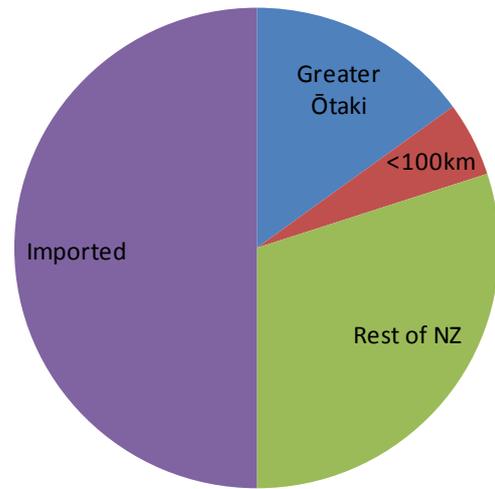


Figure 25 Very approximate origins of food consumed in Greater Ōtaki, by **calorific value**.

10 Environmental impacts of production

In this section we provide estimates of the environmental effects of food production in Greater Ōtaki using a variety of methods and with a variety of indicators. The analysis is not comprehensive: there are many negative (and positive) effects on the environment from food production, but data are insufficient to undertake a complete analysis of all these effects. Our analysis is limited to:

- An estimate of the total ‘carbon footprint’ of food consumption, with imports and domestic production treated separately
- A discussion of bottom-up approaches (life-cycle assessment), and some indicative figures from the literature
- An estimate of the carbon footprint of the international transportation of imported food
- The impacts of fertiliser use in Greater Ōtaki, including the reliance on imports and estimates of nitrate leaching
- A discussion of pesticide use in horticulture
- An estimate of the greenhouse gas emissions associated with food production in Greater Ōtaki

There are two main approaches to estimating environmental impacts of activities: bottom-up and top-down.²⁷ Bottom-up methods create an inventory of components of a product, lifestyle, or diet, and add up all the impacts associated with each of those components. This approach provides a high level of detail and precision at the expense of necessarily truncating the footprint because of the effort of data collection. Top-down methods, on the other hand, start with a picture of the total footprint of a nation, economy, or community, and attempt to disaggregate that to form a more precise picture at some more detailed level. This second approach has the advantage of being comprehensive, but at the expense of precision. The utility of the top-down approach is in providing large-scale estimates (e.g., of a nation) and first-cut estimates for higher levels of detail. Here we will investigate both of these approaches in our analysis of the material flow of food in Greater Ōtaki. We limit our discussion to greenhouse gas emissions, which, while a particularly topical and important issue, is by no means the only environmental impact of food. In particular, while water use and pollution are extremely important environmental issues for farming, data are insufficient to draw any conclusions at the level of this study area.

Previous work by Ma et al. (2008) provides an estimate of all greenhouse gas emissions for the entire Kāpiti Coast District. They estimated the total emissions in 2006/07 as 323 ktCO₂e, including 57 ktCO₂e from agriculture, but these do not include emissions in the supply chains.

²⁷ It is also possible to combine the two approaches in what is called a ‘hybrid’ method.

10.1 Top-down estimation

Environmentally extended input–output analysis (EIOA) is a commonly used top-down approach that combines economic data with environmental data to estimate the ‘footprints’ of aggregated commodity groups. Assuming that residents of Greater Ōtaki have carbon footprints similar to the national average we can apply a per capita measure to the area. Using a global multi-regional input-output model developed previously (Andrew et al. 2010), we estimate the greenhouse gas emissions embodied in New Zealand’s food imports to be about 1.5 million tonnes of CO₂-equivalent.²⁸ This is equivalent to about 0.35 tonnes per capita and about 2% of a typical New Zealander’s total carbon footprint. Applying this figure to Greater Ōtaki, we obtain an estimate of about 2900 tonnes of CO₂-equivalent for the residents of the area. A breakdown by food group is presented in Figure 26. Note this figure excludes international transportation of imported foods, which is discussed later.

This method can be used to produce other types of footprints (e.g., energy, land area), but those data are not presently available. In addition, energy and land area (in particular) are more directly indicators of use of scarce resources, rather than indicators of environmental degradation.²⁹

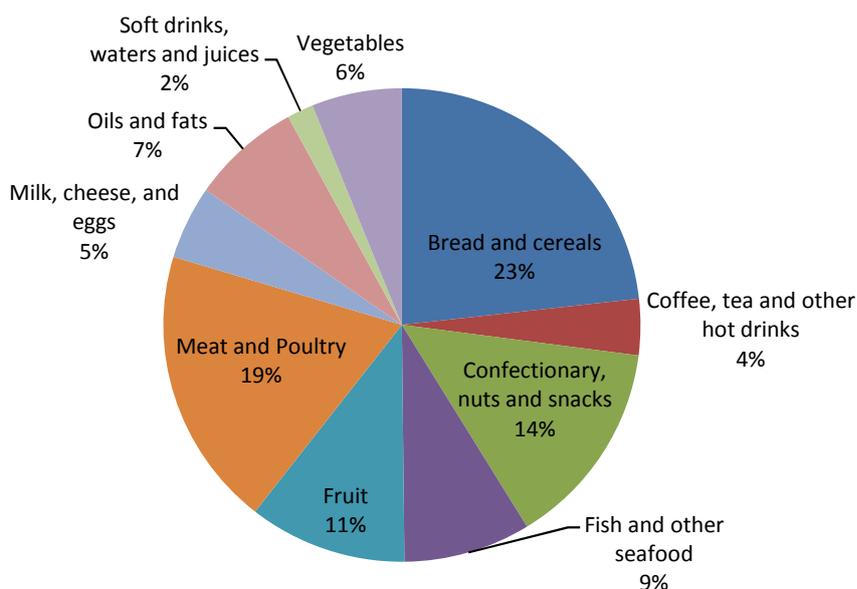


Figure 26 Greenhouse gas emissions embodied in food imports (source: own calculations using input-output analysis).

²⁸ ktCO₂e: thousand tonnes of carbon dioxide equivalents. Carbon dioxide equivalents are used to enable summation of the masses of different greenhouse gases. For example, one tonne of methane emitted is equivalent in global warming potential to over 20 tonnes of carbon dioxide.

²⁹ For example, the energy footprint of a commodity gives no indication of whether the energy was produced from renewable sources, or whether its use had a negative effect on the environment.

New and substantially improved supply and use tables for New Zealand – the primary requirements for construction of input-output tables – were released by Statistics New Zealand at the end of July 2010 (Statistics NZ 2010e). We have conducted a preliminary analysis of the greenhouse gas emissions embodied in domestically produced food purchased by New Zealand households (Figure 27). These estimates show that about 9700 ktCO₂e was embodied in food produced for household consumption. This domestic food footprint amounts to about 2.3 tonnes per capita. When combined with the footprint of imported food, the total figure is about 2.7 tonnes of CO₂e per capita, or about one sixth of an average New Zealander’s total footprint. For the 8300 residents of Greater Ōtaki, this amounts to about 22 ktCO₂e. Note that this figure excludes international transportation (see section 10.5), transport within New Zealand between producer/port and retailer and between retailer and place of consumption (section 10.3), and retail and wholesale distribution and sale.

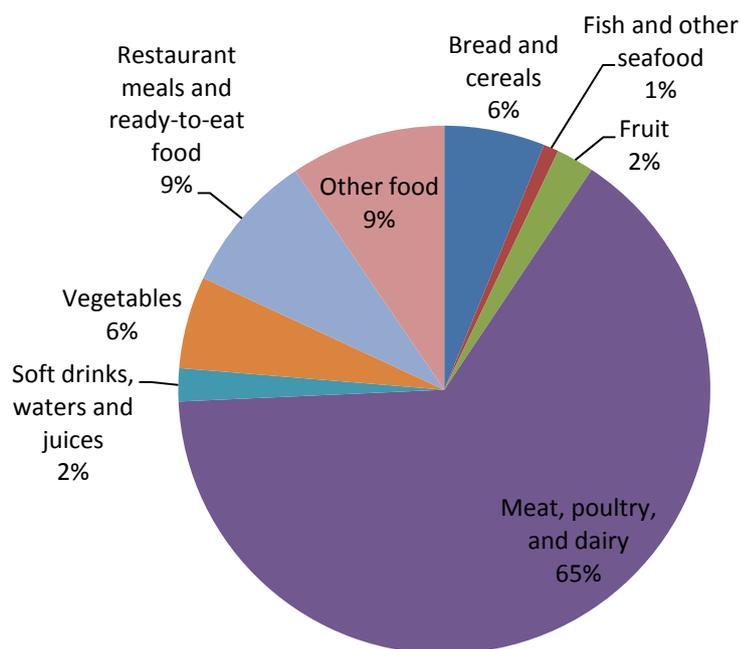


Figure 27 Greenhouse gas emissions embodied in domestically produced food purchased by households (source: own calculations using input-output analysis).

10.2 Bottom-up estimation

Bottom-up data on the environmental consequences of food production are sparse, inconsistent, and spread over a wide range of sources. Life cycle assessment (LCA) is a bottom-up method of accounting the effects of a product through some or all of its life-cycle. That is, it may include the impacts of extraction of raw materials from the environment, through production, distribution, consumption, all the way to final disposal or recycling of the product. A widely used source of a collection of food LCA data is that of Nielsen et al. (2003). A recent international summary of life cycle assessments (LCAs) of some food groups is provided by Roy et al. (2009), while the work of Muñoz et al. (2010) collates many food LCAs for analysis of the Spanish diet. A large international repository of LCA and related information regarding the food value chain is provided by the Food Climate Research Network (FCRN 2010).

In New Zealand, Mila i Canals et al. (2001, 2006) undertook a comparative LCA of integrated and organic apple production; Barber (2004) produced energy and greenhouse gas emissions budgets for dryland arable, irrigated arable, onions, and potatoes; Barber and Bengé (2006) produced energy budgets for kiwifruit; Saunders et al. (2006) reported LCAs for dairy, apples, onions and lamb for both New Zealand and the United Kingdom; and Saunders and Barber (2007) compared energy and greenhouse gas emissions between the dairy industries in New Zealand and the United Kingdom.

Since the end of 2007, the Ministry of Agriculture and Forestry (MAF) has part-funded LCAs for some of the more important primary products in New Zealand under the Greenhouse Gas Footprinting Strategy (MAF 2010). Food products for which reports are publicly available are kiwifruit (Zespri 2009), dairy products (Fonterra 2009; Lundie et al. 2009), lamb (Ledgard et al. 2010), and apples (McLaren et al. 2009). Food products for which LCAs are either currently in preparation or not publicly available are berryfruit, summer fruit, beef and mutton, and arable crops.

As an example of the use of these LCAs, we take the results from the available greenhouse gas emissions LCAs and multiply them by consumption in Greater Ōtaki, as described earlier. The on-farm carbon footprint of one litre of milk has been estimated³⁰ as 940 gCO₂e (Fonterra 2009),³¹ so, based on population and per-capita consumption, the estimated carbon footprint of dairy products in Greater Ōtaki is at least 1400 tonnes of CO₂e. Similarly, the footprint of 100 g of lamb cooked in the home has been estimated as 1.8 kgCO₂e (Ledgard et al. 2010), so the footprint for lamb consumption in Greater Ōtaki is also about 1300 tonnes of CO₂e.

With the sparse information available, only an incomplete picture can be formed of the environmental effects of consumption in Greater Ōtaki.

10.3 Greenhouse gas emissions

We have estimated emissions of greenhouse gases from Greater Ōtaki's pastoral agriculture by combining estimated livestock numbers with emission factors derived from the national greenhouse gas emissions inventory (MfE 2010), and these are shown in Table 12. Emissions of 'agricultural' greenhouse gases from horticulture derive predominantly from use of nitrogen fertiliser, and are negligible in Greater Ōtaki. These figures do not include emissions from fossil fuel combustion, for example, from the use of tractors, or from electricity use.

³⁰ This figure excludes any estimate of carbon losses from deforestation in SE Asia through the use of palm kernel expeller as a feed supplement (Stewart Ledgard, pers. comm. October 2010).

³¹ Note that this footprint is based on delivery to the UK market, and may therefore be slightly higher than that sold on the domestic market.

Table 12 Estimated annual agricultural (non-CO₂) greenhouse gas emissions by land use in Greater Ōtaki

Land use	Area (ha)	Greenhouse gas emissions (kt CO ₂ e/year)
Dairy	3440	22
Sheep and Beef	2618	11
Deer	674	2
Horticulture	506	<1
Total	7238	34.0

10.4 Transportation of food within New Zealand

There is little information about the transportation of food in New Zealand separated by export or domestic market. The Freight Demand Study (Richard Paling Consulting 2008) gives some information on freight of foods, but without a distinction between goods destined for domestic and exported markets. That study estimates transport use by the food retail industry within New Zealand by all modes (road, rail, coastal) as 8% of all freight transport (Figure 28), shifting 7.4 million tonnes of product in 2006/07 for an estimated total of 1.38 billion tonne-km. Note that some liquid milk, horticultural products, and other commodities are also destined for the domestic market. The total freight demand of food, including that destined for export, was 4.67 billion tonne-km, or 25% of the total.

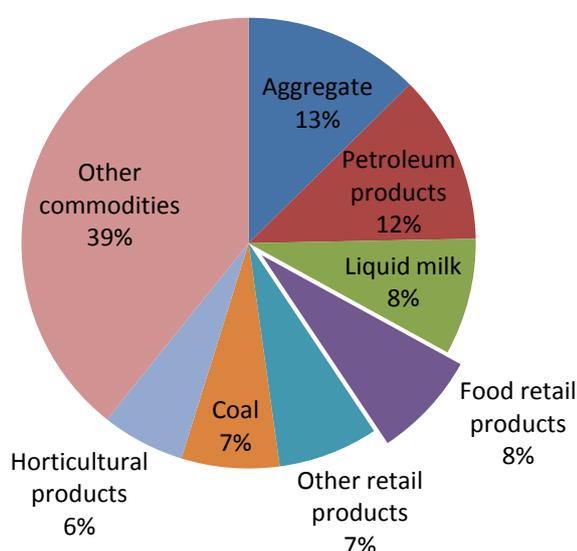


Figure 28 Domestic New Zealand transport of goods, all modes, by tonne-km (Richard Paling Consulting 2008).

According to Richard Paling Consulting (2008, p. 93), both the major supermarket chains in New Zealand

distribute goods to the stores using a variety of methods including deliveries from their own centralised distribution centres and direct deliveries from suppliers and third party distribution centres. Typically movements from the firms own distribution centres represent about 60-70 percent of all movements, but in both cases the firms were

seeking to route a higher proportion of movements through their own distribution centres to allow the consolidation of deliveries and reduce the numbers of vehicle movements to the stores. Of the balance not handled by the main distribution centres, it is estimated that about five percent of deliveries are from the local area and the balance would come from the major manufacturing and distribution hubs in the country: Auckland, Palmerston North, Wellington and Christchurch, each serving defined catchment areas.

The transportation of food by consumers can be a significant proportion of the overall travel footprint of food. The recent New Zealand lamb greenhouse gas footprint study estimated that consumer transportation in the UK – to and from supermarket or butcher – resulted in emissions of approximately 1.3 kgCO₂e per kg of lamb. This was “more than the total emissions for oceanic shipping and more than twice the emissions from the entire processing stage” (Ledgard et al. 2003, p. 11). No estimates are available for the quantity of private travel in New Zealand devoted to food purchasing (Ministry of Transport, pers. comm., 3 August 2010). However, one estimate in the UK is that about 5% of all personal travel in 1998–2000 was for food purchasing trips, including travel to and from restaurants (Cairns 2005). However, this figure might not be applicable to New Zealand, which generally has sparser urban form and lower utilisation of public transport than the UK.

10.5 International transportation of imported food

Food imported into Greater Ōtaki from overseas often travels a great distance before arriving at local suppliers. As an example, almost all New Zealand’s banana imports come from the Philippines and Ecuador, which are respectively 8400 km and 11 300 km distant from Auckland. The total imported weight of bananas, including packaging, was about 83 500 tonnes, resulting in 790 million tonne-km of transportation. By using standard fuel emission factors for refrigerated cargo ships, we can estimate the emissions from transportation of bananas to New Zealand as 32 ktCO₂e.

Figure 29 shows approximate emissions from the international transportation of imported food, by category. Emissions from sea freight transport accounted for 92% of all emissions from transport of imported food, with the remainder being from air transport.

In recent years the shipping industry has begun to address the issue of fuel consumption and emissions (Vidal 2010).

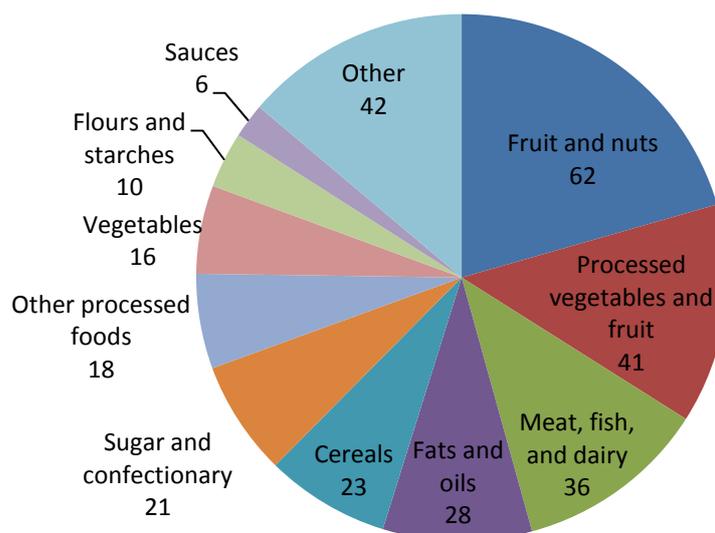


Figure 29 Greenhouse gas emissions from international transportation of New Zealand’s food imports (kt CO₂e), year ended December 2009 (source: own calculations).

Total emissions from transportation of imported food, including air-freighted food goods, are estimated to be about 300 ktCO₂e in 2009, or 0.07 tonnes per person per year. However, this can be put in perspective by comparing with the average New Zealander’s total carbon footprint of about 16 tonnes per year.³² Clearly, if New Zealanders wish to reduce their carbon footprint then there are lower hanging fruit available.

10.6 Fertiliser

With no fertiliser production in Greater Ōtaki, its use in the area represents significant reliance by local food production on other regions.

Fertilisers are significant inputs to pastoral farming, representing 16% of dairy farm expenditure in 2008–09, or about \$200 per cow (MAF 2009a), and 7% of sheep and beef farm expenditure (MAF 2009b). Equivalent figures for vegetable growing were unavailable. Fertiliser use in New Zealand grew rapidly in the 1990s and early 2000s (Figure 30) as pastoral farmers pushed to intensify production. However, use has tailed off since about 2003 because of increased fertiliser prices and increased use of nutrient budgeting tools, among other factors.

³² This figure is based on our own calculations from previous, unpublished work.

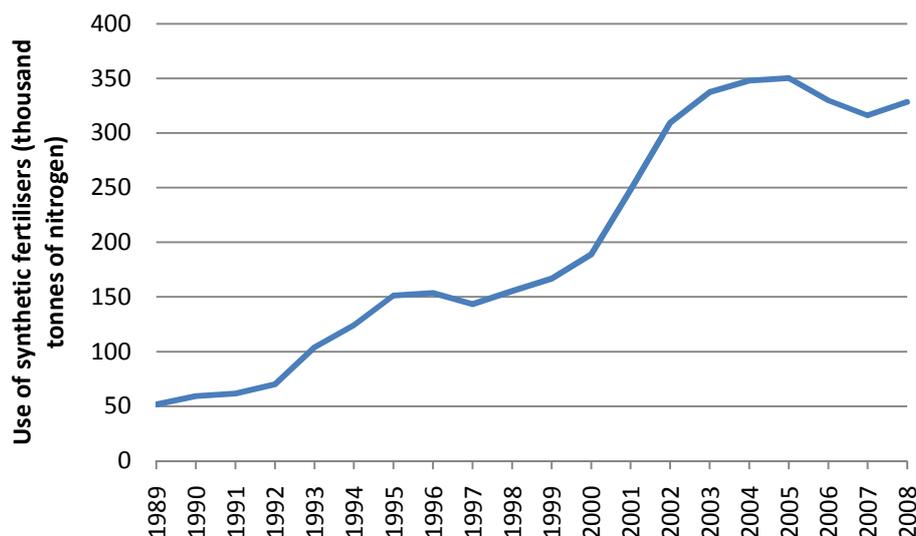


Figure 30 Growth of use of synthetic fertilisers in New Zealand agriculture (source: MfE 2010).

The use of fertiliser in the Kāpiti Coast District is presented in Table 13.

Table 13 Fertiliser use in KCDC, 2007 (Statistics NZ 2008)

Urea	Diammonium phosphate (DAP)	Ammonium sulphate	Super-phosphate	All other nitrogen containing fertilisers	Lime	Phosphatic fertilisers	Potassic fertilisers	Effluent – area sprayed over	Nitrification inhibitor applied to the farm
Tonnes								Hectares	
388	159	36	1,188	352	4,340	253	159	323	C

'C' indicates confidential data

The production and distribution of every tonne of urea results in the use of 30.55 GJ of energy and emissions of 1.56 tonnes of CO₂e, most of these from the use of natural gas in the production phase (Andrew & Forgie 2008).

Phosphate rock and other phosphates are imported in large quantities, with half of all imports in 2009 coming from Morocco³³ (Figure 31). There has been a downward trend in imports of phosphates since 2001, with a particularly low amount in 2009 (Figure 32).

³³ In fact, this proportion imported from Morocco was substantially lower in 2009 than in the previous three years, when three-quarters of all phosphate were imported from Morocco.

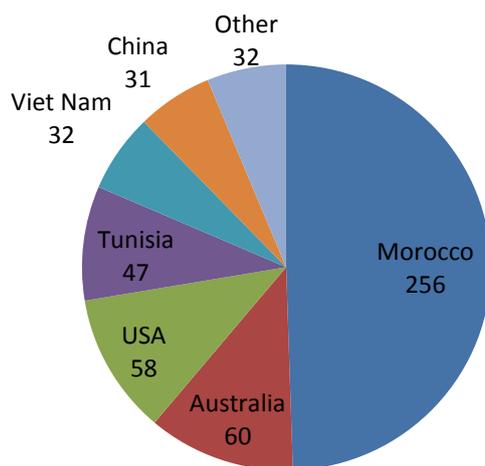


Figure 31 Origins of imported phosphate and phosphate fertilisers, thousands of tonnes, year ended December 2009 (source: Statistics NZ 2010d).

Fertiliser use can also contribute to environmental off-farm impacts, including the leaching of nitrates, emissions of nitrous oxide (a greenhouse gas), and runoff into waterways. From a farmer’s perspective, one key reason to address these off-farm impacts is because they represent wastage, with a proportion of the expensive fertiliser not contributing to enhanced soil condition and plant growth. The major tools now available for farmers to increase efficiency of fertiliser use are nitrogen fertilisers containing nitrification inhibitors (which prevent conversion to nitrous oxide), and nutrient budgeting tools.

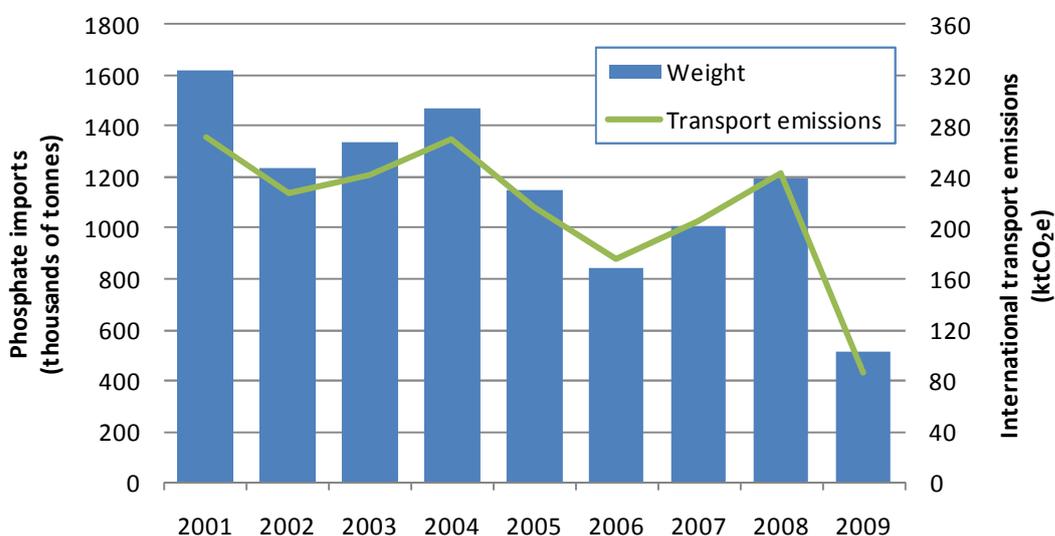


Figure 32 Imports of phosphate and phosphate fertilisers, and associated emissions from international shipping, 2001–09 (source: Statistics NZ 2010d).

The use of fertilisers in the area is highly variable, dependent primarily on soil type and land use. Dairy farmers apply anywhere from 0 to 300 kg of urea per hectare per year, with a typical rate of about 100–150 kg/ha/yr (Greg Dow, Ravensdown, pers. comm., 4 October 2010). Potassium requirements are also highly variable, ranging from 0 to 50 kg/ha/yr, with

the higher end on sandy soils. Most soils need 30–40 kg/ha/yr of sulphur, again with a little more on the sandy soils.

Market gardeners' requirements for fertiliser are primarily dependent on the number of crop rotations in a year. Overall the requirements for potassium and nitrogen are higher for gardens than for pastoral production. A potato crop requires about 1 tonne/ha of Nitrophoska,³⁴ once per year, whereas one rotation of cabbages would require 600–800 kg/ha, with 2–2½ crops per year. Typically gardeners would apply 40–50 kgP/ha for each crop, usually two to three times per year.

With significant price increases in recent years, and greater awareness of the environmental impacts of the over-use of fertiliser, many local growers have been looking to reduce their use of fertiliser. There is more soil testing to determine appropriate application rates and timing. In addition, as revenues drop and growers look to distinguish their product, organic production with lower inputs is becoming more common. A previous alternative used by several growers in the area was broiler chicken manure, provided by a local operation, but this is no longer available.

There are significant uncertainties about the impacts of fertiliser use on the environment. Primarily, these uncertainties arise from differences in conditions (soil, climate, etc.) and management (stocking rate, rate and timing of application, etc.). OVERSEER is the industry-standard model for calculating optimal fertiliser use on grazed pastures, and provides auxiliary estimates of nitrate leaching, nitrous oxide emissions, and phosphate runoff. The model is empirical, which means it is based on generalised relationships derived from a number of field studies. It is imperfect, but the best currently available in New Zealand.

While the best model available in New Zealand for estimating environmental impacts of horticultural activities is the SPASMO model, it is still effectively a research model and is not readily available. Short of modelling for horticulture, the next best option is to use data from the literature and expert knowledge.

The CLUES³⁵ project summarised fertiliser application rates for a range of horticultural activities, and the table is reproduced here (Table 14).

³⁴ 12N-5.2P-14K-6S

³⁵ Catchment Land Use for Environment Sustainability

Table 14 Typical fertiliser regimes for a range of horticultural activities (Woods et al. 2006)

Crop	Fertiliser	N content	Rate (kg/ha)	Time	Total N (kg/ha/yr)
Grape	CAN	0.27	50	Nov	14
Apple	CAN	0.27	100	Oct + Feb	54
Kiwifruit	CAN	0.27	350	Oct	95
Onion	DAP	0.18	280	Sep + Oct + Nov	150
Potato	CAN	0.27	500	Oct + Nov	270

Clothier (2009) provides more information using results from the SPASMO model (Table 15).

Table 15 Typical fertiliser rates and nitrogen leaching for a range of land-use activities (after Clothier 2009)

Crop	Fertiliser (kg-N/ha/yr)	Product Removed (kg-N/ha/yr)	Nitrogen Leached (kg-N/ha/yr)
Grapes	15	25	8
Apples	55	75	20
Kiwifruit	95	95	40
Potatoes	268	176	92
Dairy pasture	225	89	57

From these tables we can see a wide range in the application of fertiliser and rate of nitrate leaching from different land uses, with vegetable growing appearing to have the highest levels of leaching. It is possible that some growers use high rates of application as a form of insurance against rainfall: higher rainfall can leach more nitrogen from the soil, so higher application rates result in more remaining after rainfall events. Increased frequency of application at lower rates would reduce this effect, but application is labour-intensive, and increasing the number of applications may not be feasible.

We have used the OVERSEER nutrient budget model to estimate the nitrate leaching from pastoral land use, and these estimates are presented in Table 16 along with an estimate of leaching from horticulture based on the tables above and land use data. These estimates are very approximate and should be used with caution.

Table 16 Estimated annual nitrate leaching by land use in Greater Ōtaki

Land use	Area (ha)	Nitrate leaching (tonnes N/year)
Dairy	3440	66
Sheep and Beef	2618	27
Deer	674	4
Horticulture	506	27
Total	7238	123

10.7 Pesticides

Table 17 presents average use of pesticides by the agriculture industries, showing horticulture as the most intensive user on a land area basis. However, there is a very wide variety of application rates among growers.

Table 17 Pesticide use by primary industries (Source: Manktelow et al. 2005)

Industry	Pesticide use (kg active ingredient per ha)
Horticulture	13.2
Arable	2.4
Forestry	0.3
Pastoral	0.2

Modern agriculture has a high dependence on synthetic pesticides, with many crops bred without regard for disease resistance because chemical treatment is assumed to be available. In New Zealand, 80% of fungicides used in horticulture consist of low-cost, broad spectrum active ingredients, and these tend to be used at high application rates (Beresford 2010). According to Beresford (2010, p. 140), “acceptable levels of disease control with non-fungicide approaches have not yet been achieved for the New Zealand crops that most rely on fungicides, e.g. onions, potatoes, cucurbits, stonefruit, avocados, apples and grapevines.”

In some industries use of pesticides has been decreasing, sometimes substantially, generally in response to stricter requirements of export markets. Walker et al. (2010) report that between 1995 and 2008 insecticide loadings on apples has decreased by 80% and on vineyards by 72%, and fungicide use by the wine industry has decreased by 62%. The picture for fungicide use in the apple industry is slightly less clear because of the difference between conventional and organic operations. More and more conventional apple orchards have been adopting Integrated Fruit Production (IFP) guidelines, and this category has reduced its use of fungicides by 45%. However, organic apple orchards may use lime sulphur, which is not considered toxic, and the expansion of organic apple growing has resulted in an overall increase in the use of fungicide by apple growers.

In the kiwifruit industry, all non-organic orchardists follow the KiwiGreen Integrated Pest Management (IPM) programme (Manktelow et al. 2005).

The NZ GAP (Good Agricultural Practice) accreditation scheme covers “80% of all New Zealand domestically grown and marketed fresh produce” (New Zealand GAP 2010). Accredited growers must maintain a pesticide spray diary, and this information is passed on to processors and supermarkets. Free software is provided for the use of growers for this purpose. NZ GAP was introduced in 1999 as the NZ Approved Supplier Programme, and is a quality assurance programme that “provides a traceable, accountable system from crop to customer for the production of fruit, vegetables, olives and flowers. It ensures best practices are in place for the production, packaging and distribution of New Zealand fresh produce, and reduces the risk of health, safety and environmental issues - so customers can buy with confidence The programme targets locally-produced and imported crops prone to exceeding the maximum residue limit (MRL) for agricultural chemicals” (New Zealand GAP 2010).

A quality control system is also in place in the form of the Food Residue Surveillance Programme (FRSP) run by NZ Food Safety Authority (NZFSA).

Most regional councils have Air Plans requiring Property Spray Plans to be submitted by growers specifically to avoid drift.

A framework for a ‘pesticide footprint’ was recently proposed (Müller et al. 2010). The concept had three core objectives: providing a decision support tool to growers, providing an information tool to regional councils, and providing a marketing tool for retailers. While this framework is still in the research phase, it potentially provides an approach for the industry to begin to meet tighter preferences by consumers. “The New Zealand Food Safety Authority (NZFSA) conducts a Food Residues Surveillance Programme (FRSP) annually to assess the effectiveness of current controls of chemical residues on imported and locally-produced foods” (NZFSA 2010b).

Table 18 lists estimated application rates of selected agrichemicals in 2004. Caution should be exercised when reading this table because, as mentioned above, significant efforts have been made to implement Integrated Pest Management plans for some crops, particularly those that are export-focused.

Table 18 Estimated application of selected agrichemicals by crop, 2004 (Source: Manktelow et al. 2005)

Crop	Estimated application in 2004 (kg of active ingredient per hectare per year)			
	Fungicide & bactericide	Herbicide	Insecticide	Total
Asparagus	2.2	4.8	0.0	7.0
Carrots	6.5	2.9	5.8	15.2
Brassicas	6.8	2.5	2.8	12.1
Cucumbers/Tomatoes/Capsicums	11.5	-	8.8	20.3
Kumara	1.0	2.6	3.3	6.9
Lettuce	9.5	7.4	0.6	17.4
Onions/Garlic	19.4	6.4	1.9	27.7
Peas/Beans	2.6	0.7	0.0	3.3
Potatoes	15.6	2.4	1.8	19.8
Pumpkins	7.8	2.2	0.1	10.1
Silverbeet/Spinach	4.5	2.9	1.2	8.7
Squash	11.7	1.8	0.0	13.5
Sweetcorn	0.7	4.6	0.3	5.6
Tomatoes – outdoor	17.5	3.6	0.0	21.2
Apples	5.4	1.0	1.7	8.1
Apricots	10.7	1.4	2.6	14.7
Avocado	9.5	1.4	3.5	14.4
Blackcurrants	1.9	4.8	0.2	6.9
Blueberries	5.5	1.0	0.9	7.4
Boysen/Black/Raspberries	12.2	4.1	1.1	17.4
Cherries	7.8	0.1	0.7	8.7
Feijoas	1.0	1.5	0.9	3.4
Grapes (wine)	6.5	2.5	0.4	9.4
Hops	1.9	-	0.1	2.0
Kiwifruit	0.8	2.7	2.1	5.6
Olives	5.0	1.4	0.0	6.5
Citrus	2.5	4.5	1.4	8.5
Passionfruit	7.9	-	1.3	9.1
Peaches/Nectarines	15.0	0.1	2.2	17.3
Pears/Nashi	5.1	2.3	0.7	8.1
Persimmons	14.9	1.4	5.7	22.0
Plums	12.4	0.5	1.7	14.6
Strawberries	3.8	2.0	0.5	6.2
Tamarillos	5.5	1.3	2.6	9.4
Walnuts/Macadamias/Chestnuts	2.2	0.6	-	2.8

11 Potential Expansion of Horticulture

11.1 Areas suitable for horticulture

The SLURI³⁶ decision tree identifies potential horticultural land uses in a hierarchical fashion based on climatic factors (frost-free days and growing degree days), soil properties, and soil water deficit (Mackay et al. 2005). The application of this tree to Greater Ōtaki is reproduced in Figure 33, and identifies the large majority of the area as having potential for horticultural production.

In Figure 34 we have identified land parcels in which potential horticulture is greater than four hectares. This step suggests a significantly reduced area currently available for horticultural production, but does not preclude this area being used in future under modified land tenure arrangements, or under enhanced collaborative schemes. Implicit in this approach is an assumption that some large parcels of land can have a dual land use of horticulture and stock grazing.

The total areas by horticultural activity from Figures 33 and 34 are summarised in Table 19.

Table 19 Potential horticultural activities in Greater Ōtaki

Activities	Total potential area (ha)	Potential area with small parcels removed (ha)
All	2130	1415
Berries	649	525
Berries, Flowers, Market gardening, Nurseries	708	570
Market gardening, Berries, Nurseries	273	190
Olives, Viticulture	1725	1181
Olives, Viticulture, Pipfruit	1216	846
Total	6701	4727

³⁶ Sustainable Land Use Research Initiative, a government-funded research programme for maintaining and managing New Zealand's soils.

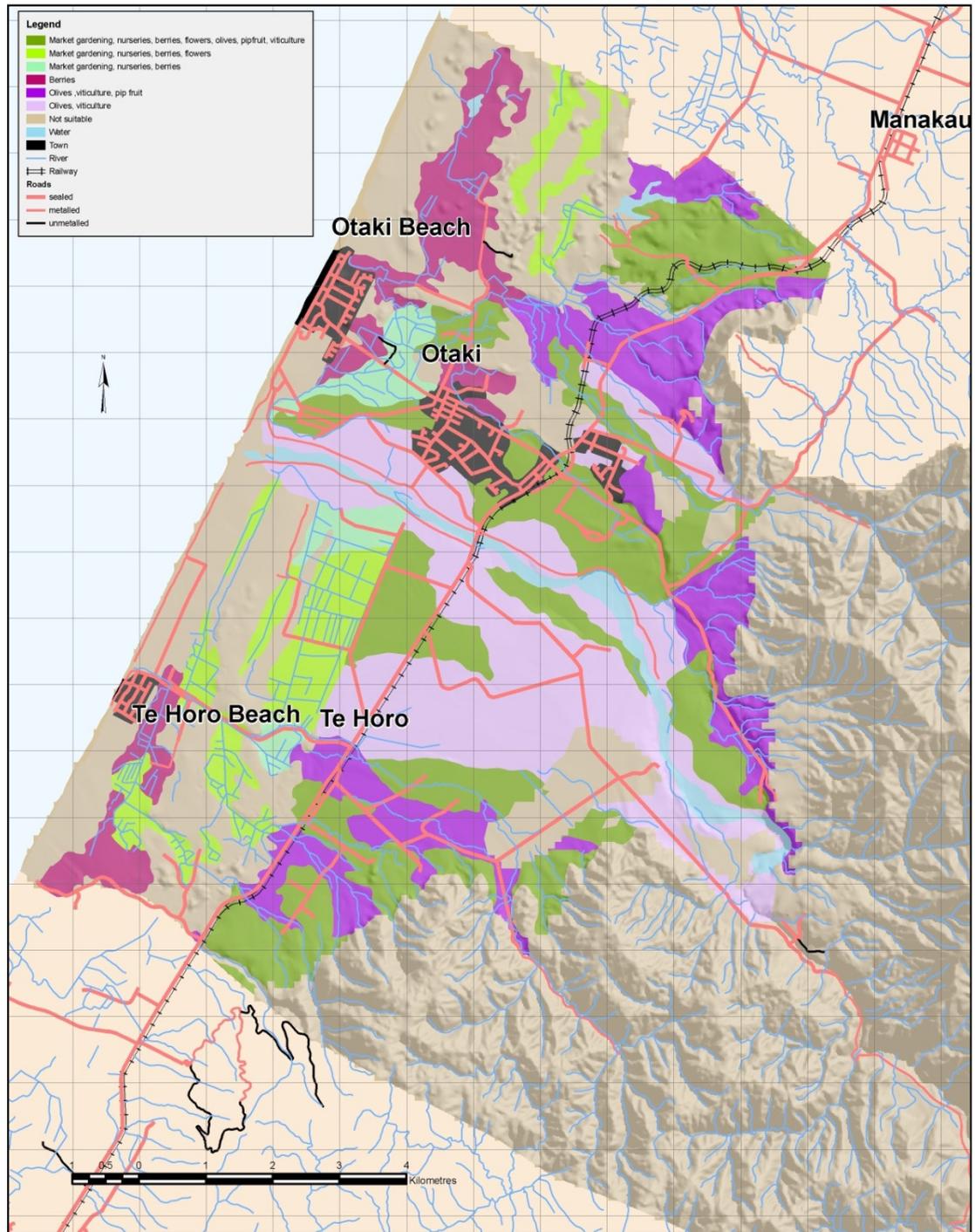


Figure 33 Potential horticulture in Greater Ōtaki based on the SLURI decision tree (Mackay et al. 2005).

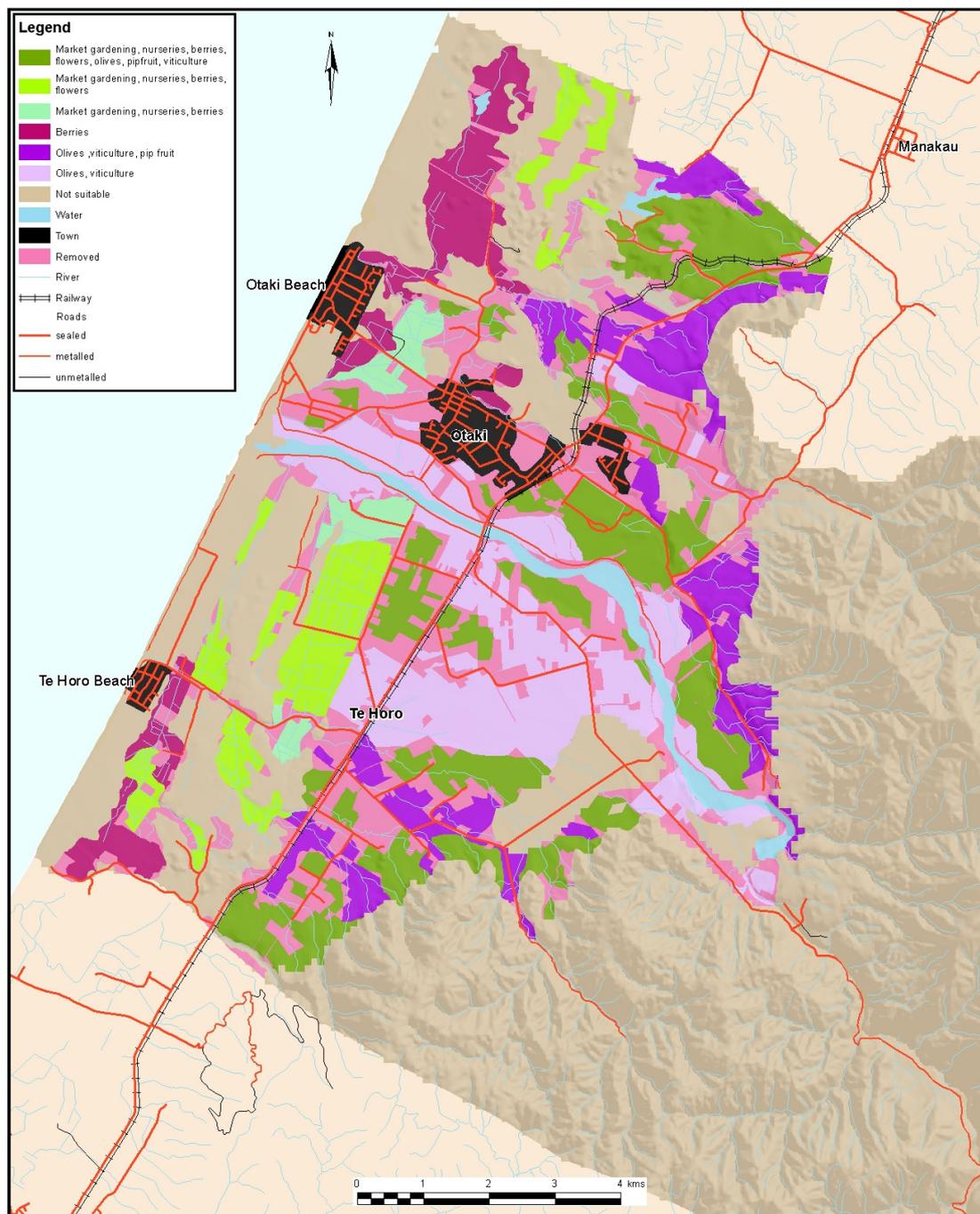


Figure 34 Potential horticulture with land parcels smaller than 4 ha removed.

11.2 Vegetable growing

The vegetable growing industry has seen significant changes over the last 20 years, brought about by greater compliance requirements, competition from imports, consolidation of retailing, the shift from auctions to negotiated pricing, and the significant increase in indoor growing. In response to these drivers, vegetable growers have had to greatly increase efficiency, reduce costs, and face lower returns on investment. Operations that saw this early and greatly increased production are now well established, making it very difficult to break into the market, particularly with oversupply in many produce lines. Large operators are

highly specialised, with high-yielding varieties, and have very high turnover with very low margins. In general, the market is no longer interested in purchasing small output from a large number of operators. They want consistent supply from a small number of operators, and that means operators that can supply either the whole North Island or the whole South Island. For new operations in Ōtaki to achieve this size would require a substantial financial investment; and this in a business that offers only low returns on capital (Horticulture NZ, pers. comm., September 2010).

The value of land in Greater Ōtaki may now be too high for a new or mortgaged growing business to make a return on the investment in land. Many of the established growers indicated that it is only because their land is freehold that they could maintain their business. Those growers who wish to expand (as well as new businesses) are moving north into the Horowhenua district where land is less expensive and the climate and soil conditions are similar to Ōtaki.

Outdoor vegetable growing is hard work: growers talk of long days and 7-day weeks, in all weather. Most growers were traditionally family businesses, but the next generation shows little interest in (and their parents are not encouraging) taking up the reins. Most professional growers we spoke to are in their fifties and many are already seeking a path to retirement. Most growers also stated that lifestyle rather than profit drives their choice to continue to grow – and the choices they make in the way they do it.

Many growers speak of the difficulty in obtaining good prices since the removal of the twice-weekly auction system, which was replaced in the early 2000s by confidential negotiated price agreements. The auction system provided a strong link between demand and supply, with prices responding to changes in each. When supply was down, growers could expect higher returns per unit, and this would cover them for times when there was oversupply. Now prices are more constant, and, according to growers, lower overall. On the other hand, the market is now one in which most (if not all) parties do not know the prices others are being paid, opening up the possibility of disinformation tactics among parties. No figures are available in New Zealand, but in the UK growers' share of the retail price of produce has reduced from 50% to 7.5% over 50 years (MAF 2005).

There are still many successful outdoor vegetable growers in New Zealand, but smaller growers face higher costs and more difficult market access. Consolidation and cooperation are potential solutions, spreading some compliance costs (e.g., NZ GAP Approved Supplier accreditation) and bringing market power: retailers see a single supplier. For example, Kapiti Green, a cooperative of three growers in Horowhenua, has 10% of the domestic broccoli market (Peter Silcock, pers. comm., November 2010).

11.3 Orcharding

Most olive operations in Greater Ōtaki would be classified as 'weekend' growers, with only two major commercial operations. Almost all olives produced in the area are pressed to produce oil, which is sold as a high-value, niche commodity. There are several small pressing operations, but one of the major commercial operations sends its olives out of the region for pressing. Production can be highly variable, with bird strike and bad weather both potentially leading to greatly reduced harvests. The domestic market for high-value New Zealand olive oil may already have become saturated, potentially making additional supply unattractive.

There are pipfruit growers in Greater Ōtaki, but according to Pipfruit NZ none of the local growers supply to packhouses for export. There used to be a packhouse in the area, but it has shut, possibly as a result of local orchardists choosing not to keep up with changing varieties. The cost of truck transport to the nearest packhouse in the Hawke's Bay prevents local growers from accessing the export market. The growing conditions in Greater Ōtaki are inferior to those of the main growing regions of New Zealand, and fruit are likely to require more disease management and their size is likely to be smaller (Gary Jones, Pipfruit NZ, pers. comm., 22 December 2010). One current market for local apple production is a local organic juice and cider vinegar producer, which sources 40% of its apples locally.

However, there is significant opportunity for increased apple production in Greater Ōtaki with the potential opening of the Australian market following a recent WTO decision. In the near future the market for New Zealand apples could expand significantly, and new growing areas would be necessary. While Greater Ōtaki is inferior to the main apple growing areas of New Zealand, it would still certainly be competitive with those in Australia. Significant investment would be required both financially in new plantings, coolstores and packhouses, but also in development of supply chains and access to retailers in Australia. At least 100 ha of apple orchards would be necessary to support a packhouse (Gary Jones, Pipfruit NZ, pers. comm., 22 December 2010).

Among other orchard crops, Greater Ōtaki supports small areas of plums, feijoas, tamarillo, passionfruit, and avocados, all apparently supplying only local markets.

11.4 Wine growing

There are large areas suitable for grape growing in Greater Ōtaki. However, while soil and climate might be suitable for producing good wine, the branding of a winery and a region are critical to a winegrower's success. Wine is intrinsically a product of the place in which it is produced, and it can take a long time to build strong brands. The story of Martinborough's development as a wine region may offer some insights. Martinborough's first vines were planted in 1980 following a DSIR report the previous year that compared the area's conditions to those of Burgundy. Thirty years later there are over 50 wineries, and the area could be said to be thriving, even though it produces only about 1% of New Zealand's total wine volume. Just as Martinborough has become a destination for Wellingtonians, Ōtaki's proximity to Wellington offers the opportunity to tap into the weekend wine tourism market.

The industry in New Zealand has seen a rapid increase in recent years (Figure 35), growing to a \$1 billion export industry. However, overproduction in 2008–09, particularly of Sauvignon Blanc, resulted in a glut and the export value per litre has dropped significantly as well as affecting the New Zealand wine brand. The industry is looking to rebuild and recover to improve value to growers, and NZ Winegrowers, the industry body, expects this period of recovery to persist until 2012 (NZ Winegrowers, pers. comm., 6 October 2010).

While the market is currently not conducive to a large number of new entries, the soils of Greater Ōtaki are well suited to wine growing. Ohau Gravels, while not in the district, has recently won major awards for its wines, and certainly shows that the area has potential. As part of its operations, Stanmore Farms also grows vines to supply wine growers locally and further afield. Successes such as those of Ohau Gravels are critical in brand development, which in turn is critical to establishment of a wine industry in Ōtaki.

The cost of establishment of a vineyard and winery is very high. Because of the current economics of the industry, financing for establishment of new operations is likely to be difficult to find. The cost of entry can be reduced by sending grapes for processing to another winery, although this introduces a reduction in control over the process, along with a potential perceived drop in wine quality because of transportation.

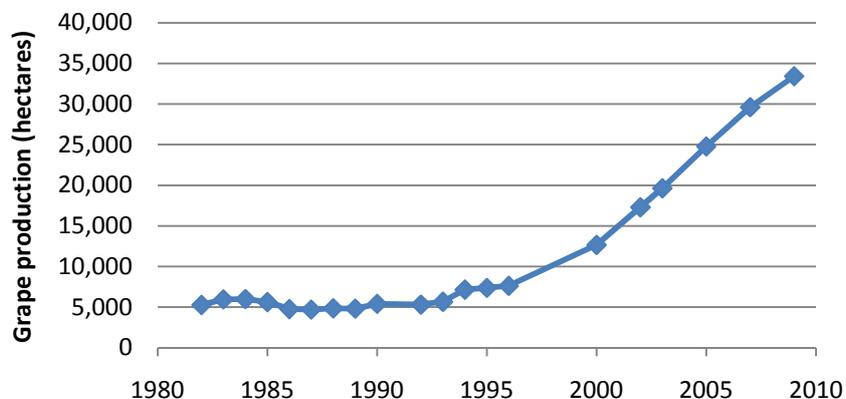


Figure 35 Grape production area in New Zealand (Source: Statistics NZ).

11.5 Berry growing

Berries are identified by the SLURI decision tree as having significant potential in the area. For many years the centre for berry research was the HortResearch site in Levin, closed in the early 1990s. However, many barriers make expansion of berry growing unlikely. Berry growing in New Zealand can be divided several ways: into strawberries and the rest; into domestic and export; and into fresh and processed.

Strawberries have a reasonable shelf life and there is strong demand, so they are popular with supermarkets. The majority of commercial strawberries are grown in Auckland and Waikato by large operations with significant economies of scale. These growers harvest until mid-January, then pull the plants out and do not start production again until May. Smaller operators continue to produce and harvest, but supermarkets have been known to import more expensive strawberries rather than deal with the smaller operators.

Blackberries and raspberries are only grown in small quantities in New Zealand, with no industry body representing and supporting these berry types, but there are several growers in Greater Ōtaki. Supermarkets are reluctant to stock blackberries and raspberries because they are highly perishable and low demand results in low turnover. While there is certainly potential for raspberry and blackberry cultivation on a large commercial scale in Ōtaki, there are significant barriers. Chief among these are the lack of (i) market, (ii) an industry body, (iii) varietal research, (iv) nursery support, and (v) maintenance of varietal germplasms. Any operation undertaking large-scale cultivation of raspberries and/or blackberries would need to address all these issues. Varietal research would be required to find and/or develop varieties that require less winter chill, particularly as winters become slowly warmer with global warming.

Of other berries, blackcurrants are grown mostly in Nelson and Canterbury, primarily for export, and Ōtaki does not have a suitable climate for their growth. Boysenberry production

is centred on Nelson and Hawke's Bay, but a small amount is grown in Greater Ōtaki (Ian Turk, pers. comm., 6 October 2010).

11.6 Home gardening

11.6.1 Estimates of potential home garden area

Ghosh et al. (2008) estimated potential food production from home gardens in Auckland using five case studies in neighbourhoods with different urban forms. Available land for growing vegetables was derived from interpretation of aerial photographs, with an allowance for flowers and lawns. Average available on-site household productive land ranged from 68 to 190 m², depending on the neighbourhood.

Rutledge et al. (2008) used meshblock-level census data on dwelling sizes (indicated by number of bedrooms) in Hamilton to estimate building areas, and calculated available space for productive gardens under four scenarios as a proportion of the total non-built-up land: maximum (100%), high (75%), medium (50%), and low (25%). They suggest the low scenario was the most likely, given that the use of dwelling size takes no account of impervious surfaces such as driveways, decks, patios, etc. They estimated a total of 629 ha were available over the Hamilton residential area under the low scenario.

We follow the conclusion of Rutledge et al. (2008) and use a figure of 25% for residential properties after subtraction of building area, whereas we use a figure of 75% of total land area for lifestyle block properties.³⁷ Clearly there is a certain level of arbitrariness about these choices of proportions, and the results must be considered indicative only, and taken in the light of later discussion about the amenability of residents to home gardens, and other barriers.

We present our estimates aggregated to meshblock level in recognition of the inherent imprecision of the approach and the desire to avoid judgement on individual households. Using this approach, the areas potentially available for home gardens are about 90 ha in residential areas (Figure 36) and 1500 ha in lifestyle blocks (Figure 37). These are summarised in Table 20.

Note that these estimates take no account of current production in either home gardens or lifestyle blocks, and are therefore not estimates of *additional* production. Nor do the estimates account for any barriers to production in these areas, including owners' preferences, skills, and knowledge.

³⁷ Properties where the landowner indicated that the property was a lifestyle block in AgriBase. We use a proportion of total land area rather than subtracting building areas because of difficulties aligning the boundaries of AgriBase with the land parcel database provided by KCDC.

Table 20 Potential area for production in residential zone and lifestyle blocks in Greater Ōtaki

	Total area (ha)	Area of buildings (ha)	Potential production area (ha)
Residential Zone	426	57	92
Lifestyle Blocks	1680	N/A	1260

We note that satellite imagery shows clearly many lifestyle blocks are harvesting hay, presumably for sale, and thus are in ‘productive’ use.

11.6.2 Community views on home gardening

Questionnaire respondents were asked whether they were happy with the amount of food they grew in their own gardens, whether they’d like to grow more or less, and what would enable them to make any change they would like to make. Most respondents said they were happy with the amount they grew and none said they would like to grow less food than they currently do. Twenty said that they would like to grow more food and four said they are working towards growing more.

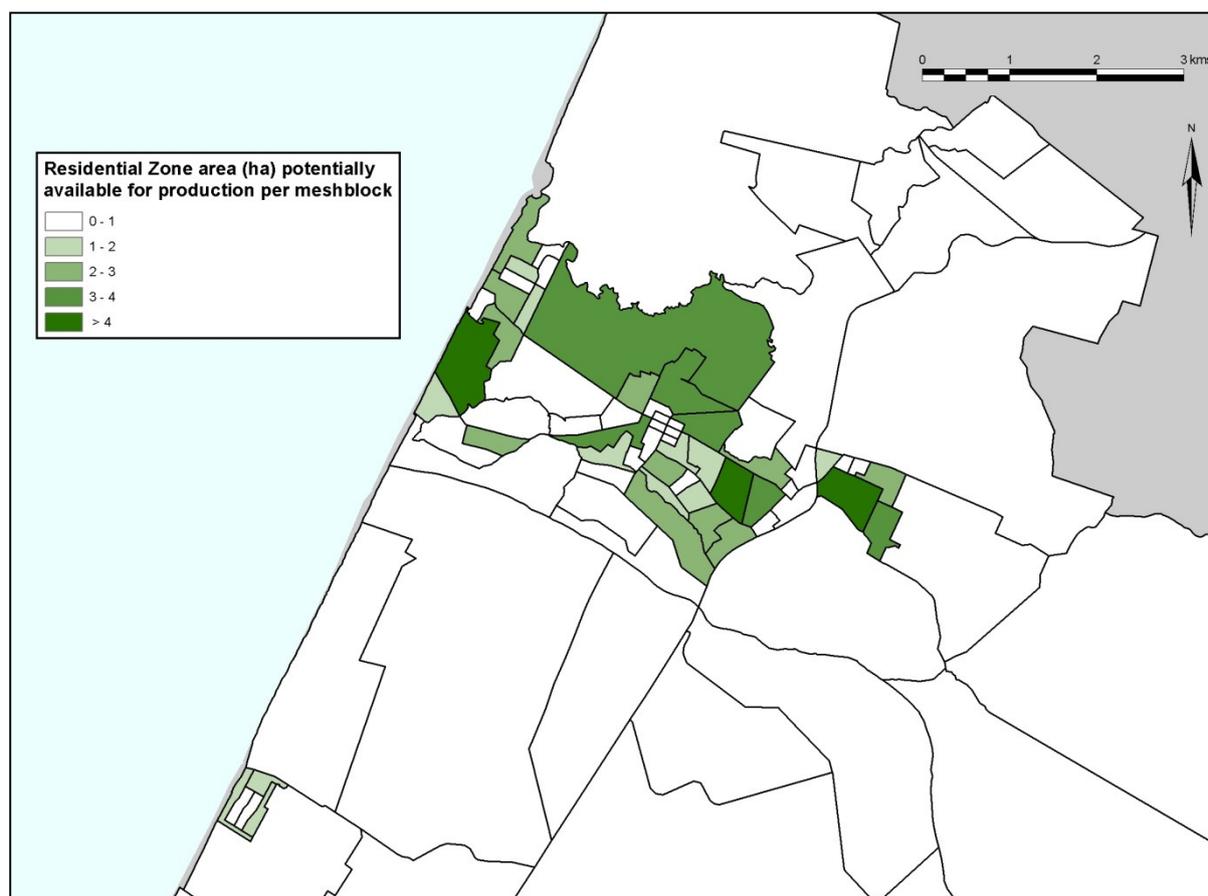


Figure 36 Potential area available for home production in the residential zones, Greater Ōtaki.

A number of focus group participants also expressed a desire to grow more food, and their comments are included here where appropriate. It was noticeable in focus group discussions that some participants wanted to grow more but faced barriers to doing so.

Comments on barriers to growing more food fit into four basic categories: physical and time constraints, the relative costs of growing versus buying food; availability of land; and knowledge and experience.

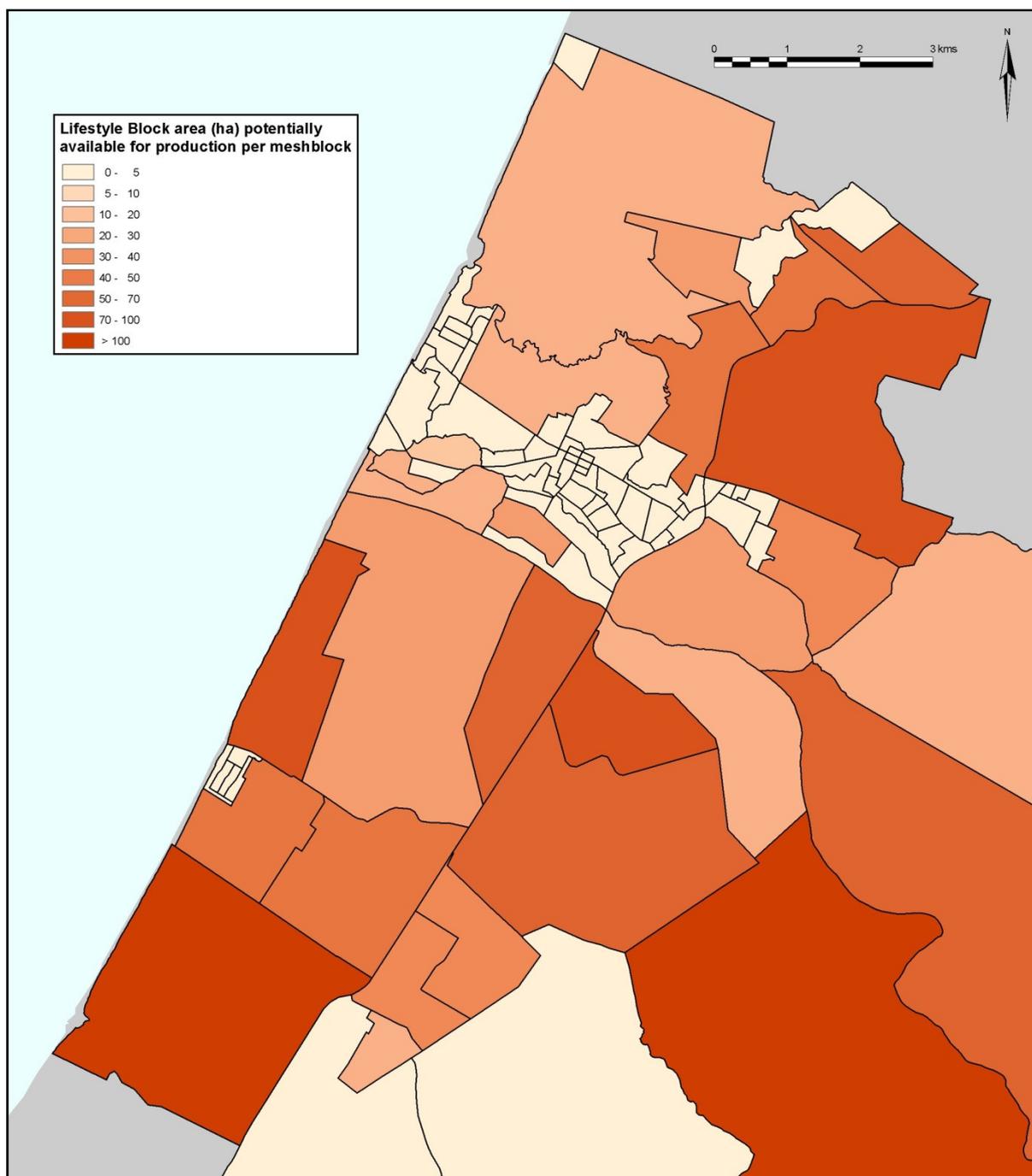


Figure 37 Potential area available for production in lifestyle blocks, Greater Ōtaki.

Physical constraints and shortage of time

The reasons most commonly given by questionnaire respondents for not growing more food were physical constraints (age, infirmity, and energy) and shortage of time. These compromise an individual’s abilities to manage a garden. Sixteen respondents mentioned a

constraint of this nature. Three people commented on needing or receiving help with their own gardens, e.g.:

“We are [elderly] and sometimes need physical help eg turning compost”

One additional respondent commented on not being able to do physical work but on wanting to see the land used better, for example through an allotment scheme.

None of the focus group participants commented on infirmity compromising their ability to garden, but several did mention time constraints.

Relative costs

Five respondents commented on the costs of growing food. One commented that it would be cheaper to grow food than to buy it (but she has insufficient space to do so). The other four respondents who commented on costs, however, commented that the costs of growing food mean that it is either not worth the effort, or is not much cheaper than buying food.

One focus group participant emphasised that the way she grows food is not cheap:

“I was wondering about the cost of actually growing stuff at my place, and I think that unless I totally go back to the methods of my grandparents, who never bought anything because there wasn’t anything to buy, that a lot of my gardening is very expensive, because I like going to nurseries and buying big bags of tomato mix. And I buy brush fencing, and I buy all sorts of things.”

This participant did describe gardening as “*an addiction*” for her but it should be recognised that costs, such as the purchase of tools, may prove to be a barrier to beginner gardeners even if they do not buy some of the less essential items that a gardening addict may choose to acquire.

Availability of land

Four respondents commented that they would like to grow more but have insufficient space to do so, and one commented on poor soil on her property. Two of these respondents commented that they while they have insufficient land to grow more food they would be happy to share a garden or be part of a community garden scheme. None of the focus group participants talked about having insufficient space to grow food although one did comment that her garden was small and so she helps an elderly man with his garden and will later lease the land from him.

Knowledge and experience

Two respondents commented that they would like to grow more but that knowledge gaps can cause a barrier to doing so:

“It would be nice to have seasonal gardening courses to help get me started with the veges, like what to plant when. I do visit gardens on display but often miss when to plant myself.”

Issues of knowledge were discussed in a little more depth in the focus groups and some important points emerged. First, a number of respondents (both adults and younger people) commented on their parents or grandparents gardening. Whether these people learnt skills

from older generations or not, seeing those family members gardening seems to remain as an influence to that younger generation. For example, one participant said:

“Grew up – fortunate to grow up – and Mum’s really into growing her own kai and doing as much as she can. And Dad – it’s more Mum, though, that sort of [thing]. He dug it up and she did the looking after the garden. So [I] didn’t really learn a great deal about doing it, but enjoyed the benefits of that, and I just sort of started in the last few years ... doing our own garden. I was happy to just go around and get her fruit and veges and flowers. But now I’ve started doing it.”

A number of participants commented on current gardening programmes in schools and in the community. It is as yet unclear whether school programmes will have the same impact as family members have had in the past but one respondent did comment that some proactive parents are following up on the school gardening lessons at home.

Second, several respondents commented that, having not tried gardening before, it is difficult to know if they would be any good at it and it is hard to get started for the first time. One respondent linked a lack of experience to the problem of young people not considering careers in the agricultural professions and explained what happened when a friend of hers wanted to restore a former vegetable garden:

“[H]e engaged with the Community Max programme and got ... sometimes six, eight, nine, ten youth people coming in, working on this project to create a garden. None of them were interested in gardening. None of them really wanted to be there, except ... it was paying better than the dole.... And they got there and they saw this, like about two acres of paddock – big weeds, trucks, rubbish, everything – and they worked on it for around about five or six months, and they turned it into this flourishing garden – rows of veges. But you know, they cleared it, they ploughed it, they planted it, they watered it, they fenced it. They did all this stuff, and they got really into it.... [T]he carrot was getting more money. But after a while they enjoyed their work and they were taking pride in their work. And then afterwards, after that programme finished, I think about three of them, who ... had never been interested in that sort of work before, went and got jobs at other places in orchards and land care.”

Sale of surplus production

With increases in home gardening in mind, respondents were asked whether, and where, they would like to sell food if they grew a surplus. Most (23 respondents) either left this question blank or said that it was not applicable to them. Fourteen said that they would not like to sell a surplus; three specified that this was because they would prefer to give their surplus away; and a number of others simply commented that they were not interested in selling produce. Eleven did comment on a preferred method of selling produce and, of these respondents the majority (seven) mentioned selling food at their own gate; selling at a farmers’ market was also mentioned by four respondents. Only one or two mentioned each of selling at a stall, direct to clients, and to cafés, restaurants or shops. Overall it seems that appetites for selling home produce were low among survey respondents.

Focus group participants expressed more interest in selling surplus; some of them already do so at the Transition Towns surplus stall.

Overcoming barriers to home gardening

Different barriers can be overcome in different ways and the Council may be able to contribute to overcoming some of the barriers. As mentioned in Section 5 participants are keen that the Council supports community initiatives and minimises the number of restrictions on the activities that community members are able to pursue; this finding may guide the Council's chosen approach to overcoming barriers to increased home gardening. While actual physical constraints themselves and individual's shortages of time are largely outside the Council's control, it may be possible to facilitate networks and linkages between individuals that minimise some of these difficulties. For example, one respondent explained that she likes the Timebank³⁸ because she can get help with jobs she can't do because of infirmity and can help others with other things in return. The Council may be able to support such initiatives and minimise the constraints that some people have about growing food.

The relative costs of growing food may be difficult for a council to address, because different individuals see different opportunity costs for different activities – for example the 'exchange rate' between time and money differs not only between individuals but between different activities. A person who enjoys gardening is likely to see time spent in the garden as a benefit rather than a cost. For example, one focus group participant said:

"[I]t's labour intensive. That's all, you know. And that's okay, because you'd rather have the labour intense – that's actually enjoyable to be out there and feel like you're actually working to produce your kai."

Again the Council may be able to support activities like gardening through initiatives like the Timebank as these may enable people to balance different activities they view as having different costs and benefits.

The Council also has a potential role in provision of advice, and good advice on, as one respondent put it, 'what grows best, how to care for it etc.' may help to reduce the costs of gardening, especially if it reduces the likelihood of crop failures and increases the yield from the work that a gardener invests in growing food. Another respondent commented that advice on composting (and council provision of low-cost compost bins or 'travelling mulchers') would help people to enrich the area's sandy soils, which again may remove some of the barriers and reduce some of the costs to growing food. There are already programmes in the area that help to enhance knowledge on gardening, and there are a number of people in the area happy to share their skills and knowledge. To help with provision of advice on gardening the Council may not even need to set up programmes of its own, just support and facilitate those that already exist and the emergence of new ones.

Finally, the Council can have a role in determining the availability of land for gardening. Beyond the direct impact of land zoning the Council can make provisions, and has begun to do so, for shared spaces, and opportunities, for gardening. Community gardens, allotments and time swaps between people with different abilities and desires can all help those who want to garden to access suitable land.

³⁸ A Timebank is an informal scheme whereby members volunteer their labour in exchange for a 'time credit', which can be used to 'purchase' labour from other members.

11.7 Summary of barriers to and enablers of increased horticulture

From the foregoing discussion a number of themes can be derived from across the food production system.

11.7.1 Cost of entry

Land prices are increasing, partly as a result of strong demand from dairy and lifestylers. Capital requirements such as machinery, coolstores, glasshouses, and irrigation are considerable. It is therefore generally necessary to obtain financing, with a consequent repayment burden. Additionally, new entrants, without prior experience of horticulture have a significant learning curve with horticultural practice, understanding the industry, regulations, etc. Considerable entrepreneurship might be necessary to develop new brands and markets.

One key solution to cost of entry is for existing operations to increase in size, leveraging their existing capital and demonstrated experience. An alternative is for existing operations to collaborate, sharing the costs of expansion, exemplified by Kāpiti Green.

11.7.2 Markets

Smaller growers have to compete with (often cheaper) imported product as well as larger New Zealand players who have more efficient cost structures. Larger players also have an advantage supplying supermarkets, who prefer a small number of suppliers and year-round supply of uniform produce, and who require growers to be certified to the NZ GAP. Supermarkets reflect demand for consumers for ‘apparent’ quality where consumers would generally prefer a blemish-free but poor-tasting item to a well-flavoured but slightly imperfect item (‘cosmetically downgraded’). In addition, some growers have reported frequent disconnection between supermarket prices and what growers are paid, with only a small proportion of the final retail price returning to growers.

Solutions to these market conditions suggested to us by growers and industry bodies include consolidation or collaboration of operations (e.g., Kāpiti Green); diversification; nimbleness; clever, niche marketing; and consumer education programmes.

11.7.3 Infrastructure

Some produce, such as kiwifruit and apples, require access to central packhouses. Other produce, such as milk and meat, requires processing at large facilities. These large operations substantially reduce the cost of packing and processing. There used to be an apple packhouse in Ōtaki, but now the nearest is in Hawke’s Bay, and transportation costs make supply to the export market uneconomic (Gary Jones, Pipfruit NZ, pers. comm., 22 December 2010). It would require a significant increase in either kiwifruit or pipfruit production to warrant the construction of a new packhouse in the area and reintroduce associated economies of scale.

Some areas of Greater Ōtaki have limited existing road access, and further development of these areas would require investment in road infrastructure. In addition, development of new properties for horticulture would require drilling of bores or other infrastructure for irrigation supply.

11.7.4 Lifestyle blocks

Lifestyle blocks have come to be an important feature of the rural landscape in Greater Ōtaki in recent years (Isnard 2009). Many growers believe these small rural subdivisions generally have considerably lower food productivity than larger, professionally operated land parcels. However, there is some evidence to the contrary. A 1996 review by MAF concluded that about 20% of lifestyle blocks actually had higher production than before they were subdivided, and that this was sufficient to offset the lower production of the other 80% of properties (Ward et al. 1996). In the Kāpiti Coast District, Isnard (2009) found that almost half of land on lifestyle blocks was used for grazing, and about 30% for recreation and lawns, which suggests relatively low economic productivity.

As more land is ‘locked up’ by subdivision, the land available for commercial horticultural expansion decreases. In addition, neighbour issues such as complaints about spraying potentially threaten the operation of horticultural operations. On the other hand, lifestyle blocks introduce production diversity, and many owners effectively subsidise that production by paid employment elsewhere (Isnard 2009).

11.7.5 Home gardens

There is significant evidence of existing production in home gardens in Greater Ōtaki and there is potential for much more. Barriers to increasing home production include lack of knowledge, perceptions of cost and difficulty, physical inability, and availability of time. Community gardens provide a means for people to learn from others, and to cooperate for mutual benefit. Lessons from these gardens can be transferred to home gardens. There is a potential role for Council to support and encourage such community initiatives. Examples of community education overseas can be used as the basis for designing low-key, local campaigns.

12 Exploratory Scenarios for Increased Horticulture in Greater Ōtaki

We present two scenarios for increasing horticultural production in Greater Ōtaki, and compare those to a business-as-usual projection.

12.1 Business as usual

Projections, by definition, require assumptions to be made. A business-as-usual projection makes assumptions about how existing trends might continue into the future. Trends in some aspects of the economy and society are more predictable than others, but none can be pinned down with certainty. Our assumptions for business as usual to 2030 are as follows:

- Population will increase from the current 8300 to 10300 (Figure 38), with the proportion of over-65s increasing from 24% to 31% (Figure 39 shows the District-level projections). While the effect of an ageing population on employment patterns is partially offset by an expected increased participation of older people in the workforce³⁹ (Figure 40), the dependency ratio is expected to increase overall. No information on how ethnicity or socioeconomics might change was available.
- Rural residential properties will continue to be in high demand, and land tenure regulations will remain unchanged. The trend of the last 10 years will continue resulting in an additional 1400 ha being subdivided from properties larger than 40 ha to create properties less than 40 ha. About half this area (780 ha) will be new properties of less than 5 ha. This could imply more than 200 additional lifestyle blocks in the area.
- Subdivisions are likely to occur from pastoral farming properties. In an area as small as Greater Ōtaki, the source of these subdivisions may be more strongly influenced by the characteristics of individual farmers (e.g., age and solvency) than by relative prevailing economic conditions between land uses. This makes it difficult to foresee which pastoral land use (or combination thereof) is likely to decline to supply the increased demand for lifestyle blocks.
- Since no clear trends are discernible, we assume dietary preferences remain as they are today, with no significant shifts from the proportions consumed of each food group, nor in the overall quantity per person.
- With introduction of integrated pest management plans and of organic methods, consumer demand over the last ten years has seen significant changes in the use of pesticides. While much of this shift has been driven by export markets, it is expected that the domestic market will follow in similar fashion. We therefore assume horticulture will reduce its use and dependence on artificial and toxic pesticides and that the use of pesticides will become much more targeted and precise.

³⁹ “[R]eflecting increased flexibility in the age of retirement (with no compulsory age of retirement), changing attitudes to retirement, and increasing life expectancy and well-being in the older ages” (Statistics NZ 2010b)

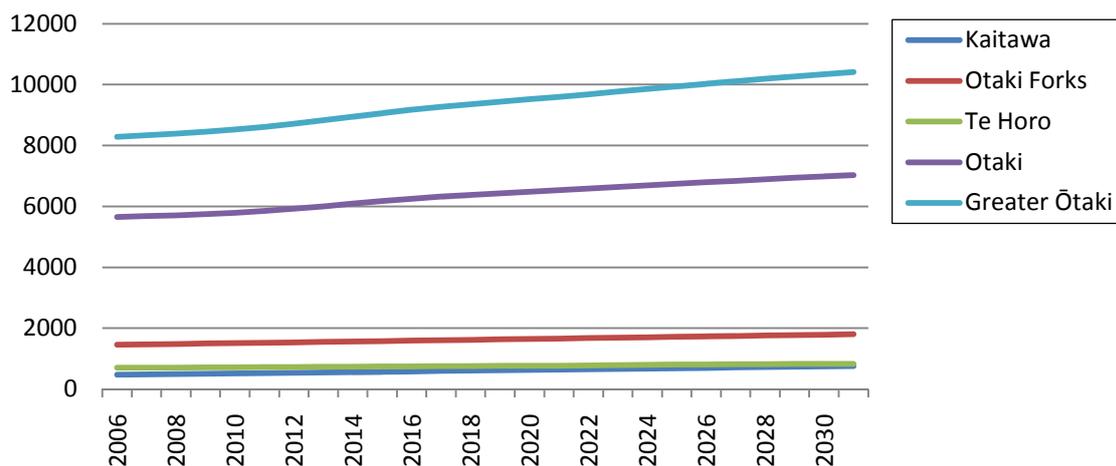


Figure 38 Medium-series population projections for Area Units in Greater Ōtaki (Source: Statistics NZ).

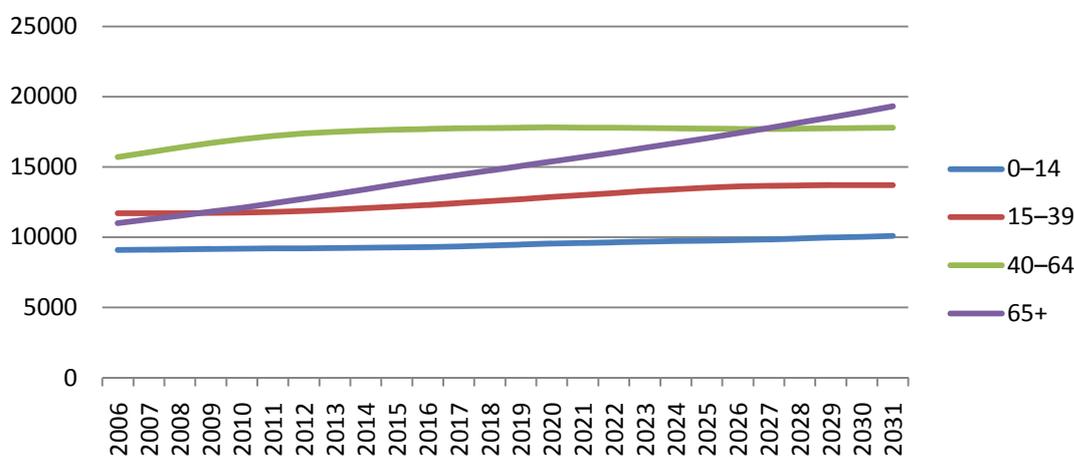


Figure 39 Medium-series population projections for Kāpiti District, by age group (Source: Statistics NZ).

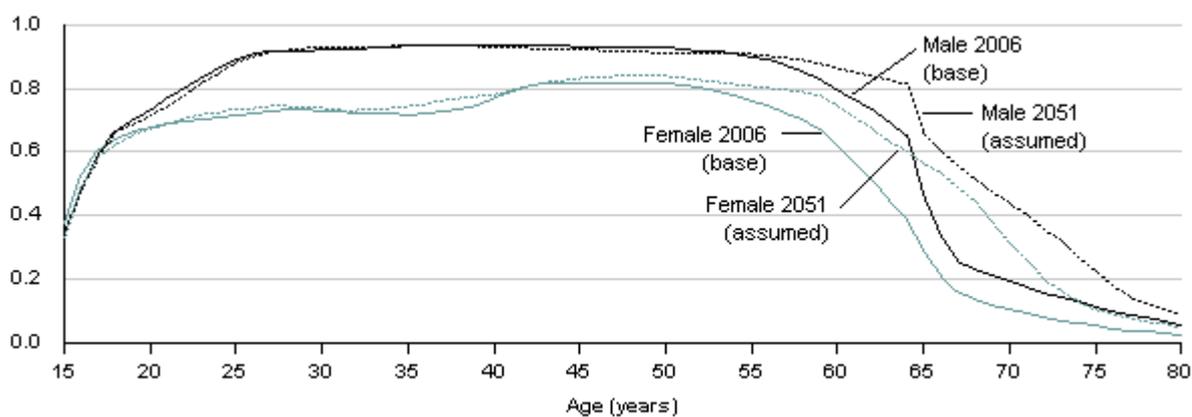


Figure 40 Projected New Zealand labour force participation rates by age and sex (source: Statistics NZ).

12.1.1 What it might look like

With the population increase, total food consumption is expected to increase from about 6500 tonnes per year at present to about 7900 tonnes in 2030. The effect of the ageing population on this projection has not been estimated.

The ageing population restricts potential employment growth from about 3600 at present to about 3900 in 2020, and 4100 in 2030. However, as higher paying jobs continue to be outside Greater Ōtaki and residents are therefore drawn away for work, so the current proportion of residents working outside the area (almost 60%) is likely to increase.

The decline in the number of producers in the area continues, with more either retiring or moving north to Horowhenua and Manawatu where soil and climate are also good but the land is less expensive, and there is a larger community of growers.

With less horticultural production in the area, more land is used for lifestyle blocks and for dairying. Greater dairying increases emissions of greenhouse gases, but uses relatively less fertiliser and pesticides compared with horticulture.

With increased supermarket share of sales of their own branded foods ('own' or 'house' brands), the connection between producer/grower and consumer is further weakened, and the continued gulf between stated and revealed preferences, obvious to supermarkets, means that consumers will continue to purchase on price rather on 'feel-good' attributes such as quality, environment, and health.

The highway bypass has substantially reduced the number of visitors to the area, with the previous 'high street shopping' insufficient to entice them to the off-ramp. Local businesses that have relied on through traffic have declined.

Production costs have increased in New Zealand with higher world fertiliser prices; higher prices for our export products, which determine prices for those same commodities sold in New Zealand; and higher prices for land and other capital. These cost increases have flowed through to higher local food costs, making imported foods and lower quality foods more attractive to consumers.

12.2 Local-food economy

In this scenario Greater Ōtaki becomes a supplier to districts within 100km, specifically branding and marketing produce (both raw and processed) as 'local', catering to and encouraging the growth of the locavore⁴⁰ market in the lower North Island. In addition, the community of Greater Ōtaki increasingly supports local production, with greater emphasis on purchasing from local suppliers, and growing more fruit and vegetables in home gardens.

Ideas that sit alongside this basic premise are: meeting/getting to know producers; wanting more information about how things are produced; reduction of dependence on agrichemicals;

⁴⁰ A locavore is one who is "interested in eating food that is locally produced, not moved long distances to market" (<http://en.wikipedia.org/wiki/Locavores>)

increased varietal diversity of food (e.g., different varieties of tomatoes); and getting back in touch with the source and seasonality of food.

12.2.1 What it might look like

Social

In general, consumers develop stronger desires to know where their food has come from, how it was produced, and who produced it, reflecting a distrust of the current anonymous food distribution system. Consumers will also develop a stronger interest in eating higher quality produce, with more flavour and more variety, and also more stringent animal welfare standards and lower pesticide residues.

Consumers are looking to trust the suppliers of their food. This currently entails a trust in large brands and implicitly in government agencies to ensure that consumers are not sold foods that might harm them. However, consumers will look for more explicit information (e.g., on food origins, animal welfare, etc.) and increasingly distrust marketing. Trust will develop through seeing for oneself, and from the advice of trusted people. Council might provide logistic support for local producers to hold ‘open days’, whereby local residents could visit the farm and see first-hand how food is produced. These visits, perhaps only once per year for each farm, develop trust and loyalty in consumers as they meet and talk with a real farmer who produces their food in a way of which they approve.

When food is purchased from overseas sources, more attention will be paid to what those sources are. Questions will be asked: Do they have high animal welfare standards? Is the purchase of imported food supporting development of the poor in developing countries? Is the product Fair Trade certified? Is the product flown in, or is it transported in very-low-emission ships?

As a result of increased connections between consumers and producers, and in particular local producers, stronger community cohesion and sense of common purpose and identity develop. In addition, those with traditional horticultural knowledge in the community, currently marginalised, are more valued and respected. These bonds increase the resilience of the community.

An increase in purchasing of local food also highlights the importance of fresh fruit and vegetables in the diet, with consequent improvements in nutrition.

Economics and labour

Greater Ōtaki’s ‘local quality’ brand is valued by consumers within the 100 km range of farmers’ markets, as well as by supermarkets in the broader region. This successful branding brings further revenue into the community and brings more stability to farmers’ incomes.

- As production becomes more manual, more labour is required and employment increases. However, labour is an expensive input, and margins will have to increase.
- Reduction in distribution costs through increased direct sales to customers will allow this increase in margins for producers.

- Indirectly, employment and income increases in agricultural service industries providing inputs and advice
- The way in which the community increasingly values good food and a connection with the growing professions encourages young people to see food production as a respected and valued profession.

Gains in employment are potentially somewhat offset by increases in home garden production, such that consumers rely less on purchased produce. However, a rebound effect might occur whereby consumers save from growing some of their own food and are then willing to pay more for higher quality and more diverse and interesting produce.

Local consumers and “food tourists” are encouraged to spend money locally, not just on food, but on other goods and services. With less spent on foods from outside the area, more of the community’s money stays in the area, with economic multiplier effects. With reduced transportation of food, the area’s energy footprint reduces, although this could be offset by the energy used by food tourists driving to Greater Ōtaki.

Existing and new lifestyleers, many of whom commute to work outside the area, are increasingly welcomed, and develop an increased sense of belonging to the local community, resulting in more expenditure in local shops.

Supermarkets will identify the trend and respond to the competition, with possible responses including: introducing clearly labelled, locally-sourced products and competing on quality assurance and convenience; and becoming involved by collaborating with local markets.

Increased demand for variety in crops will create more work for farmers, as different varieties need to be grown in different ways. While this creates a learning curve, farmers see value in meeting this demand, and consumers are willing to pay a margin to obtain access to locally produced foods of high quality.

Environment

Energy use for food production could actually increase:

- organics apples have 10% higher energy inputs than conventional (McLaren et al. 2009) because lower use of long-lasting pesticides requires more frequent applications of traditional pest-control methods
- increased production in the area will lead to increased direct use of energy unless new production is combined with greater energy efficiency

Indirect energy use is, however, likely to be significantly lower, particularly with seasonal consumption reducing dependence on glasshouses, and less energy used in transportation.

While pesticide use is already declining in export-focussed production systems, much of the vegetable and fruit production in Greater Ōtaki is destined for the domestic market. A shift towards locavorism is likely to drive down pesticide use because of:

- increased focus by domestic consumers on perceived health qualities of food,
- reduced focus on appearance of food, and

- closer connection between consumers and producers.

Unless fertiliser inputs per hectare can be substantially reduced, increased production in Greater Ōtaki will clearly lead to greater fertiliser use and therefore greater greenhouse gas emissions and potentially greater degradation of water quality. If, however, increased vegetable and fruit production coincides with reduced pastoral farming, then emissions would decrease overall because of the higher emissions per hectare of livestock production systems.

Lastly, greater variety of produce (e.g., use of heritage varieties) may introduce either greater or lesser resilience to threats from introduced pests.

12.2.2 Barriers and Enablers

At present many fruit and vegetables are not seen as an important part of the diet, and consumers purchase primarily on price and appearance. This scenario requires that a transition will have occurred in consumers' perceived value of fruit and vegetables.

Consumers are likely to spend more on foods if they perceive additional value from the increased price. Locavorism will be enabled if that increased price reflects clear differences between local production methods and those of imported foods, and consumers understand and value these differences. Such differences include labour conditions, use of pesticides, animal welfare, and environmental protection. Consumers currently have little clear information about these differences, partly because they are not always black and white: some consumers regard New Zealand as having poor labour conditions in certain areas, significant use of pesticides, animal welfare issues, and insufficient environmental protection. If growers and producers in Greater Ōtaki can clearly distinguish their production methods from those overseas, then consumers who value those aspects of production are more likely to change their purchasing behaviour.

There is a danger that a locavore market is fragile unless local foods can be seen as essential rather than luxury. When economic conditions tighten, 'luxury' purchases based on altruistic values (e.g., the environment, someone else's working conditions, etc.) are often the first to go.⁴¹ A 'buy local' market will be stronger if it appeals directly to individual consumers' own needs and if there is greater awareness (and hence peer support/pressure) of the issues involved. Direct connections with growers/producers also build loyalty, which can strengthen commitment to purchasing local goods. Consumers could be encouraged to meet growers and ask questions. By building relationships (without the 'middle man'), loyalty is developed along with a sense of community.

Locavore markets can also be extremely vulnerable to localised shocks such as severe weather or natural disasters; a strategy for dealing with them should they occur would be necessary.

There has been a decline in people working in agriculture in the district in recent years, and this decline would have to be reversed. It will be necessary to find ways to attract young people to the industry. The growing reliance on immigrant labour, while it provides much-

⁴¹ In economics, a 'luxury good' is often defined as a good with an income elasticity of demand greater than one, i.e. a good for which when price increases, demand tends to decrease (e.g., Begg et al. 1984).

needed revenue to developing (e.g., Pacific Island) nations and can inject additional life into a community, can also be seen as yet another reliance on imports.

The concept of ‘local’ varies from person to person, and also with the goods in question. While some areas east of the Tararua Ranges are within 100 km of Ōtaki, the Ranges form a barrier that some might see as equivalent to additional distance, and produce from Greater Ōtaki might not be seen as local in those areas. Therefore, a ‘buy local’ marketing campaign should not rely fully on the value of proximity.

Consumer education about the need for some pesticides may be required. Consumers with home gardens will already understand that producing food without any pesticides requires considerably more labour input. But reduction in the application of broad-spectrum pesticide sprays will be important for building community cohesion, given such spraying is already a point of contention in rural areas. More targeted pesticides and more targeted application will go some way to addressing this. Communication between growers and rural residents about the need for pesticides, and about their careful, minimal use; and forewarning of spraying times will help build trust and social cohesion. For this outcome to happen, the Council could develop further consultation with the community that focuses on facilitation rather than regulation.

12.3 Large-scale commercial berries

In this scenario, the general idea of establishing national supply of a product in the Greater Ōtaki area is investigated, using raspberries as the specific example.

Raspberries are currently undersupplied in New Zealand, having been in decline for over a decade, and local jam makers are unable to source sufficient local raspberries for their product. Because raspberries currently have a very short shelf life supermarkets are reluctant to stock them. Ōtaki has a long history of berry growing, and large areas for which the soils suit berry production (Figure 33). One or several entrepreneurs establish a large blackberry- or raspberry-growing operation, supplying fresh and frozen berries nationally to supermarkets, and concentrates to conserve producers. Short shelf life results in a higher retail price, because of high wastage. Research into longer lasting varieties would be required, along with significant investment in infrastructure and market development. A number of different varieties of raspberries could be produced in the one operation.

12.3.1 What it might look like

Labour

Berry growing requires labour throughout the year, but with tasks changing according to the season. According to one person in the industry, berry growers have high staff turnover and are always looking for replacement staff. While high staff turnover has significant associated costs, many tasks associated with berry growing do not require significant skill, and may suit

short-term employees (e.g., immigrant labour, or WOOFers⁴²). Support from the Department of Labour might be required.

Production would be a combination of high-volume, low-margin products supplying supermarkets throughout New Zealand with year-round product, with summer production of higher-margin, outdoor-grown berries.

The business would run analogous to a winery, with people visiting for an experience of picking (pick-your-own), tasting and buying products, including berry wines and a range of desserts, and eating in a café. These side operations would employ further people associated with the business.

Economics

While initially, during market development, this enterprise might start small, the scenario envisions about 10 ha of polythene-covered outdoor berries and glasshouses covering about 10 ha. Associated structures include coolstores, freezers, a packhouse, and an industrial kitchen for production of processed goods. This significant construction will most likely be undertaken by an experienced company from outside of the region.

Just as many people who visit the town of Geraldine visit the Barker's shop, the raspberry business in Greater Ōtaki could become a destination for visitors, bringing tourist dollars into the economy. However, it is unlikely to generate overnight stays, unless high-quality accommodation is established in connection with the business.

Collaboration with other local businesses to produce mixed products, e.g., Kāpiti Ice Cream and cheeses, could contribute more widely to the local economy.

Environmental

Refrigeration is a common solution to the short shelf-life of berries, and this scenario expects considerable use of refrigeration, with significant energy requirements and the potential for leaks of refrigerants, which are potent greenhouse gases. Greenhouse gas emissions of outdoor berry production are negligible, but glasshouse operations that use fossil fuels to provide heating and possibly CO₂ will result in emissions.

Berries currently require more use of fungicides to control disease than many other fruit (see Table 18).

12.3.2 Barriers and Enablers

Significant market research and development would be required in collaboration with the main retail outlets. Berries could be trialled at regional farmers' markets to ascertain market potential and stimulate demand: this is a common motivation for selling at New Zealand's farmers' markets (Guthrie et al. 2006). Support would also be required from the supermarket chains, showing a willingness to introduce a new fresh product line. Innovative solutions

⁴² Workers On Organic Farms: volunteers, often from Europe or North America.

might be required, such as a return option from regional supermarkets via backhaul to process unsold stock into jams and other derived products to reduce waste and costs.

Significant initial investment would be required. While this has been done before with other horticultural products (e.g., large-scale strawberry and tomato greenhouses), generally the market has already been established.

Recent research has shown the potential effectiveness of biological fungicides in the prevention of botrytis in a range of berries, and the delivery of these fungicides by bees thereby removing the requirement for spraying, and greatly reducing the use of the fungicide (Turk 2010).

As with the local-food economy scenario, consumers need clearer reasons to buy New Zealand-grown berries and berry products if they are to compete with cheaper imports. Fresh locally grown berries have the advantage of longer shelf life than imported berries. Other ways of differentiating these products will be required, including potentially growing a subset organically or pushing the health benefits.

Year-round production has not been demonstrated in New Zealand, so diversified production may be necessary to maintain revenue. There is sufficient land in Greater Ōtaki suitable for growing berries (see Figure 33), and large land parcels are probably not required under this scenario.

Winter chill is required to stimulate flower and fruit production, and for outdoor crops this may be affected by global warming, which is expected to reduce the number of frosts in the Kāpiti Coast (MfE 2008). Glasshouse berries could be transferred temporarily to freezer units for chilling (Geoff Langford, pers. comm., 12 October 2010).

A significant barrier to this scenario is the lack of an industry body for the blackberry and raspberry industries. Industry bodies, funded by levies, facilitate and fund coordinated research programmes, nursery support, maintenance of germplasm of varieties, and advocacy. Industry bodies require a minimum industry size to provide sufficient levy revenue, and the black- and raspberry industries are too small at present. One or two existing berry companies have the required capabilities to undertake many of these roles themselves, but another option is for Berryfruit NZ to expand the range of fruits under its umbrella.

13 Conclusions

Greater Ōtaki is confronting many of the same issues with food production and distribution faced by other communities in New Zealand and in the developed world. With ever-cheaper international transport costs and widespread lowering of tariffs, supply chains have become more global. Even within New Zealand, distribution networks are becoming much more centralised, with supermarkets preferring fewer, larger suppliers, and more people purchasing at supermarkets. There is an increasing feeling by some in the community that the diverse benefits of local food systems are silently disappearing. In addition, Ōtaki, along with several other rural areas of New Zealand within commuting distance of major cities, faces the prospect of the use options of its most productive soils being reduced by subdivision for lifestyle blocks.

Faced with supply consolidation, increased compliance costs, competition for land from pastoral farming (particularly dairy) and lifestyle blocks, horticultural production has been in decline in Greater Ōtaki for a number of years. With a high average age of growers, low return on assets employed, young people being discouraged from entering the sometimes hard-work, small-reward business of horticulture, and continuing high demand for rural lifestyle blocks these trends seem likely to continue.

In this report we have presented material highlighting the current production and consumption in the area, the origins of food purchased in the community, and some of the environmental impacts of both production and distribution. Feedback from the community of Greater Ōtaki obtained from the survey, focus groups, and conversations with growers has highlighted considerable interest in concepts of supporting local production, home gardening, community spirit and cohesion, food quality, and relearning the value of food. Some successful, community-driven initiatives are already in place, but these tend to be small. There is scope for Council to support the community to develop these initiatives further and to leverage existing enthusiasm and knowledge to create new initiatives that allow the community to increase its resilience and cohesion.

Scenarios have been used to envision potential futures for food production and consumption in Greater Ōtaki. These scenarios are intended to explore possibilities rather than to choose particular pathways. The business-as-usual case was intentionally slightly pessimistic, but remains realistic. It shows a continued decline in growing in the area, and more reliance on food producers outside the area. The local-food economy envisions a community where residents are more discerning of the methods of production and sources of their food, Council assists with a regional branding of the area's produce, and home gardeners share knowledge and produce. While this first scenario paints a rosy picture, we believe it is entirely feasible if the community supports it. The second scenario explores the possibility of a large raspberry-growing operation establishing in the north of the district supplying produce nationally. Considerable market development would be required, but this operation would bring employment to the community and visitors to the area, and potentially could be a source of inspiration and pride.

There are no simple answers to developing increased resilience in Greater Ōtaki. Many existing growers are struggling in the face of increased costs, compliance, the consolidation of the retail market, and are being overtaken by other companies who have seen the opportunities first. New operations face the same barriers with the addition of all the set-up costs and effort involved in establishing a new venture. There is a clear role for

entrepreneurial skill to develop new markets, raise substantial capital, and establish large-scale commercial operations, with consequent economies of scale. Residents can play their part by buying more local produce, meeting growers, asking questions, establishing home gardens, and sharing information. In particular, residents can re-learn the value of food and how it is grown.

Council can play a key role in facilitating the community to improve its resilience with actions such as:

- Protecting versatile soils from intensive urban development by use of zoning and subdivision restrictions
- Promoting Greater Ōtaki as a source of high-quality, local food
- Providing assistance for new entrants to commercial, community and home-garden production (e.g., training, introduction to existing networks, etc.)
- Providing space and facilities to host a farmers' market
- Providing space and support for community gardens

Further community discussion will be key to Greater Ōtaki's future success as either a significant horticultural player, a high-value tourist destination, or, more generally, as a resilient community.

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