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Māori in horticulture

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Author: Sam Green and Hillmare Schulze

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SNAPSHOT OF MĀORI HORTICULTURE 2020

5%

Māori share of New Zealand horticulture land

8%

share of onion land

9%

share of kiwifruit land

1%

of Māori land used for primary production in horticulture

300%

growth in Māori horticulture since 2006

$220m

gross output on Māori horticultural farms

3,800

Māori workers employed in horticulture sector, 17% of the total

1 Introduction

New Zealand has 84,000 hectares of horticulture, providing food for New Zealanders, and generating $3.8 billion of export revenues (excluding wine exports) each year. While the industry already has a significant share of New Zealand's exports, the industry is set to grow substantially. The Māori share of the horticulture industry has emerged quickly, and is expected to continue to grow quickly over the coming decade.

In parts of New Zealand, including the Bay of Plenty, Tasman and Hawkes Bay, horticulture is already a critical part of the economy. In other areas with a suitable climate, including the Far North District, horticulture expansion is set to grow substantially.

The upcoming changes are expected to be even faster for Māori, with rapid growth in horticulture developments. Currently, Māori entities have very large areas of pastoral land and forestry, though there is an ongoing drive to transition the suitable land to horticulture. This transition significantly increases the output of these farms, generating income and jobs for local communities.

Māori entities are increasingly participating in the horticulture industry, purchasing and developing new orchards. At present, there is not sufficient information available on the size and level of participation of Māori entities in the horticulture sector.

1.1 Scope of the report

This report was commissioned by Te Puni Kōkiri, the Ministry of Primary Industries and Horticulture New Zealand, to estimate the size and share of Māori within the horticulture sector..

This report does not address the limitations to entering or expanding participation in the horticultural sector. Horticulture developments can require a significant initial investment, and planning for available water can be critical for the success of horticultural businesses. In the majority of New Zealand's horticulture regions, availability of water is a significant concern. . This report does not consider these limitations in detail, though Māori entities planning increased horticulture involvement are working to resolve these challenges to obtain secure water supply as part of their development.

2 Data and limitations

Data on the aggregate horticulture industry in New Zealand is of very high quality. Māori horticulture statistics are limited, and need to be drawn from a wide range of sources.

2.1 Sources

2.1.1 Industry data

The primary source of aggregate industry statistics is from FreshFacts, an annual series of reports published by Plant & Food Research. These statistics include land use, production volumes, and export value of horticultural products.

Data on the Māori horticulture industry have been collected from as many sources as possible. Statistics New Zealand (StatsNZ) Tatauranga Umanga Māori data from 2017 and 2018 was used to establish a baseline estimate, with additional information being obtained directly from growers and organisations. This information includes all Māori authorities, and businesses where the owners self-identify Māori ownership and Māori management of the farms in the Business Operations Survey.

The Māori kiwifruit industry has very reliable figures, as there is data collected by the New Zealand Māori Kiwifruit Growers Incorporated (MKGI). This provides an up-to-date figure of the total land used and production of Māori kiwifruit growers.

Other growing associations have been contacted, though they typically do not collect any information surrounding ethnicity, and are unable to provide a summary of Māori or non-Māori growers. Some data has been sourced from Māori growers directly, though this is limited to larger Māori entities.

2.1.2 Employment data

Employment statistics are primarily sourced from the New Zealand census records. Records have been obtained for occupation and industry by ethnicity from StatsNZ for the 2013 and 2018 Censuses. Additional information surrounding the amount of employment per hectare has been sourced from a range of sources including growers associations and sector research.

2.2 Limitations

While the data on a national level is very good, data on Māori horticulture in New Zealand is limited. Other than the Māori Kiwifruit Growers Incorporated, there are no associations or collectives that collect comprehensive data on horticultural production of Māori businesses.

StatsNZ also collect data on horticulture. The StatsNZ Tatauranga Umanga Māori research is used as a baseline of Māori horticulture. This includes information on Māori authorities and small and medium-sized Māori businesses. This data is not comprehensive, and StatsNZ note small businesses with a turnover of less than $3,000 or with fewer than six employees are excluded. As horticulture operations are typically very labour intensive and have a high turnover, this limitation would not be expected to result in a significant impact on the total entities counted.

Due to the small scale of Māori horticulture until recently, the agricultural statistics provided by StatsNZ are overwhelmingly focused on pastoral farming and forestry.

Employment data provided by StatsNZ is of a very high quality, though the census date does not necessarily reflect the horticulture industry throughout the year. The census is taken in March, which is a period of harvesting for apples, but is too early for harvesting of other large industries including kiwifruit.

3 New Zealand horticulture industry

New Zealand's export market has always been dominated by the primary industries, though the types of exports have been constantly changing. Flax, wool and dairy have all been at the top of the export industry. The New Zealand horticulture industry has been changing constantly, though the land used for all horticulture has been steady over the past 10 years. However, the value of horticultural exports are growing quickly with growth in high-value crops. The horticulture industry now brings almost $3.8 billion per year to New Zealand through exports, while wine returns an additional $1.7 billion per year.

3.1 Fruit

Over the past 20 years, the industry has changed in structure. Horticulture typically experiences periods of rapid expansion or transition, typically in specific areas, followed by a steady period with marginal growth.

Table 3.1 Fruit grown in New Zealand 1998 to 2018, hectares

Product	1998	2008	2018	2008-2018 (%)
Apples	15,500	8,832	9,448	7
Kiwifruit	10,015	12,186	12,692	4
Avocados	1,210	4,004	3,839	-4
Citrus	1,800	1,834	1,660	-9
Nuts		1,484	1,344	-9
Olives		2,173	2,172	0
Summerfruit	2,890	2,294	2,140	-7
Berryfruits	1,619	2,563	3,127	22
Other fruit	2,812	2,268	1,678	-26
Total fruit	**35,846**	**37,638**	**38,100**	**1**

As shown in Table 3.1, apples from 1998 to 2018 reduced in size significantly from 1998 to 2008. This was due to a rapid uptake of wine grapes planted in the Hawkes Bay and upper South Island. In Marlborough, apple orchards in 1998 used 758 hectares of land. By 2008, only 25 hectares remained, with the balance being converted to wine grapes for the booming sauvignon blanc market.

3.1.1 Kiwifruit industry

Kiwifruit growth has been relatively slow over the past 10 years in terms of hectares, though the industry has been through a significant period of disruption because of the Pseudomonas Syringae pv Actinidiae (PSA) disease. From a peak of 13,000 hectares in 2010, the industry fell to 11,000 hectares in 2014 before starting a rapid recovery. Simultaneously, the growth in the gold kiwifruit variety also resulted in a significant expansion of the profitability of the kiwifruit industry. Despite having only four percent growth in the past 10 years, the value of kiwifruit exports has more than doubled.

3.2 Vegetables

The vegetable industry has also been through some major transformations. Despite New Zealand's significant population growth since 1998, the vegetable growing industry has reduced substantially, from 77,000 hectares to just over 45,000 hectares in 2018 as shown in Table 3.2.

Table 3.2 Vegetables grown in New Zealand 1998 to 2018, hectares

Product	1998	2008	2018	2008-2018 (%)
Beans	1,050	724	1,200	14
Brassicas	3,778	3,875	3,432	-11
Carrots	1,300	1,320	1,410	7
Kumara	1,020	1,264	2,541	101
Lettuce	905	1,309	1,582	21
Onion	4,704	4,595	5,227	14
Potatoes	14,152	10,050	10,344	3
Squash	7,155	7,774	6,642	-15
Sweetcorn	6,000	6,210	3,871	-38
Other vegetables	37,196	12,658	9,217	-27
Total vegetables	**77,260**	**49,779**	**45,466**	**-9**

In the Waikato Region, with significant growth in dairy farming, the vegetable industry has reduced by 50 percent. In 1998, Waikato grew 87 percent of New Zealand's onions, with 5,000 hectares. This has now reduced to just 1,700 hectares in 2018.

The Manawatū-Whanganui Region has also had a similar reduction, from 7,800 hectares of vegetables to 3,600 hectares over the 20-year period from 1998 to 2018.

3.2.1 Alternating crops

Vegetable growing follows a different business model to growing fruit. Rather than planting and maintaining trees for years, vegetables are planted and harvested within one year, allowing farms to alternate crops from year to year to generate optimal soil conditions and improve the harvest each year. In Gisborne, squash is often alternated with sweetcorn, with each crop complementing the other, improving the harvest of both products.

For some crops, vegetables (often peas and wheat) can be alternated with pastoral farming to add nitrates and phosphates to the soil. This was common practice historically, though the additional nutrients are now commonly added to the soil in fertilisers.

3.2.2 Rise of the dairy industry

The reducing quantities of vegetable land in use is the result of these farms transitioning to other types of farms. In the Waikato, there has been substantial growth in the dairy industry, with 385,000 hectares of land in 2018[1]. With population growth in the area, some of the productive area has also transitioned to housing as Hamilton expands.

[1] New Zealand Dairy Statistics 2017-2018

Transitioning land uses to other more profitable uses will continue to occur in the horticultural space. With expanding population, this productive land can also include being converted to residential or industrial areas. . Due to New Zealand being a relatively small country, often this profitability is driven by the prices that can be achieved in the international markets.

4 Māori history of horticulture

Horticulture has long been a central part of the Māori economy. Historically important crops were kumara, taro, yam gourd and Pacific cabbage trees.[2] Farms were communally operated with up to five hectares providing food primarily for local residents.

Following European settlement in New Zealand, Māori engaged in international trade with Australia and the United Kingdom, selling flax fibre, timber and other goods.

With a relatively low population density by international standards, pastoral farming became the dominant farming industry of New Zealand. The process of clearing forest areas for farming also established a substantial timber and log export industry, though this has evolved to plantation forestry on land that is not suitable for pastoral farming.

On a per hectare basis, horticulture is significantly more lucrative, while also being much more resource and labour intensive. As New Zealand's economy grows, there is an ongoing drive to increase the value of production, leading to transitions from relatively low value products to higher-value products. Horticulture is just one of the ways that this is occurring. With each pastoral farm that transitions to horticulture, new jobs are created, more value is added, and the New Zealand economy grows.

This does come with challenges, although there is also a possibility of a bright future for the industry. With automated picking technology continuing development, the industry is producing increasing amounts of high-skill labour, while also reducing the high levels of seasonal work for some horticultural products. A 2019 research paper presented the design of a robotic kiwifruit picking machine with 90 percent pickable kiwifruit detection rate, and 51 percent of available kiwifruit was able to be picked in test orchards.[3]

4.1 Horticulture share of Māori land

Currently, Māori own approximately 400,000 hectares of land in 'farms engaged in primary production activities', less than one percent of this land is in horticulture. In total there is 1.5 million hectares of Māori freehold land, of which large sections are in indigenous forest and hill country, and are not collected by Statistics New Zealand.

A summary of the land over the past decade is presented in Figure 4.1. More than half of this land is in grassland, used for pastoral farming feeding 2.5 million animals for the sheep beef and dairy industries in 2017. Compared to this scale, horticulture plays a very small role in the Māori agricultural sector.

While currently a very small proportion of the agricultural land, the Māori horticulture industry is growing quickly as shown in Figure 4.2. From just 1,000 hectares of land in 2006, the Māori horticulture industry has since quadrupled, with more than 4,000 hectares of horticulture in 2019.

The significant pastoral land holdings present a significant opportunity for these Māori landowners. Where suitable land is available, converting land has become increasingly common. Since 2014, the land in forestry has increased significantly. On a percentage basis, horticulture has grown even faster, though from a much smaller starting point.

[2] EnviroHistory NZ 2010, Māori gardening in Pre European New Zealand Te Ara Encyclopaedia of New Zealand
[3] Williams Robotic kiwifruit harvesting using machine vision, convolutional neural networks, and robotic arms. Biosystems engineering, May 2019

Converting this land to horticulture can significantly increase the financial return per hectare, while also creating additional employment opportunities.

Figure 4.1 Māori land by land use, 2006 to 2017

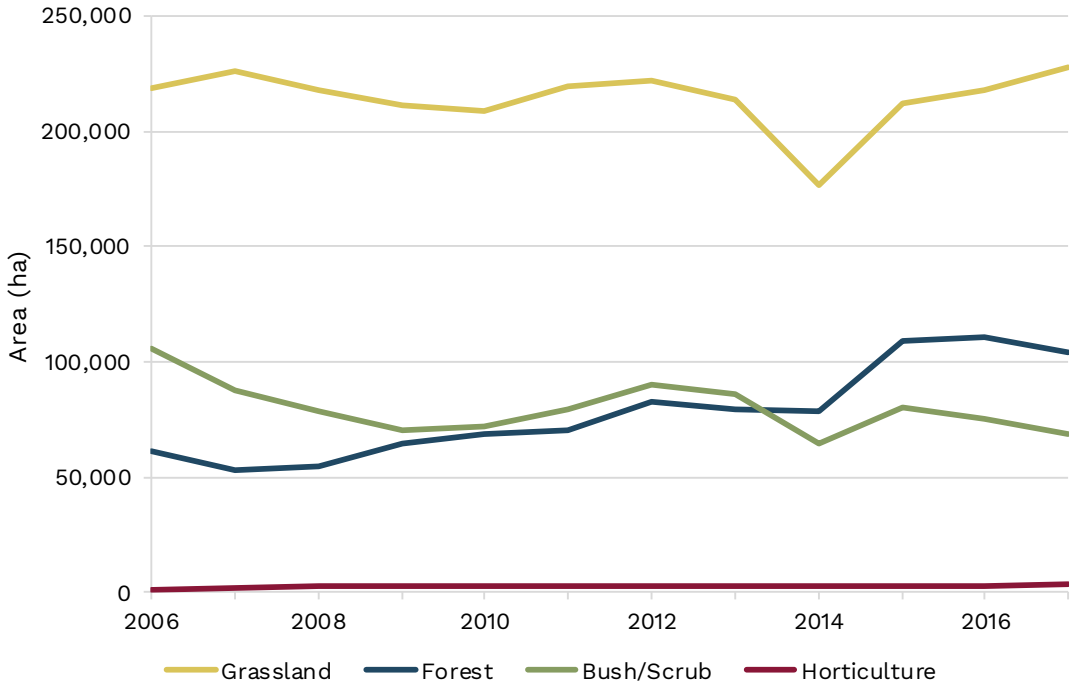
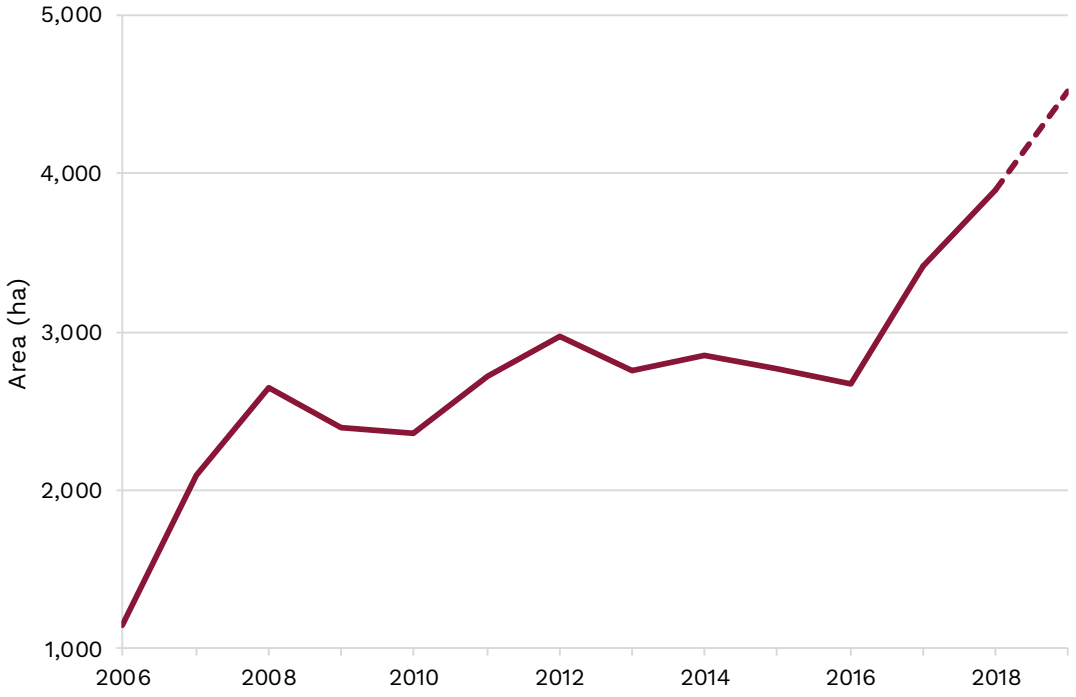


Figure 4.2 Māori horticultural land 2006 to 2019[4]



[4] Data from 2018 is based on BERL estimates. Data includes wine (321 ha from 2017)

5 Māori horticulture operations

The extent of Māori horticulture operations has limited data availability, though we estimate that approximately five percent of the horticultural land in New Zealand is operated by Māori authorities, organisations and individuals.

A summary of the total land is presented in Table 5.1. The crop with the largest Māori share is kiwifruit with just over nine percent of the total area. Kiwifruit is also the product with the largest magnitude of Māori involvement, with 1,150 hectares of kiwifruit being grown by Māori farmers and organisations.

Table 5.1 Māori share of horticulture in New Zealand, hectares 2019

Product	Total hectares	Māori hectares	Māori %
Apples	9,448	108	1.1
Kiwifruit	12,692	1,154	9.1
Avocados	3,839	134	3.5
Citrus	1,660	27	1.6
Nuts	1,344	10	0.7
Onion	5,227	435	8.3
Squash	6,642	313	4.7
Potatoes	10,344	20	0.2
Other horticulture	32,370	1,995	6.2
Total horticulture	**83,566**	**4,196**	**5.0**

5.1 2019 estimation

In 2017, work by StatsNZ based on the Tatauranga Umanga Māori statistics found that over 3,000 hectares of Māori land was in horticulture. In 2018, this had grown to 3,500 hectares.

Further information from the same time period reveals an undercount. In particular, the New Zealand Māori Kiwifruit Growers Incorporated (MKGI) reported that in 2017 880 hectares of Māori land was being used in kiwifruit production, 409 hectares more than reported by StatsNZ. It is not known if this additional area is incorporated in the "Other" category.

Variations on the 2017 and 2018 figures and additional plantings which have been identified in 2019 are presented in Table 5.2. This brings the total Māori horticulture (excluding viticulture) to 4,200 hectares of land, or five percent of the total horticulture industry.

Table 5.2 New Zealand Māori horticultural land, hectares

Product	Hectares 2017 StatsNZ	Hectares 2018 Other data	Known additions	Hectares 2019 estimate
Apples		+108		108
Kiwifruit	471	+409	+274	1,154
Avocados	36	+36	+62	134
Citrus			+27	27
Nuts		+10		10
Berryfruits			+40	40
Other fruit			+8	8
Onion	435			435
Squash	133		+180	313
Potatoes			+20	20
Other Vegetables		+40	+6	46
Unknown	2,024			1,901
Total Horticulture	**3,099**	**3,579**	**617**	**4,196**

Between 2017 and 2019 kiwifruit horticulture grew faster than all other types, with significant growth also occurring in squash and avocados. It seems likely that there has been growth in other categories though data is not available. Likely growth categories are potatoes, squash and onions. Some squash is grown in Gisborne and the Hawkes Bay on Māori land, which is leased to non-Māori growers.

The Far North has seen significant new plantings of avocado, some of this is likely to be Māori owned, though some of these orchards will not be producing a commercial crop yet.

5.2 Jobs created by Māori horticulture

5.2.1 Kiwifruit

Each hectare of kiwifruit requires significant amounts of labour. The equivalent of one full time worker is required for every two hectares of kiwifruit[5]. This varies based on the type of kiwifruit, with green kiwifruit requiring 0.46 Full Time Equivalent workers (FTEs) per hectare and gold kiwifruit requiring 0.64 FTEs per hectare. This means the equivalent of 600 people are employed directly by these orchards.

5.3 Economic activity

Horticultural land generates significant revenue for businesses. Some crops are prolific producers, and yield very large quantities of fruit and vegetables per hectare. In 2018, the average yield per hectare of kiwifruit was 36 tonnes.

For a large portion of the horticulture land it is not known what crops are being grown. An estimated revenue per hectare of $14,000 has been adopted, which represents the weighted average revenue of all vegetables in New Zealand. This is a relatively conservative figure, as fruits (excluding kiwifruit) generate an average of approximately $30,000 per hectare.

[5] New Zealand Kiwifruit Labour Shortage, New Zealand Kiwifruit Growers Incorporated. July 2018

In total, the estimated gross output of Māori horticulture in New Zealand is $220 million per year. This is primarily concentrated in kiwifruit, where Māori operate nine percent of the industry, with the next largest estimated production being of onions with $10 million per year as shown in Table 5.3.

Table 5.3 Gross output of Māori horticulture, 2019

Product	Māori hectares	Revenue per hectare	Gross output ($m)
Apples	108	80,670	8.7
Kiwifruit	1,154	142,747	164.7
Avocados	134	37,015	5.0
Citrus	27	39,880	1.1
Nuts	10		
Onion	435	23,532	10.2
Squash	313	9,274	2.9
Potatoes	20	27,098	0.5
Other horticulture	1,995	13,698	27.3
Total horticulture	**4,196**		**220.5**

The operation of these businesses also supports other businesses indirectly. Research is done in horticulture to improve yield on a regular basis, resilience to weather conditions, marketability and harvest efficiency.

New Zealand innovations in horticulture are having effects all over the world, with New Zealand apples including the envy apple being voted the best apple in the USA in 2017. The golden kiwifruit has also been an international success, with significant improvements on the already high returns for kiwifruit growers.

6 Māori horticultural employment

Horticulture is a broad industry with varying levels of Māori participation across the industry. Currently, Māori are highly represented in the fruit industry, with employment apples and pears, and kiwifruit being much higher than proportional to the Māori share of the New Zealand population. As shown in Table 6.1, 17 percent of the horticulture workforce are Māori, with a high representation in apples and pears as well as kiwifruit.

6.1 Sub-industry

The horticultural industry in New Zealand is dominated by a few very large industries.

Sub-industry categories are based on the Australia New Zealand Standard Industrial Classification 2006 (ANZSIC). As avocados are a relatively new industry in Australia and New Zealand, they are included in "other fruit and tree nut" growing. In 2018, avocados represented 76 percent of the land area in this category, with walnuts, macadamias, feijoas, and persimmons being the largest other products.

Table 6.1 Horticultural direct employment by product, 2018[6]

Product	Non Māori	Māori	Total	Māori share (%)
Apple and Pears	3,570	1,107	4,677	24
Vegetables	4,632	1,014	5,646	18
Kiwifruit	2,112	654	2,766	24
Other Fruit and Tree Nut	1,701	315	2,016	16
Berries	978	144	1,122	13
Nursery Production	2,553	288	2,841	10
Other	2,463	267	2,730	10
Total	**18,009**	**3,789**	**21,798**	**17**

6.2 Regional Māori horticulture

Horticultural activity is highly dependent on climate, soil, and land geography. This results in most crops being isolated to very few areas. The overwhelming majority of kiwifruit is grown in the Bay of Plenty, with small developments spread across the upper North Island and in Nelson-Tasman.

New Zealand's apples are almost entirely grown in the Hawkes Bay and the Nelson-Tasman Regions. Avocado orchards are located in similar quantities in Northland and the Bay of Plenty.

The employment arising through these industries are spread across New Zealand relative to the local land used for growing.

[6] The census is taken during apple harvesting season, which would be expected to have a relatively high number of labourers
The significant majority of "other fruit and tree nut" is the avocado industry

6.3 Skill levels of direct employment

Horticulture is much more labour intensive than pastoral farming, though this is often concentrated in low-skill employment. Of the 3,800 Māori working in horticulture, 612 are highly skilled as shown in Table 6.2. The significant majority of these individuals are the managers and chief executives of the orchards.

Of the skilled workers (level three), there are a large number of horticulture workers. These workers are responsible for looking after the vines and trees throughout the year.

6.4 Seasonal employment

Many of the horticultural products in New Zealand have significant seasonal employment requirements. Thinning and harvesting are labour intensive as they are predominantly done by hand, requiring a significant unskilled labour force. This employment is additional to the labour as recorded in Table 6.1, other than apples, which is in harvesting season at the time of the census.

A 2018 report by the NZKI, stated that 56 percent of kiwifruit workers are New Zealanders, with 17 percent arriving as part of the Recognised Seasonal Employer (RSE) scheme, and 22 percent being visitors on a working holiday visa. The RSE scheme allows migrants to work in New Zealand during periods of high seasonal labour demand, often from the Pacific Islands.

Some organisations have constructed villages for seasonal workers to live in, allowing overseas workers to live near the orchards, and allowing a more stable workforce across the picking season.

Table 6.2 Skill level of horticultural jobs, 2018

Skill Level	# of workers		% of workers	
	Non-Māori	Māori	Non-Māori	Māori
1 - High Skill	5,571	612	31	16
2	655	116	4	3
3	1,829	293	10	8
4	2,125	643	12	17
5 - Low Skill	7,847	2,125	44	56
Total	**18,027**	**3,789**	**100**	**100**

7 Māori Horticulture aspirations

As horticulture presents significant benefits in terms of economic development, a number of Māori entities intend to develop pastoral land into increased horticulture. Over the next decade, Māori entities are planning to invest heavily in growing the Māori involvement in avocado and kiwifruit growing. These investments could see the industry double in the next ten years.

7.1 Kiwifruit development

Currently, 78 percent of the New Zealand kiwifruit land is in the Bay of Plenty, with the next largest producer being Northland, with four percent of the planted area. Over the coming decade, the industry is set to have another large-scale expansion. New Zealand Kiwifruit Growers Incorporated (NZKGI) are projecting an increase in production of 55 percent, which is projected to double the annual revenue. If this growth is achieved, the industry will be worth four billion dollars annually.

The Māori kiwifruit Growers Incorporated (MKGI) are also projecting rapid expansion. The MKGI 2019 annual report includes a target of 20 percent of the kiwifruit industry being owned by Māori growers.

Ngāi Takoto has indicated that they have plans for up to 200 hectares of additional kiwifruit.

7.2 Avocado development

Aspirations for future avocado developments are also concentrated in Northland, with Ngāti Kuri planning up to 160 hectares of additional land for avocados. Other Māori landowners and authorities in Northland are also exploring further avocado developments, though this may be limited by access to water for irrigation. Due to the Aupouri aquifer being below sea level and in sandy ground, there is a possibility that salt water may leach into the aquifer if too much fresh water is taken. Limiting access to water takes in the future may limit growth, though this may be remedied through increased investment in water storage as an alternative to taking from the aquifer.

8 Conclusion

Horticulture is a relatively small but rapidly growing share of the Māori economy. In the coming decade, Māori horticultural growth is set to continue, especially the expansion of kiwifruit, avocados and berries.

While the Māori share of the industry is approximately five percent, the growth in the Māori horticulture industry is set to continue. Various Māori entities has indicted that they are focussing on significant expansions, with this in mind the Māori horticulture industry may double in size in as little as ten years.

The Māori horticulture industry has a number of hurdles to overcome before these growth goals can be achieved. The biggest challenges include obtaining water, a reliable labour supply and having available funds to invest in land development.