UNDER	the Resource Managemnet Act 1991 ("**the Act**")
AND	
IN THE MATTER	of a submission pursuant to Clause 6 of Schedule 1 of the Act in respect of **PRIVATE PLAN CHANGE 93** to the **WESTERN BAY OF PLENTY DISTRICT PLAN**

STATEMENT OF EVIDENCE OF ETHAN ENGLAND

1. INTRODUCTION

1.1 My name is Ethan England. I am a Kiwifruit Technical Manager at Seeka Ltd.

Qualifications and experience

1.2 I have a Bachelor of Agriscience from Massey University (2012). I also have a certificate in intermediate Sustainable Nutrient Management, certificate of intermediate Farm Environmental Planning and a certificate in Science and Technology all from Massey University.

1.3 I have 9 years' experience in the kiwifruit industry. I specialise in technical aspects of growing kiwifruit, including spray programmes, nutrient programmes, trials and new products/techniques.

Involvement in project

1.4 I was engaged by the DC Kirk Family Trust in June 2022 to provide technical advice in respect of the potential effects of commercial development adjacent to kiwifruit orchards.

Purpose and scope of evidence

1.5 The purpose of my evidence is to explain the key risks to operations at the Okaro Orchard arising from the development enabled by the Te Puna Springs plan change and comment on potential solutions.

1.6 Specifically, my evidence will:

(a) Address the value of the Kiwifruit industry in the Western Bay of Plenty (Section 3);

(b) Discuss the key risks associated with locating commercial development adjacent to a kiwifruit orchard, including:

(i) The risk of spray drift and its implications (Section 4);

(ii) The creation of frost pockets (Section 5)

(iii) Insect incursion, including passion vine hopper (Section 6); and

(iv) Dust incursion (Section 7).

(c) Provide brief comments on the Council Officer's Report (Section 8).

1.7 A summary of my evidence is contained in Section 2.

Expert Witness Code of Conduct

1.8 I have read the Code of Conduct for Expert Witnesses, contained in the Environment Court Consolidated Practice Note (2014) and I agree to comply with it. I can confirm that the issues addressed in this statement are within my area of expertise and that in preparing my evidence I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

2. SUMMARY OF EVIDENCE

2.1 Okaro Orchard is a 3.46 ha Gold 3 kiwifruit orchard located in Te Puna, on the corner of Armstrong Road and Te Puna Road. Okaro Orchard is owned by the Kirk Family and vine managed by Seeka Ltd.

2.2 Kiwifruit require specific conditions to grow successfully. To grow a high-quality product, careful management is required. There is little room for compromise if an export quality product is to be produced.

2.3 The location of commercial activities adjacent to the boundary of Okaro Orchard poses significant risks to the orchard, as follows.

Spray drift

2.4 Spray drift is a particular concern for the operators of kiwifruit orchards. Kiwifruit require regular spraying with various treatments, some of which are safe and some of which are termed harmful to humans and animals. Products applied to kiwifruit typically comprise:

(a) Foliar nutrients, which help promote strong, uniform growth in the shoots, leaves and fruit.

(b) Bud breaker applications (Hi-Cane) which improve the number of winter buds to burst in a uniform manner, which in turn allows all other growth stages of the vines to be better uniformed.

(c) Insecticides to manage pest incursion. Some of these can be dangerous to human health due to their respective modes of action.

(d) Bactericides to manage *Pseudomonas syringae pv actinidiae* (Psa).

2.5 Although actual harm to human health is relatively rare, public anxiety about spraying can be a very significant issue.

2.6 Neighbours and the public are likely to complain in the event of spray drift from the orchard and if they are misinformed of a spray event. The implications for Okaro Orchard's operations could be very severe, resulting in pressure on it to change its management practices and the risk that spray operators may give up the contract.

2.7 In terms of solutions to manage spray drift, the imposition of a buffer zone between the orchard and sensitive activities, such as childcare centres, may not be sufficient to manage the issue: the main problems arising with spray drift are not about how sensitive the receivers are (e.g., children versus adults) but about managing spraying activities in circumstances where members of the public are likely to be in the vicinity and the likelihood of complaints.

2.8 Although I agree that natural shelter can mitigate spray drift events, natural shelterbelts require annual trimming to keep them in check, as well as competing with the kiwifruit vines for water and nutrients.

2.9 In my opinion, a better solution is to provide a buffer zone on the development side which is planted up, and which the public are completely excluded from, to allow any airborne particulate to settle in that area.

Creation of frost pockets

2.10 Another significant concern arising from the location of large-scale commercial buildings adjacent to a commercial kiwifruit orchard is the potential for frost pockets to occur.

2.11 A frost pocket is an area in which the air movement is restricted, and the cold air can sit and build up in height, often in depressions and gullies. The cold air can accumulate to a level where it reaches the Kiwifruit canopy and causes frost damage to the soft green tissue of kiwifruit shoots and buds.

2.12 The construction of large commercial buildings on the boundary may block air flow, preventing the wind from pushing the cold air into the gullies to the west of the orchard. Instead, it would settle in the lower portions of Blocks 1 & 2 and cause damage to the kiwifruit vines. This is another reason why a setback from the boundary for large buildings is required.

Pest incursions

2.13 Insect incursions can cost kiwifruit growers a large amount of money and frustration if they are not controlled correctly and in a timely manner. In particular, Western Bay of Plenty has had an ever-increasing Passion Vine Hopper ("PVH") population which has been causing large scale losses on kiwifruit orchards due to sooty moulds.

2.14 The development of the plan change area poses a major threat in terms of potentially encouraging more PVH and other pest species to the orchard through the planting of landscaping species which are attractive to those pests.

2.15 As such, it is critical that appropriate controls are placed on the landscaping species planted on the site to ensure that they do not lead to a major pest problem, in accordance with the guidance document created by Zespri which identifies native plants that can be used around orchards.

Dust incursion

2.16 It is also possible for dust caused by construction processes and operations to have negative effects on the kiwifruit production system. Appropriate measures to manage this would include rules to ensure dampening of bare soil surfaces when high wind events are expected during the risk periods of the year, applying shredded hay to any bare soil surfaces that are not currently being worked, and planting out the northern boundary with appropriate vegetation first that will act as a buffer zone where hopefully the air borne particulates will settle rather than in the orchard.

My comments on the Council Officer's report

2.17 In my opinion, the report has given insufficient consideration to the very significant issues raised by Plan Change 93 for the ongoing productivity of

the Okaro Orchard. The report contains little discussion of the appropriate measures to manage effects on Okaro Orchard and appears to have been prepared on the basis that the Kirk Family has agreed to the proposed boundary treatment measures.

2.18 My understanding is that this is not the case. In my opinion, substantially stronger measures are required to manage the interface and limit the risk that kiwifruit production will be adversely affected by the development. In particular, in my opinion, the following is required:

(a) A buffer area between the orchard and the plan change area, including a planted berm.

(b) Rules controlling construction and operational activities which may create dust, including dampening of bare soil surfaces when high wind events are expected during the risk periods of the year, applying shredded hay to any bare soil surfaces that are not currently being worked.

(c) Requirements for landscaping species to be selected that are known to not attract pest insects to the area that could infiltrate into the neighbouring orchards that could cause crops losses or market restrictions.

3. KIWIFRUIT PRODUCTION

3.1 Okaro Orchard is a 3.46 ha Gold 3 kiwifruit orchard located in Te Puna, on the corner of Armstrong Road and Te Puna Road. Okaro Orchard is owned by the Kirk Family and vine managed by Seeka Ltd.

3.2 Okaro Orchard is divided into 3 blocks, of which Blocks 1 & 2 are adjacent to the development.

3.3 The export market for Gold Kiwifruit is very significant. The most recent Zespri Annual Report, which is attached as **Attachment A,** records that the average Orchard Gate Return[1] per hectare for SunGold kiwifruit was $177,846 in the 2020/2021 year.[2]

3.4 The agriculture, forestry and fishing sector is the biggest driver of the economy in the Western Bay of Plenty District, and kiwifruit production is a

1 Meaning the revenue received by an orchardist after post harvest costs are deducted.
2 Attachment A, page 8.

major part of that.[3] The kiwifruit industry therefore provides a critical role in the Bay of Plenty by employing its people, generating income to be spent within the community and providing a world class fruit to be consumed all over the world.

3.5 Kiwifruit require specific conditions to grow successfully. To grow a high-quality product, careful management is required. There is little room for compromise if an export quality product is to be produced. The following sections of this statement of evidence describe the key concerns for kiwifruit production which arise as a result of the proposal to allow commercial development to locate near the boundary of the site.

4. SPRAY DRIFT EFFECTS

4.1 Spray drift is a particular concern for the operators of kiwifruit orchards. Kiwifruit require regular spraying with various treatments, some of which are safe and some of which are termed harmful to humans and animals.

4.2 Specifically, the treatments that are typically applied to kiwifruit orchards include:

(a) Foliar nutrients, which help promote strong, uniform growth in the shoots, leaves and fruit. These are harmless to human health;

(b) Bud breaker applications (Hi-Cane) which improve the number of winter buds to burst in a uniform manner, which in turn allows all other growth stages of the vines to be better uniformed. Therefore, products like Hi-Cane can improve the amount of fruit grown per vine but also mean that they are grown in synchronicity and so increase the efficiency of orchard actions. These are crucial to achieve the crop loads that orchards such as Okaro achieve but there is a stigma against applying these products because of their perceived damage to ecological life;

(c) Insecticides to manage pest incursion. Some of these can be dangerous to human health due to their respective modes of action. But without these the amount of fruit lost to reject and the number of market holds applied to the fruit from this orchard would increase greatly; and

3 https://www.westernbay.govt.nz/community/about-the-western-bay/our-economy?ed-step=1.

(d) Bactericides to manage *Pseudomonas syringae pv actinidiae* (Psa), these products are mostly safe to humans and animals but are used to reduce Psa bacteria which in recent history has caused huge economic losses for growers throughout the North Island of New Zealand.

4.3 Although actual harm to human health is relatively rare, public anxiety about spraying can be a very significant issue.

4.4 Throughout the season, Okaro Orchard will be applying chemical treatments around 12-16 times depending on the weather and pest pressure to ensure the crop is of high quality. In the 2022 harvest season (April - March), Okaro applied 16 sprays. Spraying is undertaken by contractors who visit the site to undertake the work. For all sprays there is a warning alert that is sent out to all neighbours, as per the regional air plan and Zespri Crop Protection Standard. Signage is used to identify what was applied and by who, as well as a date that is safe to re-enter.

4.5 Although efforts are of course made to avoid conditions which might cause spray drift out of the site, it can still happen with slight changes to the wind direction and velocity. The magnitude of the risk this creates depends on the product being applied at the time. Products like insecticides and Hi-Cane have a higher degree of risk to humans and pets.

4.6 Neighbours and the public are likely to complain in the event of spray drift from the orchard and if they are misinformed of a spray event. Often, however, simply the sound of orchard machinery is enough to generate complaints because of anxiety in members of the public about the potential for spray drift of dangerous chemicals.

4.7 The proposal to locate commercial activities operating so close to a working orchard poses a problem in terms of how to warn every person on site of on what is going on next door. Even a safe application of foliar nutrients may cause complaints due to its smell and the presence of spraying machinery.

4.8 The implications for Okaro Orchard's operations could be very severe, resulting in pressure on it to change its management practices, which would inevitably make it less profitable. More importantly, spray operators may give up the contract due to it becoming too much effort to manage complaints and attracting too much criticism.

4.9 In terms of solutions to manage spray drift, the imposition of a buffer zone between the orchard and sensitive activities such as childcare centres may

not be sufficient to manage the issue: the main problems arising with spray drift are not about how sensitive the receivers are (e.g., children versus adults) but about managing spraying activities in circumstances where members of the public are likely to be in the vicinity and the likelihood of complaints.

4.10 Although I agree that natural shelter can mitigate spray drift events, natural shelterbelts require annual trimming to keep them in check, as well as competing with the kiwifruit vines for water and nutrients. They also have a greater chance of shading out the lowest part of the Okaro block 2. Further, while artificial shelter allows even wind dispersal through each of its weaves, if not maintained correctly natural shelter belt can cause the wind to dump over which can be damaging young shoots.

4.11 The upgrading of the existing artificial shelter belt with one which has a finer weave would catch a greater amount of spray drift, but this would create shading and reduction of air flow.

4.12 In my opinion, a better solution is to provide a buffer zone on the development side which is planted up, and which the public are completely excluded from, to allow any airborne particulate to settle in that area.

5. CREATION OF FROST POCKETS

5.1 Another significant concern arising from the location of large-scale commercial buildings adjacent to a commercial kiwifruit orchard is the potential for frost pockets to occur.

5.2 Frost can cause a large amount of damage to a kiwifruit crop if not managed correctly, both for the current season and for the following.

5.3 A frost pocket is an area in which the air movement is restricted, and the cold air can sit and build up in height, often in depressions and gullies. The cold air can accumulate to a level where it reaches the Kiwifruit canopy and causes frost damage to the soft green tissue of kiwifruit shoots and buds.

5.4 Spring frosts cause a burning affect on the young, tender shoots of the kiwifruit vines which can not only reduce the current season's crop but also limit the following season crop if severe enough. The frost shoots are often too damaged to continue to grow and bear fruit. This can obviously therefore have a major effect on productivity.

5.5 This issue is one of the key reasons why shelter belt is permeable – it needs to allow appropriate air flow to pass through the boundary to disperse the

cold air. In contrast, the construction of large commercial buildings on the boundary may block air flow, preventing the wind from pushing the cold air into the gullies to the west of the orchard. Instead, it would settle in the lower portions of Blocks 1 & 2 and cause damage to the kiwifruit vines.

6. INSECT INCURSION AND PASSION VINE HOPPER

6.1 Insect incursions can cost kiwifruit growers a large amount of money and frustration if they are not controlled correctly and in a timely manner. There are different negative effects caused by certain pest insects, it can be physical damage to the vines, leaf bronzing from Thrips and cane damage from Cicadas, loss of crop caused by Passion Vine Hopper ("PVH") and market restrictions such as from Armoured Scale.

6.2 Western Bay of Plenty has had an ever-increasing PVH populations, which have been causing large scale losses on kiwifruit orchards due to sooty moulds. Sooty mould is the term which is given to a black mould that grows on the sugary excrement that is present on the fruit and plants.

6.3 It was estimated in the 2019/20 season that sooty mould cost the industry $77m, through reject fruit, thinning costs, additional spray applications and removal of host species. Cicadas also cause sooty mould but to a lesser degree than PVH, but their main damage is through laying their egg rafts in the canes of the kiwifruit which become weak and susceptible to breaking in wind. Thrips and scale both cause different market restrictions to be placed onto the crop which in term make it more difficult for post-harvest operations to find suitable markets to take the fruit, thereby significantly reducing its value.

6.4 In previous years, Okaro has experienced high incursions from PVH which resulted in many fruit covered in sooty mould which rendered the fruit to be classed as rejects. This not only meant that the fruit would be disposed of, but also that the orchard would be required to pay reject penalties to cover the increased workload the packhouse was subjected to. The table below illustrates the amount of fruit in Kgs the Okaro Orchard has lost to sooty mould, which is caused by PVH, over the last 5 years. An average of 2.26% of the fruit has been deemed rejects, this does not include the amount of fruit that the Kirk family have paid to have thinned off before harvest.

Year of Harvest	Sooty Mould Rejects (Kg)	Total Fruit Weight (Kg)	Percent of Submit (%)
2018	1,586	138,924	1.14%
2019	2,559	157,173	1.63%
2020	10,871	307,230	3.54%
2021	4,839	268,529	1.80%
2022	7,457	232,351	3.21%
Average	5,462	220,841	2.26%

6.5 The development of the plan change area poses a major threat in terms of potentially encouraging more PVH and other pest species to the orchard through the planting of landscaping species which are attractive to those pests. Infiltration of pest species could cause major damage or create market holds.

6.6 As such, it is critical that appropriate controls are placed on the landscaping species planted on the site to ensure that they do not lead to a major pest problem. Zespri has created a highly detailed document that identifies native plants that can be used around orchards and lists them by their susceptibility to pest insects. 'Plants with purpose – native and shelterbelt planting guide for kiwifruit orchards' is attached as **Attachment B**.

6.7 In my opinion, landscaping species utilised on the site should be limited to plants that are not rated as poor for PVH, cicada, armoured scale or thrips shown on the chart on page 28 of 'Plants with purpose'.

7. DUST INCURSION

7.1 It is also possible that dust caused by construction processes and operations could have negative effects on the kiwifruit production system, if it enters the orchard at the wrong time of season. The main time periods would be prior to budbreak enhancement applications in mid-August and during pollination in early-November.

7.2 Dust coating the canes prior to application of Hi-Cane can interfere with normal absorption process, which may lead to reduced budbreak and reduced crop. Dust may also coat the stigma of the kiwifruit flower, which can inhibit the adherence of the pollen grains, which can reduce the pollination potential of the kiwifruit, resulting in a reduced crop.

7.3 With the kiwifruit being in close proximity to the development site there is a risk that if during the sensitive periods outlined above the dust could cause detrimental effects to the crop.

7.4 Appropriate measures to manage this would include rules to ensure dampening of bare soil surfaces when high wind events are expected during the risk periods of the year, applying shredded hay to any bare soil surfaces that are not currently being worked, and by planting out the northern boundary with appropriate vegetation first that will act as a buffer zone where hopefully the air borne particulates will settle rather than in the orchard.

8. COMMENT ON ISSUES RAISED IN THE COUNCIL OFFICER'S REPORT

8.1 I have read the Council officer's report prepared in respect of this plan change request. In my opinion, the report has given insufficient consideration to the very significant issues raised by Plan Change 93 for the ongoing productivity of the Okaro Orchard.

8.2 The recommendation in the report[4] to accept the interface measures proposed by the applicant (comprising a landscaped strip and sensitive activities setback) is not sufficient to manage the potential effects on the orchard. In my opinion, the following is required:

(a) A buffer area between the orchard and the plan change area, including a planted berm.

(b) Rules controlling construction and operational activities which may create dust, including dampening of bare soil surfaces when high wind events are expected during the risk periods of the year, applying shredded hay to any bare soil surfaces that are not currently being worked.

(c) Requirements for landscaping species to be selected that are known to not attract pest insects to the area that could infiltrate into the neighbouring orchards that could cause crops losses or market restrictions.

Ethan England

30 June 2022

4 PC 93 District Plan Committee Meeting Agenda, Topic 4.

ATTACHMENT A

ZESPRI ANNUAL REPORT 2020-2021

VALUES AND *Value*

ANNUAL REPORT 2020/21

Zespri™ KIWIFRUIT

VALUES

It's during challenging times that our values often shine brightest. That's again been the case in 2020/21 as we've managed the considerable risks posed by COVID-19. More than ever, we've focused on our **personal connections** — listening to each other with compassion and acting with empathy and humility. We've embraced **kaitiakitanga** (guardianship) — nourishing record levels of consumers around the world and growing kiwifruit in a way which is good for our people, our communities and our environment. We've remained **results driven** — focusing on delivering the season despite the immense challenges we've faced, ultimately producing outstanding results.

VALUE

Our values have helped us to deliver more **value** in 2020/21. Grower returns across all varieties have increased this year. That's a remarkable achievement considering that at the start of the season we weren't even sure we'd be able to pick, pack or ship our fruit. We've also made greater contributions to our local communities, donating more than 100 tonnes of kiwifruit to some of those most in need across New Zealand, and even more throughout our offshore markets to ensure first responders, hospitals, school children and the elderly could access fresh, healthy fruit. Our new brand has also helped deliver more value, attracting new consumers, and we've continued to invest in innovation – ensuring that our industry retains the foundations required to deliver even greater value in the years ahead.

Highlights 2020/21

Total sales volumes reached

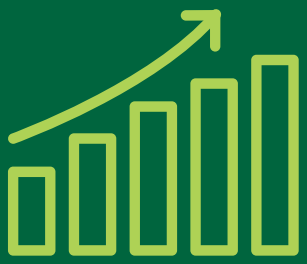
181.5M

trays of New Zealand and non-New Zealand kiwifruit

Zespri global sales volume up from previous year

Global net Kiwifruit sales increased to

$3.58BN*



up 14% from previous year

**As per the Alternative Revenue Statement on page 106.*

PEOPLE

A global team of almost 700 based in Mount Maunganui and throughout Asia, Europe and the Americas

Zespri's total fruit and service payments (including the loyalty premium) to New Zealand growers increased by

15%

to $2.25bn in 2020/21

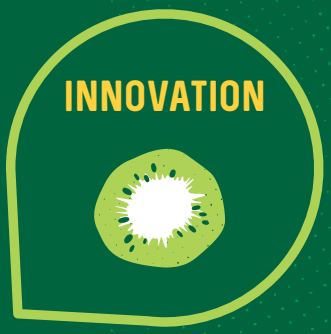
Vitamin C

One of the most popular searches on Google in 2020 was for foods high in Vitamin C

SUSTAINABILITY

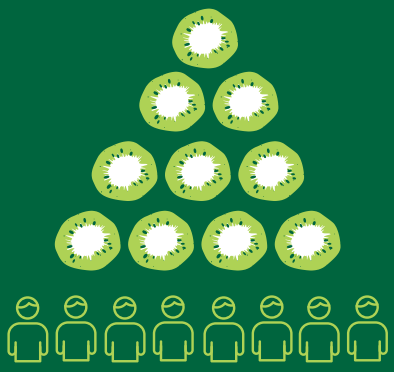
We have delivered the first of our sustainability commitments – to report on our climate-related risks and opportunities by August 2021

INNOVATION



After the success of Zespri Red in China, Singapore, Japan and New Zealand the new variety is set to be fully commercial in 2022

COMMUNITY



Donated more than

100 TONNES

of fresh and healthy kiwifruit to those most in need in New Zealand

BRAND

12 AWARDS

for the much-loved Kiwi Brothers advertising campaign

CONTENTS

SEASON *Overview*

This was clearly a challenging year as we faced an unprecedented range of issues driven by the pandemic.

COVID-19 affected every part of our business and it took a huge effort right across the industry and throughout the supply chain to ensure we could safely pick, pack, ship and market what was a record-breaking crop.

What is most remarkable is the fact that in spite of the challenges we saw an increase in both per hectare and per tray returns across all categories compared to last year.

Total sales volumes reached 181.5 million trays of New Zealand and non-New Zealand kiwifruit, a 10 percent increase on the previous financial year. Global revenue generated by fruit sales increased by 14 percent to $3.58 billion, and Zespri's total fruit and service payments (including the loyalty premium) to New Zealand growers increased by 15 percent to $2.25 billion in 2020/21.

The strong Orchard Gate Returns (OGR) across all categories reflect the global demand we continue to see for Zespri Kiwifruit, with consumers increasingly seeking fresh, healthy products rich in Vitamin C like kiwifruit. This trend was further accelerated by COVID-19 in 2020/21 with the health crisis driving greater awareness of health and wellbeing and a desire to eat and live better.

Zespri's net profit after tax in 2020/21 was a record $290.5 million, up from the $200.8 million recorded last year. This reflects strong consumer demand, higher volumes of New Zealand-grown fruit and increased revenue generated from ongoing licence release.

In New Zealand the 2020 licence round generated gross licence revenues (excluding GST) of $303.2 million, with other licence income for the year accounting for a further $3.7 million. Zespri issued 700 hectares of conventional SunGold licence, 50 hectares of Organic SunGold licence, and 150 hectares of Zespri Red licence.

The Board has declared a final dividend of $0.27, taking the total dividend per share in 2020/21 to $1.33, up from $0.94 recorded in 2019/20.

The ongoing investment Zespri is making in our brand and our Zespri Global Supply (ZGS) strategy, is critical to attracting new customers to our product, and helping to achieve our ambition of supply for all 12-months of the year. ZGS sales reached 23.5 million trays, up from the 19.1 million trays in 2019/20, with revenue increasing from $369.4 million in 2019/20 to $472.8 million in 2020/21.

While risks and challenges remain, which we will have to continue to address together, we're heartened by the continued strong demand we're seeing for our fruit around the world. Our focus remains on making sure we're getting closer to our customers and consumers to meet their changing needs and finding new ways to add value to the industry and our communities.

ANNUAL MEETING

31 MARCH 2021
Financial year-end

9 JULY 2021
Annual Report circulated

16 AUGUST 2021
Deadline for proxies for Annual Meeting

18 AUGUST 2021
ANNUAL MEETING
The Annual Meeting of the Shareholders of Zespri Group Limited will be held at 1pm on Wednesday 18 August at Trustpower Arena, 81 Truman Lane, Mount Maunganui

DECEMBER AND AUGUST
Indicative dates for dividend payments, August (prior year final and current year first interim) and December (second interim)

FINANCIAL *Highlights*

	2020/21	2019/20	Variance
Seasonal results			
New Zealand–grown fruit and service payments (including loyalty premium)	2,253.2 million	1,962.5 million	15%
– Per tray supplied	$14.11	$13.25	6%
New Zealand–grown Orchard Gate Return (OGR) per hectare	$123,041 (average)	$107,142 (average)	15%
– Green	$76,722	$67,295	14%
– Organic Green	$66,453	$63,734	4%
– SunGold[1]	$177,846	$161,660	10%
– Organic SunGold[1]	$158,599	N/A	N/A
– Sweet Green	$56,853	$43,550	31%
Financial Year results			
Net profit after tax	$290.5 million	$200.8 million	45%
Dividend per share (cents)			
– Interim	106.0	75.0	41%
– Final	27.0	19.0	42%
– Total	133.0	94.0	41%
Percentage of available profit	80%	80%	
Zespri global operating revenue[2]	**$3.890 billion**	**$3.355 billion**	16%
Zespri global kiwifruit sales (net)	**$3.583 billion**	**$3.140 billion**	14%
Export earnings (New Zealand–grown)	**$2.599 billion**	**$2.272 billion**	14%
Equity	$307.2 million	$246.0 million	25%
Zespri global volume (trays sold)	181.5 million	164.4 million	10%
New Zealand–grown	**158.0 million**	**145.3 million**	9%
– Green	66.7 million	66.8 million	(0%)
– Organic Green	2.8 million	2.8 million	0%
– SunGold[1]	84.8 million	72.8 million	16%
– Organic SunGold[1]	1.4 million	N/A	N/A
– Sweet Green	0.3 million	0.4 million	(31%)
– Other	2.1 million	2.5 million	(16%)
Non–New Zealand–grown	**23.5 million**	**19.1 million**	23%
– Green	9.7 million	8.1 million	20%
– Gold	13.8 million	11.0 million	25%

1 2019/20 comparative for SunGold reflects the combined pool of Zespri SunGold and Organic SunGold kiwifruit. These varieties have been split into separate pools for the 2020/21 year, as reflected above.

2 Global operating revenue equals global kiwifruit sales plus new cultivars licence revenue as presented in the Alternative Revenue Statement, see page 106.

ORCHARD GATE *Returns*

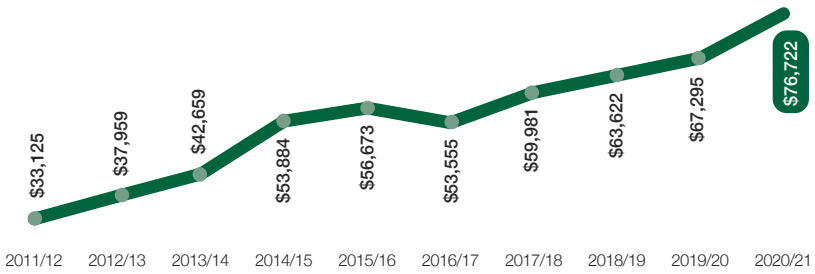
ZESPRI GREEN KIWIFRUIT New Zealand-grown kiwifruit

Average orchard gate return per tray

$7.51

Average orchard gate return per hectare

$76,722



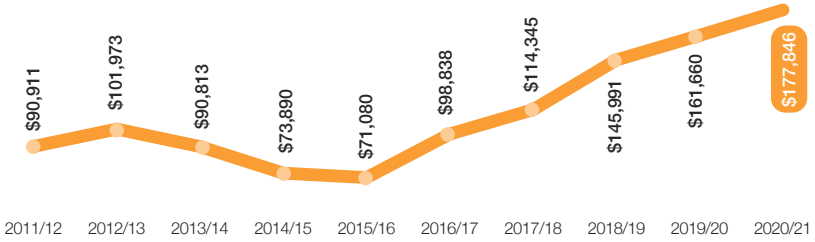
ZESPRI GOLD KIWIFRUIT New Zealand-grown kiwifruit

Average orchard gate return per tray

$12.46

Average orchard gate return per hectare

$177,846



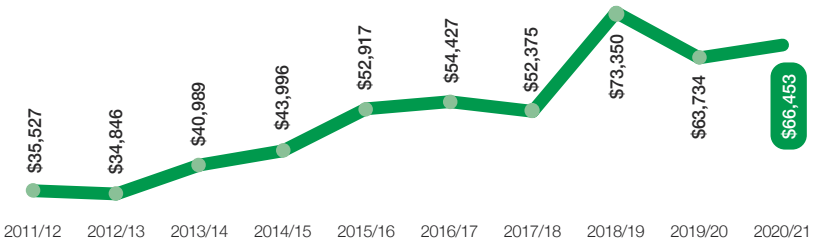
ZESPRI ORGANIC GREEN KIWIFRUIT New Zealand-grown kiwifruit

Average orchard gate return per tray

$10.53

Average orchard gate return per hectare

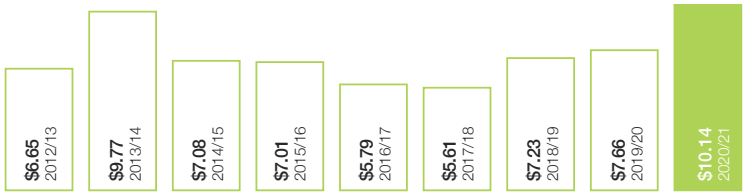
$66,453



ZESPRI SWEET GREEN KIWIFRUIT New Zealand-grown kiwifruit

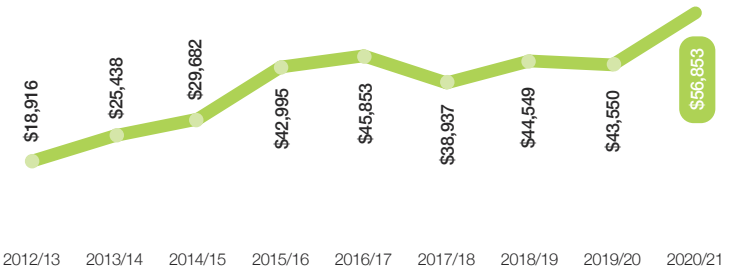
Average orchard gate return per tray

$10.14



Average orchard gate return per hectare

$56,853



The Zespri Sweet Green Kiwifruit pool was introduced in 2012/13

ZESPRI ORGANIC SUNGOLD KIWIFRUIT New Zealand-grown kiwifruit

Separate pool introduced in 2021

Average orchard gate return per tray

$15.36

Average orchard gate return per hectare

$158,599

GUIDED BY *Our Connections*

This has been a milestone year for our industry, and we're proud not only of what we have achieved together, but the way we have done it.

The foundations of our success lie in the many years of hard work and effort across the whole industry – from orchard to market. It stems from our continued focus on adding value.

We have an outstanding product, a commitment to quality, to each other and to our communities and environment, and a clear set of values that unites our global team. Of course, like the rest of the world, our year was turned on its head with the arrival of the pandemic.

COVID-19 affected every part of our industry and global supply chain, forcing people to work remotely, changing the way we operated on-orchard and in packhouses, severely disrupting shipping channels and altering not only the way we connected with our consumers but consumption in general.

While it was a challenge, we all responded quickly, and effectively.

At Zespri we focused on three basic priorities:

1. Putting people and their wellbeing first;
2. Delivering the season; and
3. Continuing to invest for the medium-term.

We made a commitment that as an industry we would support our communities and uphold the responsibilities of our role as an essential service for New Zealand, including implementing all procedures to remain COVID-19 free.

And we did this successfully, once again showing why our industry is renowned for its ability to respond to a crisis, to innovate, and to work collaboratively. All of these things stand us in good stead in the challenging and uncertain times the world faces.

Our unity meant we've worked together to embrace additional safety protocols and find ways to deliver our fruit safely to our customers and communities.

We've highlighted the health benefits of our fruit so that we could support even more consumers with the goodness of kiwifruit during a global health pandemic.

And we've continued our investment in the Zespri brand, with more consumers connecting with our refreshed brand identity and purpose – an investment which proved even more impactful in such uncertain and volatile times when we know consumers turn to brands they trust.

← Dan Mathieson (Chief Executive) with Bruce Cameron (Chairman).

"OUR UNITY MEANT WE WERE ABLE TO WORK TOGETHER TO EMBRACE ADDITIONAL SAFETY PROTOCOLS AND FIND WAYS TO DELIVER TO OUR CUSTOMERS AND COMMUNITIES."

The investment the industry has made in our supply chain and the partnerships that have been formed over many years with our valued shipping partners have also helped provide a viable pathway through the worst of the crunch on global shipping lines which were significantly disrupted.

We have proven before that as an industry we can pivot and respond to incredibly challenging circumstances. This past year was a testament to the way we continue to build our industry and to work together in times of both success and challenge.

And we've been able to deliver some truly strong results in 2020/21.

CORPORATE RESULTS

Supported by an outstanding tasting crop, in 2020/21 total global sales reached 181.5 million trays, up from 164.4 million trays in 2019/20. Global revenue from kiwifruit sales also increased to $3.58 billion, up from $3.14 billion in 2019/20. The total fruit and service payments to New Zealand growers increased to $2.25 billion, up from the previous season result of $1.96 billion.

Grower returns were up across all varieties on a per tray and per hectare basis as a result of higher global revenue and higher volumes, surpassing the top end of the forecast ranges Zespri provided at the start of the season. Together, we achieved a net profit after tax of $290.5 million, versus $200.8 million in the previous year. This hard-earned result reflects the record crop volumes and increased demand for our kiwifruit.

This year's outstanding results have also triggered a margin reset. Agreed to under the industry Enduring Funding Agreement, the fruit return portion of the margin Zespri earns on the sale of New Zealand fruit is reset down by 0.25% when the three-year rolling average of the New Zealand Supply EBIT % is more than 1.2%. As a result of this year's performance, Zespri's fruit return margin percentage will reduce from 7.25% to 7.00% in the financial year ending March 2022, resulting in increased value to growers.

Profit after tax
↑ 45%
to $290.5m

Zespri global kiwifruit sales (net)
↑ 14%
to $3.583b

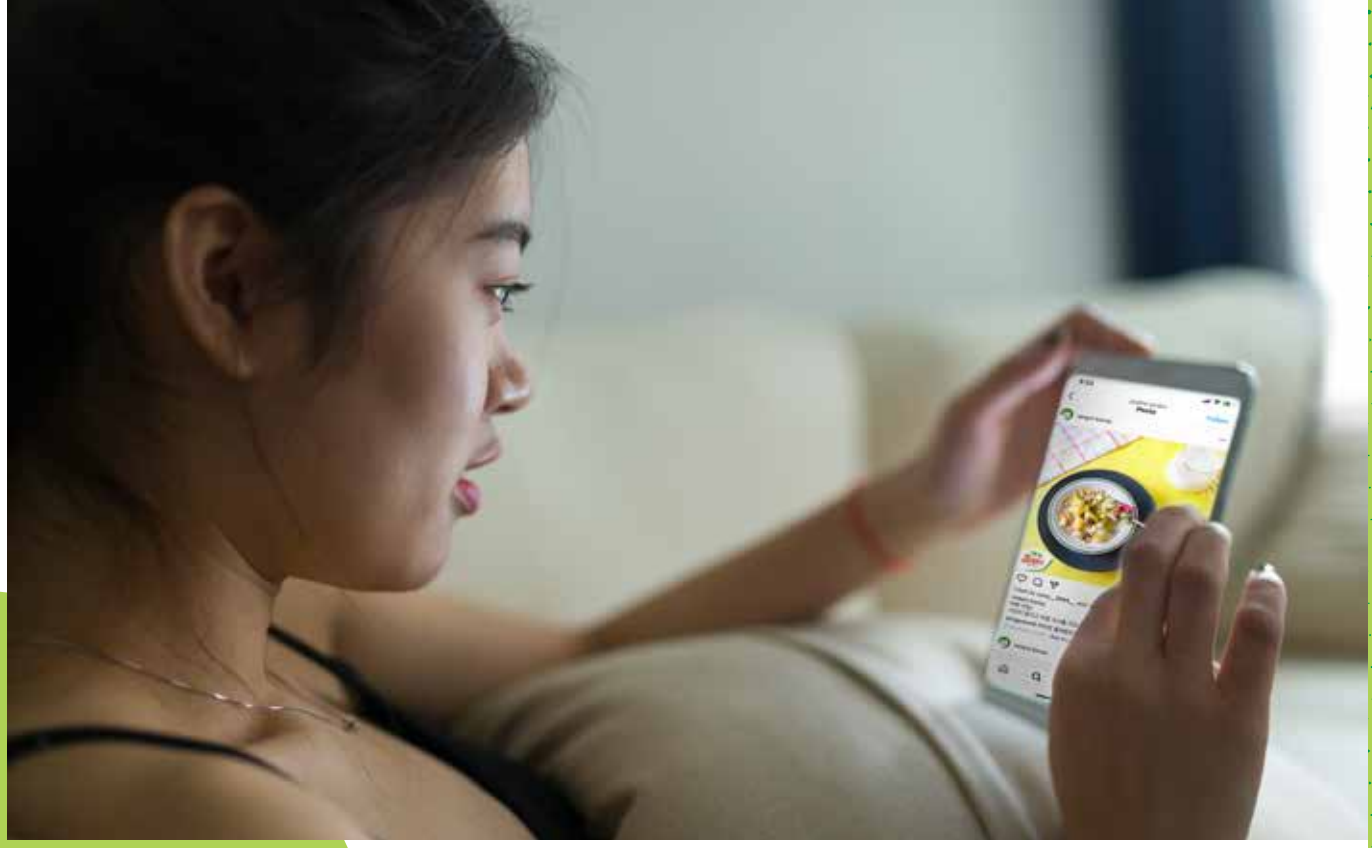
Export earnings (New Zealand-grown)
↑ 14%
to $2.599b

Dividend per share
↑ 41%
to 133c

Zespri global volume (trays sold)
↑ 10%
to 181.5m

New Zealand-grown (trays sold)
↑ 9%
to 158.0m

In 2020/21, revenue per full-time employee equivalent was $5.7 million, versus $5.8 million in 2019/20, with 264,000 trays sold per full-time employee equivalent versus 284,000 trays in 2019/2020. This reflects the fact that we are continuing to invest to keep demand ahead of supply, as well as investing in people for the Horizon Programme, which will replace many of the legacy systems and processes to enable us to support our continued healthy growth.



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Consumers around the world are expressing a strong interest in healthy products, like our kiwifruit.

Across 2020/21, our performance was again led by our major markets of Greater China, Japan and Europe, but also by exciting new ones like North America and Vietnam.

The strong results in Europe were driven by consistent demand for Zespri Green Kiwifruit from many of our key customers for all 12 months of the year. Zespri SunGold Kiwifruit was also available for a longer period than ever before.

With increasing competition in the fruit bowl, the importance of having our fruit available to customers and consumers for as long as possible throughout the year has never been more essential to ensuring we continue to drive strong returns for growers. This was illustrated in the increasing value of Zespri SunGold Kiwifruit in North America and a strong lift in sales.

In 2020/21, we were also forced to adjust our sales and marketing approach at late notice as a result of COVID-19 and across the business teams worked closely with our customers to keep our kiwifruit available for all our consumers.

With many consumers locked down around the world, Zespri's ability to re-prioritise much of our marketing spend to in-home media, as well as digital and social media advertising, has been crucial, and will help enable greater use of these channels in the years ahead.

We also adjusted some of our in-market messaging, placing a greater emphasis on the health and nutrition of kiwifruit in light of the fact that one of the most popular searches on Google in 2020 was for foods high in Vitamin C.

We expect many of these trends to continue, with the lessons we have learned and the processes we have adjusted throughout 2020/21, providing a strong foundation for continued growth in the years ahead.

Overall, we continue to see growing interest in the kiwifruit category, with consumers around the world expressing a strong interest in healthy, delicious and safe foods that are grown in the right way.

CATEGORY PERFORMANCE

The lift in global demand for Zespri Kiwifruit has been driven by consistent investment in sales and marketing to help build demand, and accelerated by the increasing desire for fresh, healthy fruit in a world where health concerns are so prominent.

There were strong results across each fruit category. The average Zespri Green per tray return increased to $7.51, with the average per hectare return for Green reaching $76,722.

Zespri Organic Green reached an average return per tray of $10.53, with the average per hectare return reaching $66,453.

The Zespri SunGold Kiwifruit average return per tray increased to $12.46, and the average return per hectare was also a record $177,846. Demand for SunGold Kiwifruit continues to increase strongly, with the Zespri Board confirming the release of an additional 700 hectares of Zespri SunGold Kiwifruit licence and 50 hectares of Zespri Organic SunGold Kiwifruit licence in 2020/21. In 2021, we will be seeking feedback from growers and post-harvest on the industry's ability to manage any ongoing increase in supply associated with the further licence release, noting the challenges we have faced in 2021, including attracting enough labour.

Zespri Organic SunGold Kiwifruit saw a per tray return of $15.36, with the average per hectare return reaching $158,599.

Zespri Sweet Green achieved an average return per tray of $10.14 and an average return per hectare of $56,853.

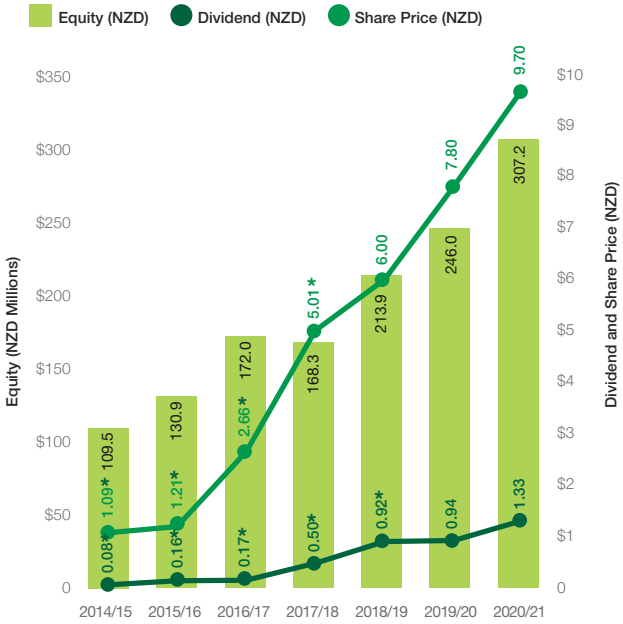
Interest in the new Zespri Red variety is incredibly high and we believe it will bring new consumers to the category. In 2020/21 we sold 73,000 trays generating $2.1 million of sales in New Zealand, Singapore, as well as Japan for the first time. We're also seeing strengthening interest from growers in this variety, with 150 hectares released in 2020 and 350 in 2021.

SUPPLY CHAIN

From a supply chain perspective, the challenges we faced with the breakdown of the maturity clearance system in 2020 created a huge impact on the industry, forcing us to forego taste testing for the year.

ZESPRI GROUP LIMITED PROFITABILITY – 7 YEARS

ZESPRI GROUP LIMITED EQUITY, DIVIDEND RETURNED AND SHARE PRICE – 7 YEARS



* Adjusted to reflect the impact of the share issue and buyback transactions in November 2018 and the three-for-two share split in March 2019.

Over a five-year period from 1 April 2016 to 31 March 2021 Zespri has achieved a compound annual total shareholder return of 66 percent. This measure reflects a combination of the increase in share price and gross dividend over the period.

Fortunately, growers and post-harvest delivered an outstanding tasting crop which has helped us deliver such strong returns. Finding a way forward for the current season has also tested us, with the industry working together to develop and implement a new taste and maturity clearance system at short notice so that fruit could successfully be harvested. Work on understanding the relationship between taste and consumer willingness to pay, and how to make sure the Taste Zespri Programme delivers great tasting fruit efficiently into the market is ongoing and will lead to another industry discussion early next year.

Notably, the temporary foreign workers who are a critical part of our seasonal workforce were unable to travel to New Zealand as a result of the nationwide lockdown last year, and with inbound travel restricted it did put pressure on labour attraction. Our industry adapted quickly, working with businesses in the hospitality and tourism industries that had been negatively affected by the lockdown restrictions, to place their staff in jobs within our industry.

Having enough workers for the upcoming season remains one of our most significant concerns for the year ahead, as we know it is in many industries, given the ongoing travel restrictions. We are continuing to work with New Zealand Kiwifruit Growers Incorporated (NZKGI) and the New Zealand Government on this in order to address the issue and allow our industry to grow. However some uncertainty remains as the Government considers options.

The industry welcomed three new charter reefer vessels courtesy of our long-term partners at Fresh Carriers. The three new vessels – Kowhai, Kakariki and Whero – were named by the kiwifruit industry, in recognition of the fact that Gold, Green and Red kiwifruit will be the main cargo these ships will transport.

COVID-19 has had an impact on international trade and on shipping routes and we are continuing to closely monitor the export shipping environment and its current challenges. Our shipping programme was completed successfully through both container and charter reefer vessels which provided flexibility and mitigated risk by avoiding the serious congestion at major overseas container terminals. Zespri will continue to use a mixture of shipping modes in the current 2021 season, while also working with our long-term port and shipping partners to ensure we are well placed to ship our fruit to markets and to manage any negative impacts should they arise.

We've also made some positive steps forward in the last year in ensuring kiwifruit is an industry that people wish to work in. We've strengthened our compliance programme so that any contractors who fail to meet the standards we expect in the kiwifruit industry are removed. We commit to an industry where workers feel valued, safe and supported and where they are treated fairly, including with respect to wages, working hours and benefits. This is behaviour that we know our consumers and customers expect and which we expect of ourselves.

↑

We're committed to ensuring kiwifruit is an industry that people wish to work in.

ZESPRI GLOBAL SUPPLY

Zespri Global Supply (ZGS) has had a record year and is now beginning to realise its substantial potential as we work towards 12 month supply to ensure Zespri Kiwifruit is on shelves all year, supporting sales of New Zealand fruit.

From a base of around 4,000 hectares of planted SunGold Kiwifruit, much of which is yet to reach full production, global supply sales reached 23.5 million trays in 2020/21, up from 19.1 million trays in 2019/20.

Revenue has increased from $369 million to $473 million in 2020/21, driven by stronger sales, increased prices, favourable foreign exchange position and lower costs, due to reallocation of fruit to Europe. As a result, ZGS has contributed a record $28.8 million towards Zespri profit in 2020/21. As we bridge the gap between demand and supply, we expect ZGS to continue to grow the contribution it makes to our corporate profit in the mid- to long-term horizon, acknowledging short term headwinds are expected related to Italian frost impacted volumes and foreign exchange rates.

GLOBAL KIWIFRUIT SALES – 7 YEARS

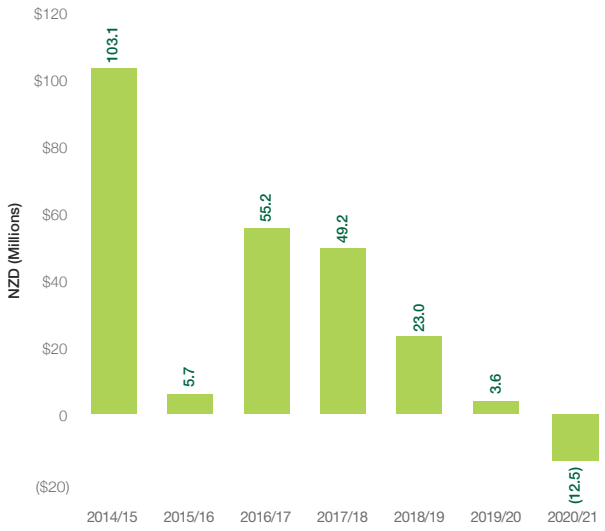
In Europe, we have recently reached three significant milestones: supplying in excess of 10 million trays of SunGold Kiwifruit from Italy, providing a €10.00 return per tray to suppliers for the first time, and supplying in excess of 10 million trays of Green Kiwifruit.

In Asia, we've seen significant quality improvements in Korea, and in Japan production has increased for the first time, since 2014 and the challenges associated with Psa.

It is pleasing to see that we are overcoming many of our past challenges, and seeing the supply of Northern Hemisphere Zespri SunGold Kiwifruit, especially from within Italy, increasing. Favourable weather during the critical pollination period has also meant that in 2020/21 there has been high dry matter and a larger fruit profile.

In addition to Italy, we are now also sourcing Hayward fruit from Greece where in 2020/21 we procured 3 million trays. This helps us to achieve our 12-month supply strategy and mitigate production risks including those posed by climate events such as the frosts experienced in Italy and France in 2021.

FOREIGN EXCHANGE AND OIL HEDGING GAIN/(LOSS)



*Zespri hedges grower returns in advance, with an overall objective of reducing volatility across seasonal grower returns, in accordance with its Treasury Management Policy. 2020/21 saw small foreign exchange derivative losses due to the average New Zealand Dollar spot being slightly lower than the average of all realised foreign exchange hedges for the season. The lower New Zealand Dollar spot also allowed us to hedge a portion of future season returns at favourable rates, leading to an unrealised foreign exchange gain of $309.5m on the balance sheet at 31 March 2021.

ZESPRI GROUP NORMALISED PROFIT AFTER TAX

Zespri provides a normalised profit view to reflect normal operating profit. Normalised profit is derived by adjusting net profit after tax for significant extraordinary items. Extraordinary items adjusted below are historical and relate to: a historical China provision; and specific pre-2015/16 licence revenue.

	2020/21 $m	2019/20 $m	2018/19 $m	2017/18 $m	2016/17 $m	2015/16 $m	2014/15 $m
Net profit after taxation	**290.5**	200.8	179.8	101.8	73.7	35.8	34.6
China provision	**–**	–	–	–	–	(13.0)	–
Licence revenue*	**–**	–	0.3	2.7	5.1	5.0	(13.1)
Normalised profit after taxation	**290.5**	200.8	180.1	104.5	78.8	27.8	21.5

*The licence revenue adjustment relates to a change in revenue recognition for licences, subject to a specific Psa clause. The reduction from profit in 2014/15 is brought back over time as the revenue is received. The final adjustment has been made in 2018/19. Licence releases from 2015/16 do not have these clauses and are not adjusted in normalised profit.

← ZGS has had a record year, and we've seen significant improvements in production in Korea.

↑

There is significant potential to expand growth in ZGS over the next five years to meet the demand opportunity and continue to support New Zealand fruit.

Pressure from Brown Marmorated Stink Bug (BMSB) continues to grow and has observably increased in 2020/21 as the pest spreads more widely across our production regions. We are learning how to mitigate the impacts of this, although it has led to increased market access restrictions. While challenging for our ZGS growers, this also gives us the opportunity to test management options which will help mitigate the impacts of BMSB if it was to enter New Zealand.

Another area of focus for the Zespri team and our partners in Europe is Kiwifruit Vine Decline Syndrome (KVDS) which has caused significant Hayward losses to date and which is beginning to affect Zespri SunGold Kiwifruit orchards in Italy. We now know that KVDS canopy symptoms — wilting and collapsing — are a consequence of compromised root function, developing from unfavourable soil conditions. An exciting development is the establishment of a cross-functional taskforce based in Europe, which aims to build data and share expertise enabling development of successful mitigation strategies.

There is significant potential to expand growth in our ZGS business over the next five years to meet the demand opportunity and continue to support New Zealand fruit. We are assessing potential new production opportunities in Greece and North America for SunGold Kiwifruit, while continuing to expand production in Italy, France, Japan and South Korea. We are confident that we can further expand ZGS, realising benefits for New Zealand growers through the advantages of 12-month supply, including more efficient sales and marketing spend and enabling our efforts to increase brand awareness all year round.

ONGOING CHALLENGES

While we are seeing good returns and are growing, we are facing a number of ongoing challenges which we must continue to respond to. This includes rapidly changing regulations in New Zealand and in our markets globally, particularly around packaging and water. Biosecurity issues also remain an ongoing challenge and as noted we're seeing a real impact in some of our ZGS locations.

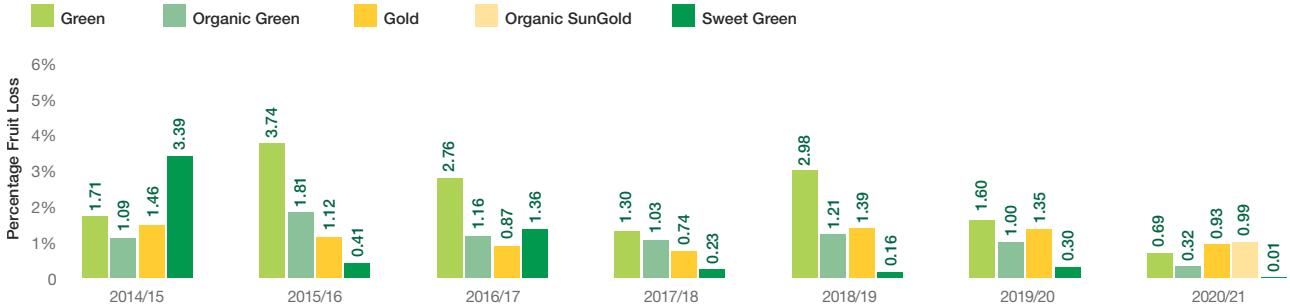
The geopolitical environment is also increasingly uncertain as opposition to free trade grows, as trade concerns are increasingly tied up with foreign policy ones and as competition for geostrategic influence increases. Exporters are having to be increasingly cognisant of the possible impact of this uncertainty on their businesses and to adapt accordingly.

These are issues which are taking up an increasing amount of time and resource, adding pressure on growers and the wider industry, but they must be addressed.

2020/21 saw the ongoing focus on the unauthorised Gold3 plantings in China, with the plantings spreading to an estimated 5,400 hectares by March.

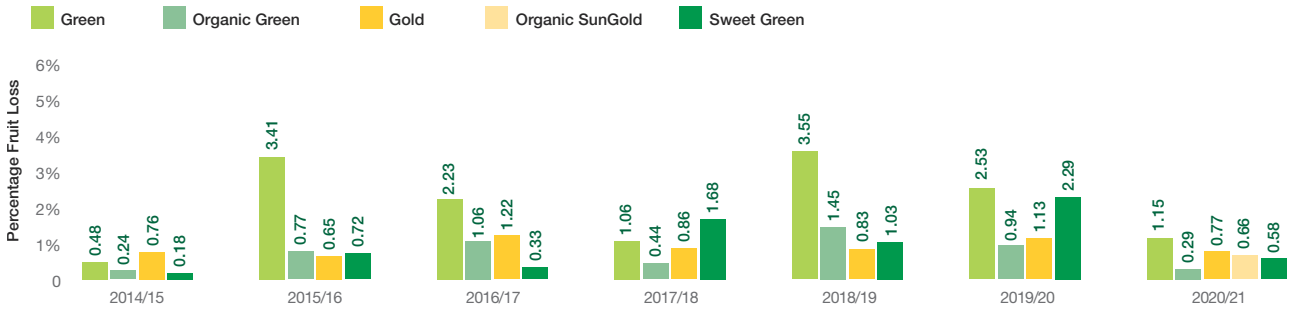
The industry voted on a proposed trial put forward to enable us to understand the problem better and explore a commercial solution. While 70.5 percent of growers supported the proposal to carry out an orchard monitoring trial and 64.5 percent supported the limited sales and marketing trial, the 75 percent threshold was not reached. Instead our core business activities will progress in China, including further R&D as well as engaging in China as we consider our next steps.

ONSHORE FRUIT LOSS – 7 YEARS



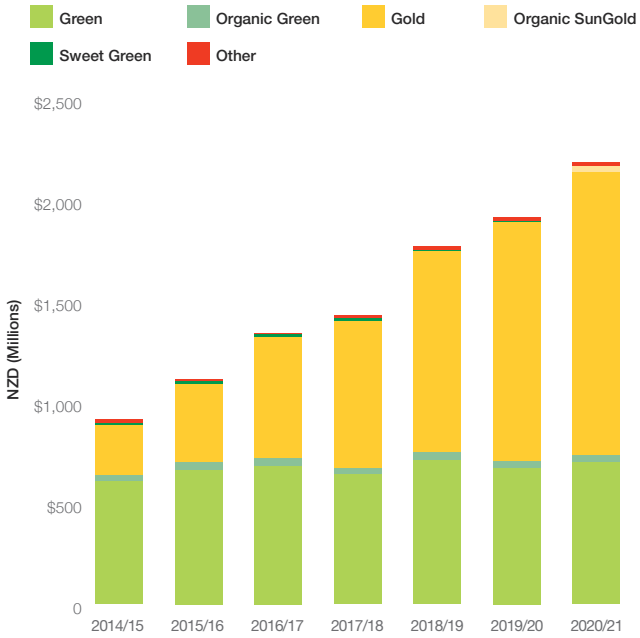
These fruit-loss percentages do not include crop management trays.

OFFSHORE FRUIT LOSS – 7 YEARS



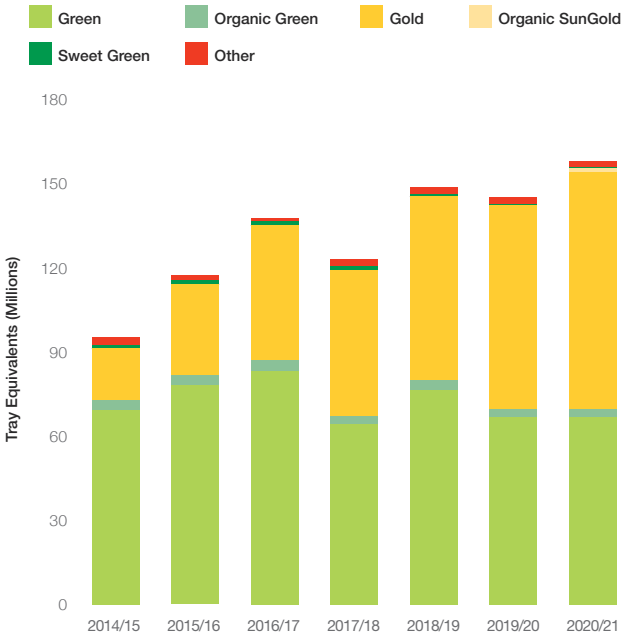
TOTAL FRUIT AND SERVICE PAYMENTS – 7 YEARS

New Zealand-grown kiwifruit (excluding loyalty premium)



TOTAL VOLUME SOLD – 7 YEARS

New Zealand-grown kiwifruit



The 2019/20 and earlier comparatives for Gold Kiwifruit include the combined pool of Zespri SunGold and Organic SunGold Kiwifruit. These varieties have been split into separate pools for the 2020/21 year.

"IN NEW ZEALAND, OUR COMMUNITY INVESTMENT HAS FOCUSED ON SUPPORTING LOCAL FOOD BANKS AND CHILDRENS' CHARITIES, AMONG OTHERS, TO ENSURE THE COMMUNITY BENEFITS ALONGSIDE THE INDUSTRY."

A BETTER TOMORROW

We're making progress on our industry sustainability commitments, with areas of improvement identified right through the supply chain.

These included our pledge that by 2025 we will use 100 percent reusable, recyclable or compostable packaging, do more to help the environment, and to become carbon positive by 2035.

We're focused on growing in a way which is good for our communities and the environment – as well as for growers. Our sustainability focus is on our offshore growing locations, as well as New Zealand.

One thing we have also made sure to do is focus on living our purpose of helping people, communities and the environment to thrive through the goodness of kiwifruit.

This year that was even more important because our communities trusted us to continue operating as an essential service during the lockdowns, believing in our ability to do things the right way and with our communities at the forefront of our minds. We also recognise that we had a very successful year, while many struggled with the impacts of COVID-19. It was more important than ever that our communities benefited from our growth and we offered an increased level of support in 2020/21.

In New Zealand, our community investment has focused on supporting local food banks and childrens' charities, among others, to ensure the community benefits alongside the industry. We launched our first ever national initiative, the Zespri Young and Healthy Virtual Adventure Challenge, which focuses on teaching our young people about the importance of eating well, exercising and looking after our environment.

Our communities are critical to our success and we will remain focused on supporting them as we grow.

STRATEGIC LEADERSHIP

Within Zespri, we've also continued to recruit strongly, making several key appointments to both Zespri's Executive and the Zespri Board.

On behalf of the Board and Executive, we would like to extend our thanks to Teresa Ciprian who is standing down as an Independent Director in 2021. Teresa made a significant contribution to Zespri and the broader kiwifruit industry, and was a driving force in the creation of the Women in Kiwifruit industry group. The Board and Executive also wish to thank John Griffin who retired from the Director Remuneration Committee after ten years of service.

We are delighted that Alison Barrass joins the Zespri Board as an Independent Director in 2021, bringing with her more than 30 years' experience in major international FMCG companies, including PepsiCo, Kimberley-Clark, Goodman Fielder and Griffins Foods. The reappointment of Peter Springford and Nathan Flowerday as Board Directors, and Andre Hickson's election to the Director Remuneration Committee will also ensure we retain significant experience within our ranks.

In 2020/21, Zespri also formally welcomed new executives to its team, including Alastair Hulbert starting as the company's Chief Global Supply Officer, and Giorgio Comino as Executive Officer Europe and North America.

As part of a wider realignment of the Executive team, Dave Scullin was appointed Chief Digital Officer and Jiunn Shih's role of Chief Growth Officer was expanded to include both the Innovation and Growth functions. By moving the innovation portfolio to the Growth function, we can more closely align our innovation with the key challenges we face, the signals our consumers are sending and balance our strategic development to generate more value for the industry.

Prime Minister Jacinda Ardern and Chairman Bruce Cameron took the opportunity to highlight the amazing work of our community partners at an event hosted at Parliament.

Carol Ward was appointed Chief Grower Industry and Sustainability Officer, and in a move designed to reflect our commitment to sustainability we have also created the role of Executive Officer for Sustainability, to which Rachel Depree has been appointed. Nick Kirton has taken on the role of Executive Officer for Northern Hemisphere Supply, supporting the future growth of ZGS.

We farewelled Dave Courtney, previously Chief Grower and Alliances Officer; Blair Hamill, previously Chief Global Supply Officer; Sheila McCann-Morrison, previously Executive Officer Northern Hemisphere Supply; and Les Greeff, previously Chief Transformation Officer. We thank them all for the significant contributions they've made to Zespri, and to the wider kiwifruit industry.

CONCLUSION

In 2020/21 we faced immense challenges which tested us.

The strong results of the year are a reminder that through hard work and collaboration, not only can our industry respond to change, but succeed. We must continue to challenge ourselves to do better and to do more.

This past year has helped us build a stronger base for real opportunities ahead, so that we can provide even more consumers around the world our premium quality kiwifruit.

We'll be continuing to get closer to our consumers so we can meet their changing needs, investing in our brand to build demand for our product, and ensuring that we're helping people, communities and the environment around the world thrive through the goodness of kiwifruit.

Although there will be challenges ahead, we're confident in the future.

GUIDED BY *Our Communities*

Zespri is committed to supporting our communities and helping them to thrive.

"IN 2020/21, WE DONATED MORE THAN 100 TONNES OF FRESH AND HEALTHY KIWIFRUIT TO THOSE MOST IN NEED IN NEW ZEALAND."

The 2020/21 season demonstrated the collaboration our industry is known for. Growers, contractors and packhouses actively supported communities and families, providing jobs to locals who had lost their roles in the hospitality and tourism sectors, as a result of COVID-19, ensuring we were able to complete our harvest.

We were grateful for the support we've received, including from the Government and our growing communities, as well as the confidence in our product from our global customers and consumers, which has been crucial in enabling us to continue to make positive contributions to our local communities.

In 2020/21 we donated more than 100 tonnes of fresh and healthy kiwifruit to those most in need in New Zealand and partnered with several new organisations across the country. In addition to supporting our existing community partners, we've also formed new partnerships with KidsCan and Ronald McDonald House — charities which share our values and commitments.

Our global offices also worked hard to assist their local communities through donations of fresh fruit and financial contributions so that hospital workers, senior citizens, young children, and those in need around the world can access kiwifruit and its high Vitamin C content.

← ↑

Our community partnerships enable us to have a real impact on the lives of young people.

- Our Zespri Japan team launched a 'Thank You Supermarket' campaign, to support and acknowledge supermarket staff working during the COVID-19 pandemic, and donated kiwifruit to more than 1,100 stores nationwide on behalf of their local kiwifruit consumers. They also donated to the Children's Cafeteria, an organisation which provides healthy and nutritious meals to children, and to medical staff working tirelessly in Japanese hospitals, and the #giveakiwi campaign saw 90,000 pieces of kiwifruit distributed to critical workers.
- Our Zespri Korea team shared 40,000 pieces of fruit with vulnerable senior citizens, as part of their COVID-19 response.
- Zespri North America donated more than 300,000 pieces of fruit to families in need through Feeding America.
- Zespri Shanghai partnered with the Shanghai Government on a childhood nutrition programme which focused on improving the health and wellbeing of 30,000 children.

Beyond COVID-19 initiatives, we were proud to launch Zespri's first nationwide community investment programme, the Zespri Young and Healthy Virtual Adventure.

Encouraging healthy lifestyles and habits among 20,000 young New Zealanders from more than 760 classrooms, including Te Puke Primary School. The programme is supported by ambassadors Ameliaranne Ekenasio, Ardie Savea, Kane Williamson, and Samantha Charlton, with students gaining points through healthy behaviours to move around a global course, virtually visiting countries like Japan, Italy, Peru and Croatia.

As part of the six-week adventure, Zespri also organised a community day for more than 600 children and their families at Papatoetoe South Primary School, as well as five events across the North Island to surprise 130 children with brand new ASICS shoes, which the Te Puke Primary School students can be seen wearing on page 23. This programme is having a real impact on the lives of young people around New Zealand, teaching them habits which will help them lead healthier, more active lives.

GUIDED BY *Our People*

In 2017 Zespri developed a set of priorities to transform our business for exceptional growth. Culture is one of those priorities.

←

Our focus on inspiring and enabling Zespri people to be their best ultimately supports our ability to deliver great results.

A winning culture, role-modelled by excellent leadership, is essential in lifting the performance of a diverse, connected and highly engaged global workforce. Our focus on inspiring and enabling Zespri people to be their best ultimately supports our ability to deliver great results for growers and shareholders.

During the last year we've made progress across our people and culture strategy to support a thriving culture. This includes in areas such as leadership, performance management, communication, learning and development, and safety and wellbeing.

During 2020 we launched our framework for leadership across Zespri and engaged 175 people leaders in 16 groups across all regions. Each 'Lead Zespri' programme is supported by an executive sponsor from Zespri's senior team and delivered in-house. It focuses on three core elements of leadership – character, capability and capacity – and centres on how leaders create the conditions for people to be at their best. The programme continues during 2021.

We have introduced a refreshed performance framework that gives people clarity on how their individual objectives align to our organisational goals. It also promotes continuous feedback to support performance and development.

A priority has been to support our people through the global pandemic. We delivered an intense phase of crisis communication as teams around the world adapted to lock-down conditions and to working from home. We put people first, communicated frequently, and benefited from an effective digital platform for collaboration and productivity. Learning from the disruption of COVID-19, we have now implemented a policy on flexible working. This empowers people to take advantage of flexibility of place and schedule, driven by what works for themselves and their teams. Trust and accountability underpin the approach.

"LEARNING FROM THE DISRUPTION OF COVID-19, WE HAVE NOW IMPLEMENTED A POLICY ON FLEXIBLE WORKING."

On safety and wellbeing, we have focused on targeted controls to reduce fatal risks. This includes rolling out driver training with practical courses for field-based staff and online training for all staff. Another important element has been wellbeing and mental health, involving company-wide communication on `Boost' – an awareness campaign to engage people on the five ways to wellbeing.

Zespri seeks feedback from our people on engagement, through a twice-yearly Pulse survey. Our most recent engagement survey had a participation rate of 95 percent and an engagement score of 79 points – putting Zespri in the top 15 percent of participating companies. We have heard positive feedback in the areas of productivity, support through the pandemic and our safety climate, with more opportunities around career paths and feedback.

Looking at the year ahead, we continue to work on several building blocks for a high performing, thriving culture. This includes building on the launch of a new company-wide platform for online learning and development, embedding a refreshed reward framework, developing our approach to talent management and delivering a strategy on wellbeing for our people.

In short, we are working to address all the 'moments that matter' for our people, from joining the company to performing and thriving. There are many components and each one is directed to supporting the culture we aspire to, making Zespri a truly great place to work and ensuring all our staff are committed to delivering stronger returns to growers.

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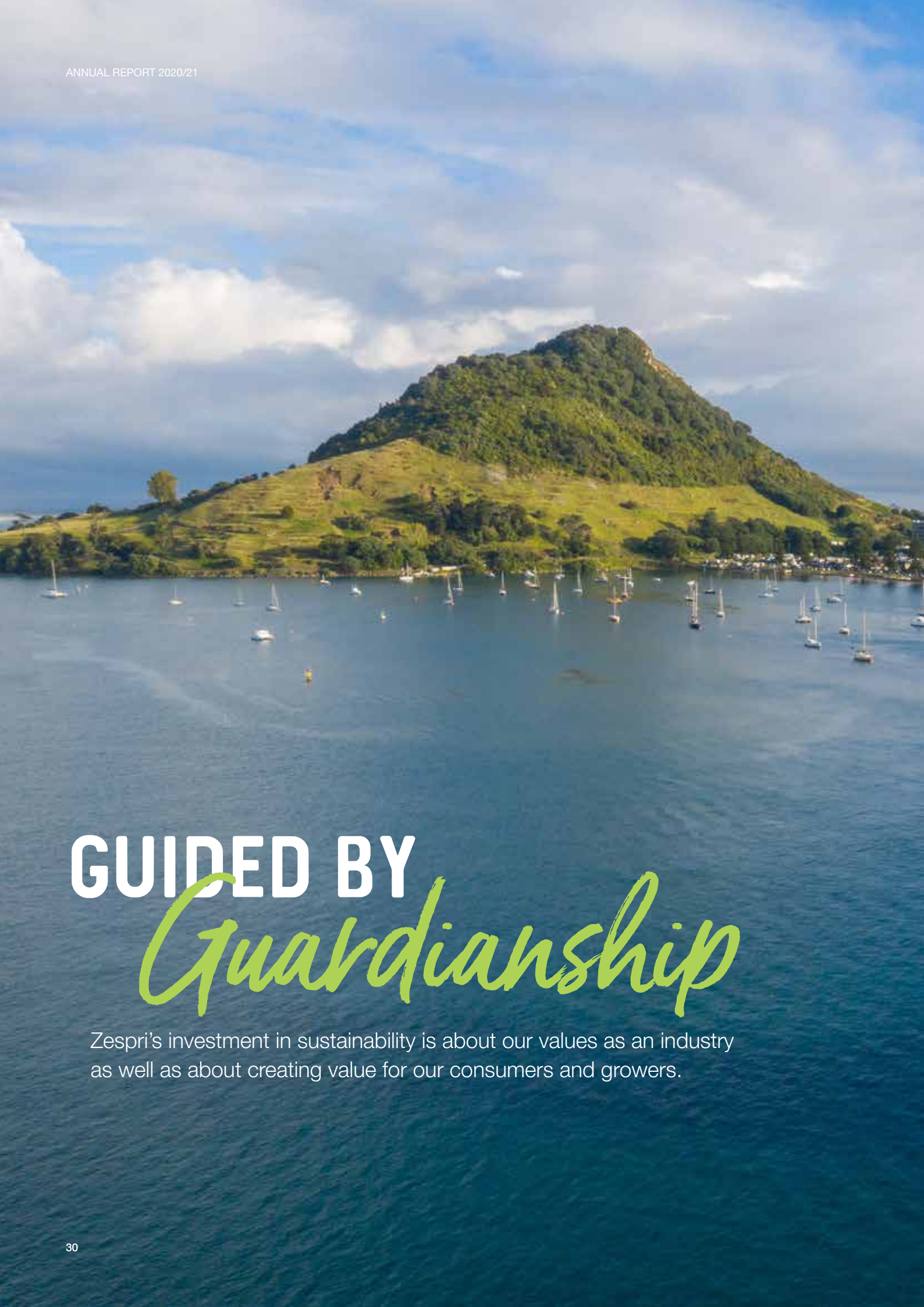
We continue to work on several building blocks for high performing thriving culture.



GUIDED BY *Guardianship*

Zespri's investment in sustainability is about our values as an industry as well as about creating value for our consumers and growers.


KAKARIKI
PANAMA

"WE HAVE STEPPED UP OUR INVESTMENT IN THE SCIENCE NEEDED TO SUPPORT OUR GROWERS, SUPPLY CHAIN AND CUSTOMERS TO ADDRESS WATER, CLIMATE CHANGE AND PACKAGING IMPACTS."

The focus on sustainability from our customers and consumers continues to grow. COVID-19 has highlighted the importance of healthy food and helped people understand how nature sustains us and how supportive communities play a major part in success in times of crisis.

Zespri's investment in sustainability is about our values as an industry as well as about creating value for our consumers and growers.

It's about how we prepare for and respond to the expectations from our markets and help growers navigate regulatory changes, particularly as governments around the world accelerate action. Together we can protect people from climate change and act on issues such as water quality and environmental and social concerns, and ensure we respond to changing regulatory, customer and consumer environment.

FOUNDATIONAL WORK

Launching our sustainability goals and targets in early 2020 was our response to the challenge from our industry to show leadership and to help interpret and respond to the changes we were seeing.

Over the year, we've progressed our foundational work, establishing our risk framework, agreeing our governance for climate change and sustainability, integrating sustainability into business decisions and agreeing our approach to sustainability reporting.

In addition, we have stepped up our investment in the science needed to support our growers, supply chain and customers to address water, climate change and packaging impacts.

SHOWING LEADERSHIP AS AN INDUSTRY

We've also seen significant leadership emerging from the industry with resources being committed by a number of our post-harvest operators, accompanied by dedicated sustainability performance reporting from some and significant investments in energy saving from others.

This reflects the increasing recognition across the industry that we're accountable to our communities and customers for this performance, as well as our regulators around the world.

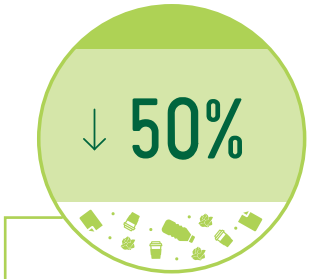
We take pride in our role as a New Zealand exporter, in providing trusted, healthy, premium products to the world.

We're starting to work more closely with our primary sector colleagues to lift the story of the value we bring to our consumers globally, and we know this will become increasingly important as 'buy local' sentiments strengthen and concern over distance from markets intensifies.

TAKING ACTION

We're taking action in all areas of Zespri's sustainability framework.

Over the last year, we've strengthened our investment in the community, and continued our focus on safety and wellbeing and labour practices. Given the rising consumer concern and shifting regulatory environment, over the year we invested in the set-up of our environment pillar and its three priorities of packaging, water and climate change.



We reduced our office waste to landfill in New Zealand by more than 50%.

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In 2020/21, we hosted a range of industry events to spark discussion on both climate action and soil health.

LOOKING AHEAD

We're proud of the progress we're making.

Sustainability will succeed when we can work alongside the industry, balancing the demands of the season and bringing growers, suppliers and customers with us.

COVID-19 has brought many challenges, but also a greater understanding amongst consumers about the importance of sustainability.

We have a healthy, nutritious product grown from the land in communities around the world and are well positioned to respond.

Our work this year on getting the foundations in place will ensure our long-term ability to bring about the change required to achieve our goals, keep our people safe and well-cared for, and to play our part in restoring the health of our planet.

GUIDED BY *Our Environment*

We're striving to address how production, supply and sales impact on and enhance the environment with a focus on packaging, water quality and climate change.

"SIGNIFICANT EFFORT HAS GONE INTO THE DEVELOPMENT OF OUR CLIMATE CHANGE STRATEGY, DEFINING ITS PURPOSE AS GUIDING THE KIWIFRUIT INDUSTRY TO A LOW-CARBON, CLIMATE-RESILIENT FUTURE."

ACCELERATING OUR PACKAGING TRIALS

Over the year, we've made significant strides in understanding our consumer packaging footprint through our investment in life-cycle analysis. From transport packs to consumer packs, we now better understand our environmental impact and have established baselines for our first two targets.

ZESPRI'S PROGRESS ON ITS PACKAGING TARGETS*

Progress on our packaging targets	2020/21
1. Our packaging will be 100% recyclable, reusable or compostable by 2025	86%
2. Any plastic packaging we use will be made from at least 30% recycled plastic by 2025	11%

*Prepared in accordance with Zespri Packaging Targets Basis of Preparation available at zespri.com/sustainability. The figures have been subject to Limited Assurance. The Independent Limited Assurance Report is available at zespri.com/en-NZ/zespri-sustainability.

We've started our first commercial trial of a fibre alternative to our plastic trays, delivering over 200,000 trays to Lidl, one of our key customers in Europe. We are also working with our suppliers to trial better alternatives to fruit labels so we can meet regulatory and consumer expectations, noting the technological challenges involved in this.

We've also worked on a number of trials of consumer pack solutions with our customers, identifying value and understanding how to scale them effectively.

We know reducing the impact of packaging is challenging and we can't do it alone, so we're excited by the willingness of key customers to work with us and over the coming year we will create a platform to work with innovative companies and collaborate on solutions.

We haven't always got it right and a negative reaction to single use plastic packaging in North America reminded us of the importance of meeting expectations of our consumers.

MANAGING OUR WATER RESOURCES

A Water Strategy for the Kiwifruit Industry was developed in 2019, led by New Zealand Kiwifruit Growers Incorporated (NZKGI) and in partnership with Zespri, Māori Kiwifruit Growers Incorporated (MKGI), Horticulture New Zealand (HortNZ) and growers. This set out a number of objectives on how we can best manage water on orchards.

We've continued our multi-year science research and innovation projects to answer key questions on water and nutrients on kiwifruit orchards. We've also worked with central and local government to inform policy to try to ensure the best outcome for growers and our water resources. Over 400 growers have taken part in irrigation and low-nutrient workshops during the year.

Visit **www.nzkgi.org.nz/what-we-do/water/** to find out more about our progress.

PREPARING FOR A CHANGING CLIMATE

Significant effort has gone into the development of our climate change strategy, defining its purpose as guiding the kiwifruit industry to a low-carbon, climate-resilient future.

This strategy focuses on playing our part to reduce emissions, adapting to the impacts of climate change and supporting our industry to respond, including by delivering carbon positive kiwifruit to the world.

REDUCING EMISSIONS

Over the year, Zespri's corporate greenhouse gas emissions have reduced by 90 percent, however we recognise this is largely due to the reduction in global travel as a result of COVID-19.

While we expect some rise in travel emissions once the world starts to return to normal, the increased adoption of remote and virtual working across our global teams provides an opportunity for the business to rethink its approach and make even more progress towards Zespri's target to be carbon-neutral by 2025.

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We are committed to taking action to reduce our impact as an industry.

ZESPRI'S CORPORATE EMISSIONS*

Scope	Emission source	2020/21 (tCO_2-e)	2019/20
Scope 1	Vehicle fuel	**100**	300
Scope 2	Office electricity	**300**	300
Scope 3	Air travel	**300**	7,800
	Staff mileage and taxis	**100**	200
Total Zespri corporate emissions		**800**	8,600

*Prepared in accordance with ISO 14064-1:2018 organisational reporting standard. The figures have been subject to Limited Assurance. The Independent Limited Assurance Report is available at zespri.com/en-NZ/zespri-sustainability.

As an industry, we're working towards being carbon-positive to our retailers by 2030. This year we've expanded the scope of our annual carbon reporting to include the emissions related to shipping. Our shipping emissions make up approximately 43 percent of our industry emissions.

Between FY20 and FY21 our shipping emissions increased by 7%. This is in line with the increase in volume of fruit shipped over the same reporting periods. Our shipping efficiency (measured in kg of CO2-e per kg and tray equivalents of fruit shipped) was the same for both years. Over the coming year, we will work with our shipping partners to develop a pathway for emissions reduction.

ZESPRI'S INDUSTRY SHIPPING EMISSIONS FROM NEW ZEALAND-SOURCED FRUIT*

Industry emissions source	Unit	2020/21	2019/20
Shipping	t CO_2-e	**339,800**	319,000
	kg CO_2-e per kg of fruit shipped	**0.5**	0.5
	kg CO_2-e per Tray Equivalent (TE)	**2.2**	2.2

*Scope 3 emissions, prepared in accordance with ISO 14064-1:2018 organisational reporting standard. The figures have been subject to Limited Assurance. The Independent Limited Assurance Report is available at zespri.com/en-NZ/zespri-sustainability.

Assumes an additional 70% of the total fuel used for Zespri's outbound container voyages to account for the greenhouse gas emissions associated with empty containers being repositioned to NZ for the purposes of exporting kiwifruit.

ADAPTING TO CLIMATE CHANGE

The first step in developing our plan for how we adapt to the impacts of climate change is understanding our risks.

We delivered the first of our sustainability commitments – to report on our climate-related risks and opportunities by August 2021. In accordance with the Task Force on Climate-related Financial Disclosures (TCFD) guidelines, we've undertaken a climate scenario analysis[1] to identify the priority climate-related risks for the kiwifruit industry:

1. Rising average temperatures and more weather variability and extremes;
2. Tightening environmental regulation; and
3. Consumer concerns about unsustainable products.

These occur over the medium to long-term and we need to consider their impact on growing systems, costs, and brand. A full report on our climate risks and opportunities, as well as our strategy to address them is available on our website at **zespri.com/en-NZ/zespri-sustainability**.

GETTING OUR HOUSE IN ORDER

We've also set targets to reduce our office waste around the world.

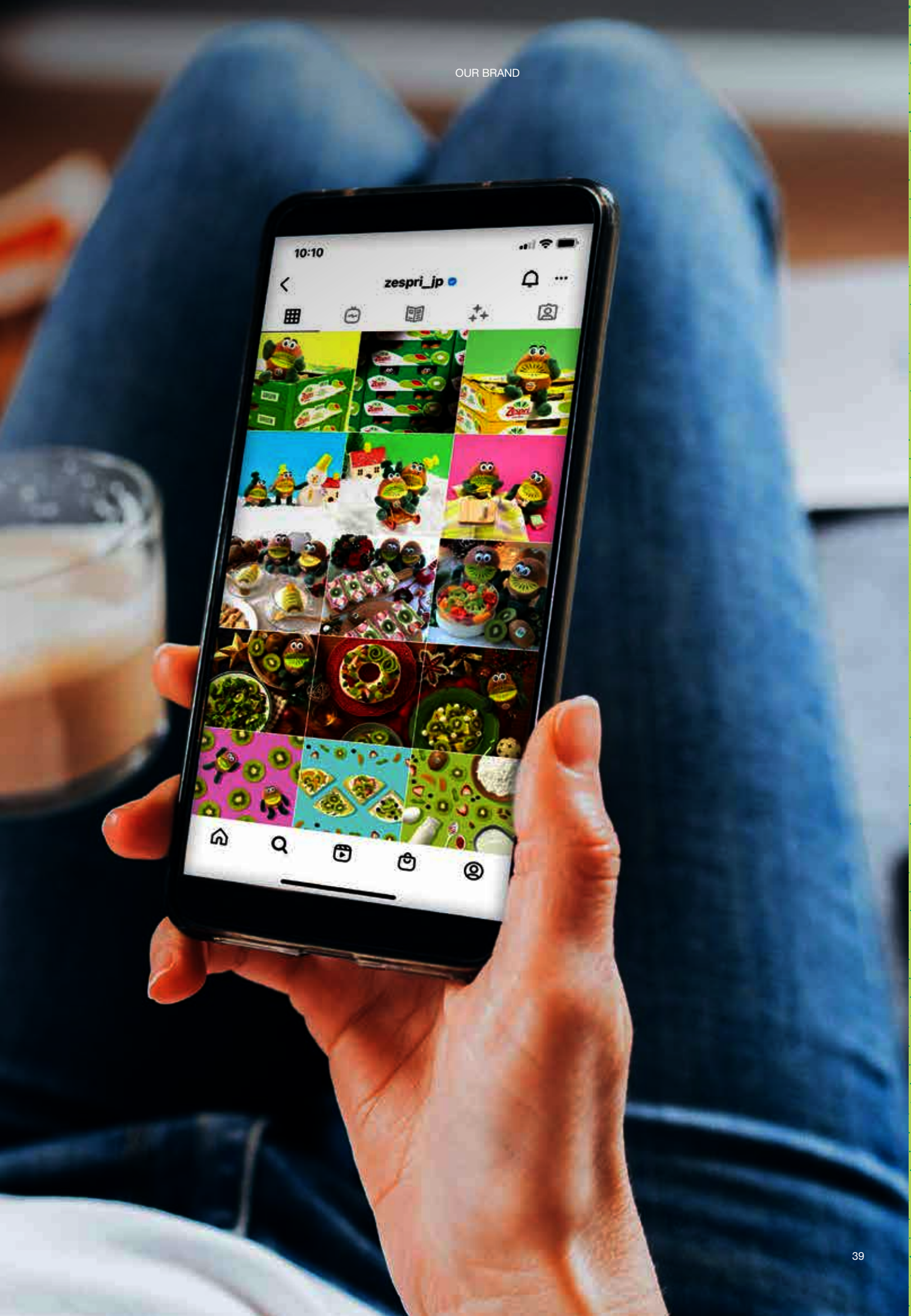
In New Zealand, we've introduced a new waste system as part of our efforts to meet our target of reducing waste to landfill by 50 percent and in less than a year, we've achieved Platinum status under the Tauranga City Council Business Resource Wise Programme.

This new system will be extended across our global offices over the coming year, and we'll also be further developing our plan for eliminating single-use plastics from our offices.

1 Scenario-based climate analysis explores the risks associated with low and high emissions futures.

GUIDED BY *Goodness*

Our new brand better represents Zespri today, reflecting our purpose of helping people, communities and the environment thrive through the goodness of Kiwifruit.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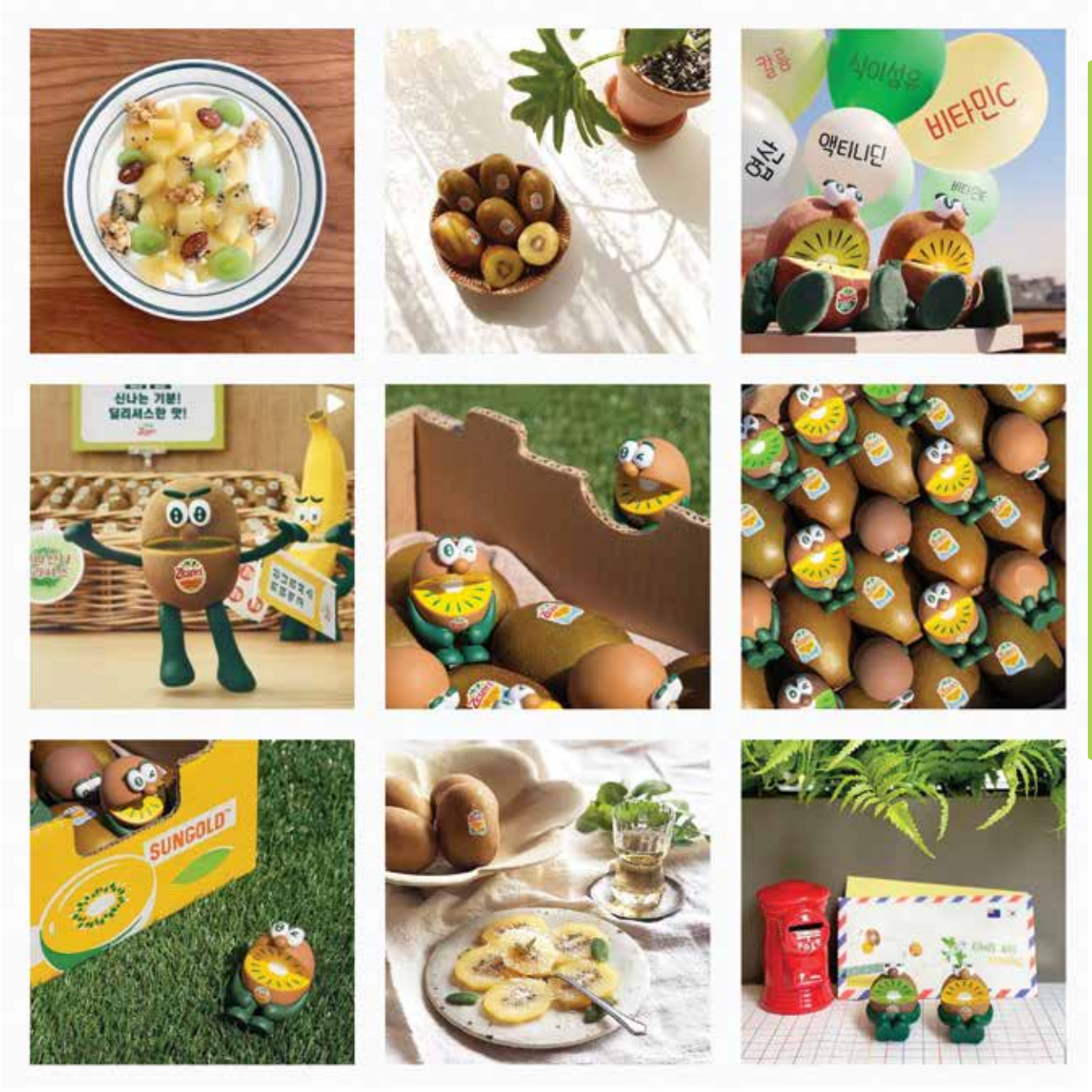


"OUR CAMPAIGNS HAVE HELPED DELIVER OUR BEST-EVER BRAND EQUITY MEASURES, WITH OUR BRAND AWARENESS, BRAND POWER AND BRAND PREMIUM SCORES ALL IMPROVING."

From a brand perspective, 2020 was a landmark year, with the business undertaking its first ever brand refresh. The new brand, first launched at Berlin Fruit Logistica in 2020, is more than just a new logo.

Our new brand better represents Zespri today, reflecting our purpose of helping people, communities and the environment thrive through the goodness of kiwifruit. It captures the burst of flavour consumers get when biting into a Zespri Kiwifruit and it's been developed to deliver improved brand recognisability. It's also been created with a view towards building stronger emotional connections with our consumers, particularly those looking for healthier options.

Our ambition is to unlock greater demand for Zespri and continue our path of becoming a leading global, healthy food brand.

In launching our new brand identity, we were clear that we were fruit on a mission, in a bid to help our consumers *make their healthy irresistible*; and our brand communications would focus on achieving this globally. The investment in the brand was $15 million.

Our much-loved Kiwibrothers campaigns have helped grow our brand awareness.

In August 2020, our Japanese campaign, Aggelicious won an award for outstanding works of digital content. Zespri Head of Marketing APAC Kanako Inomata received the prestigious award on behalf of Zespri.

Despite the significant challenges that COVID-19 posed to everyday business across all our markets, our teams globally continued to drive efficiency and effectiveness with fewer campaigns, bigger impact and better results, with 12 awards achieved in 2020 – including the Grand Prix at ACC Branded Communication for Japan's much-loved Kiwibrothers campaign and an Effies effectiveness award for the US team.

Crucially, all our campaigns have showcased the Zespri brand in a consistent manner, underpinned by our global visual identity and tagline that with Zespri you can *Make your Healthy Irresistible*. Our campaigns have helped deliver our best-ever brand equity measures, with our brand awareness, brand power and brand premium scores all improving.

With added focus on efficiency and effectiveness, our communications and the total number of global campaigns was reduced from 10 in 2019 to six in 2020. 86 percent of our global sales value was covered by just two campaigns – the expansion of Kiwibrothers to cover Japan, Korea, Vietnam and Europe and Vitamin C Goldmine campaign across Greater China.

While the total promotional spend was $167m in 2020/21, a decrease from $171m in 2019/20. The small decline was a result of marketing efficiency coupled with the impacts of COVID-19, which reduced activities like fruit sampling.

Despite international restrictions, our teams proactively and rapidly responded to the new environment with agility. With more time spent online for entertainment and grocery shopping, much of our traditional media focus was diverted to online platforms, engaging with consumers where they were looking for information and inspiration.

We saw a significant shift in consumer's needs, interests and requirements towards nutrition, and specifically boosting their immunity. We also responded through key messages which highlighted the superior Vitamin C content in our kiwifruit.

While COVID-19 and its ongoing impacts continue to be a major focus for us, we are proud of what we have achieved with our new brand.

We have delivered exceptional results against our objectives which include both a long-term focus on building our brand and shorter-term initiatives focused on selling trays, which together will set us up to succeed in the years to come.

In 2020/21 we saw a continued increase in the number of markets where Zespri is the number one fruit brand, based on Kantar Brand Power rankings, up from 2 to 3 in the last year, and similarly in 2020/21 we are in the top 3 fruit brands in 10 of our markets, up from 9 last year.

Similarly, we've seen an increase in the percentage of our key markets in which our brand is strong enough that consumers are willing to pay a premium for our great-tasting fruit. In 2020/21, 80 percent of our key markets had a brand premium over the market average, up from 71 percent last year.

While the fruit category returned to growth across our core markets, Zespri growth also significantly outpaced the total category, up 14 percent in global sales compared to 3 percent for the broader fruit category. The category's growth can certainly be attributed to the global rise in health concerns caused by the global pandemic. While our growth can also be explained by the strong association with health and fitness, our brand has gained standing from significant improvements in a number of health-related image attributes versus last year as a result of our brand campaign.

With a bold new brand, a team unified by our purpose and our values, we're excited that the path ahead will be one with more milestones to celebrate.

ZESPRI *Global Supply*

Our Global Supply Strategy is largely two-fold.

We want to keep Zespri branded fruit on retail shelves for 12 months a year, so that we can hold shelf space and reduce our marketing spend to 'open' markets for New Zealand fruit.

The strategy also brings associated benefits through our ability to leverage our promotional spend and the improved learnings we get from shared research and development activities. This year for example, when COVID-19 hit, our European suppliers were able to share experiences on operating during the pandemic to help the New Zealand industry implement innovative solutions to operating during lockdown.

Zespri currently procures SunGold Kiwifruit through contracted growers and Green fruit through procurement of fruit that meets Zespri standards. Zespri remains focused on ensuring that our ZGS growers and supply partners are meeting the Zespri brand promise.

We've now got over 4,000 hectares of planted SunGold Kiwifruit in the Northern Hemisphere and the partnerships we have with growers and suppliers in Europe are creating sustainable value.

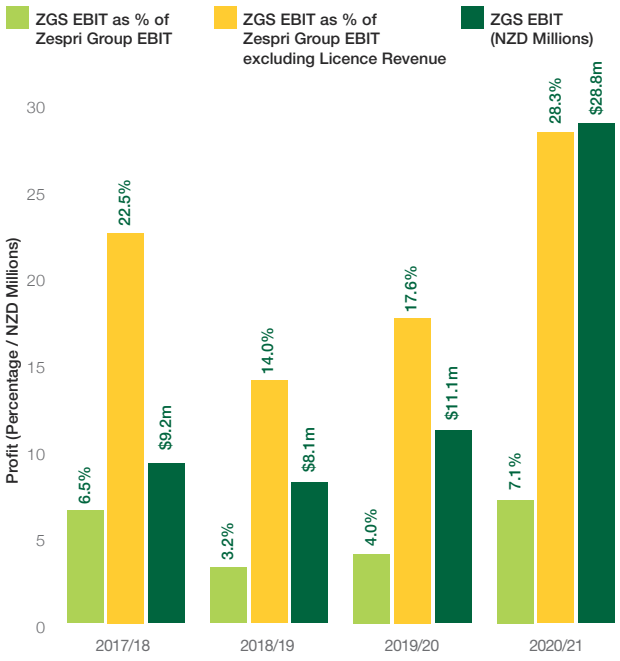
Greece has provided a significant uplift in our Green supply volumes, providing greater certainty in achieving 12-month supply and spreading our supply risk.

In 2020/21, total ZGS revenue reached NZ $473 million, with around 23.5 million trays sold. ZGS accounted for almost 30% of Zespri Group's total EBIT excluding licence revenue.

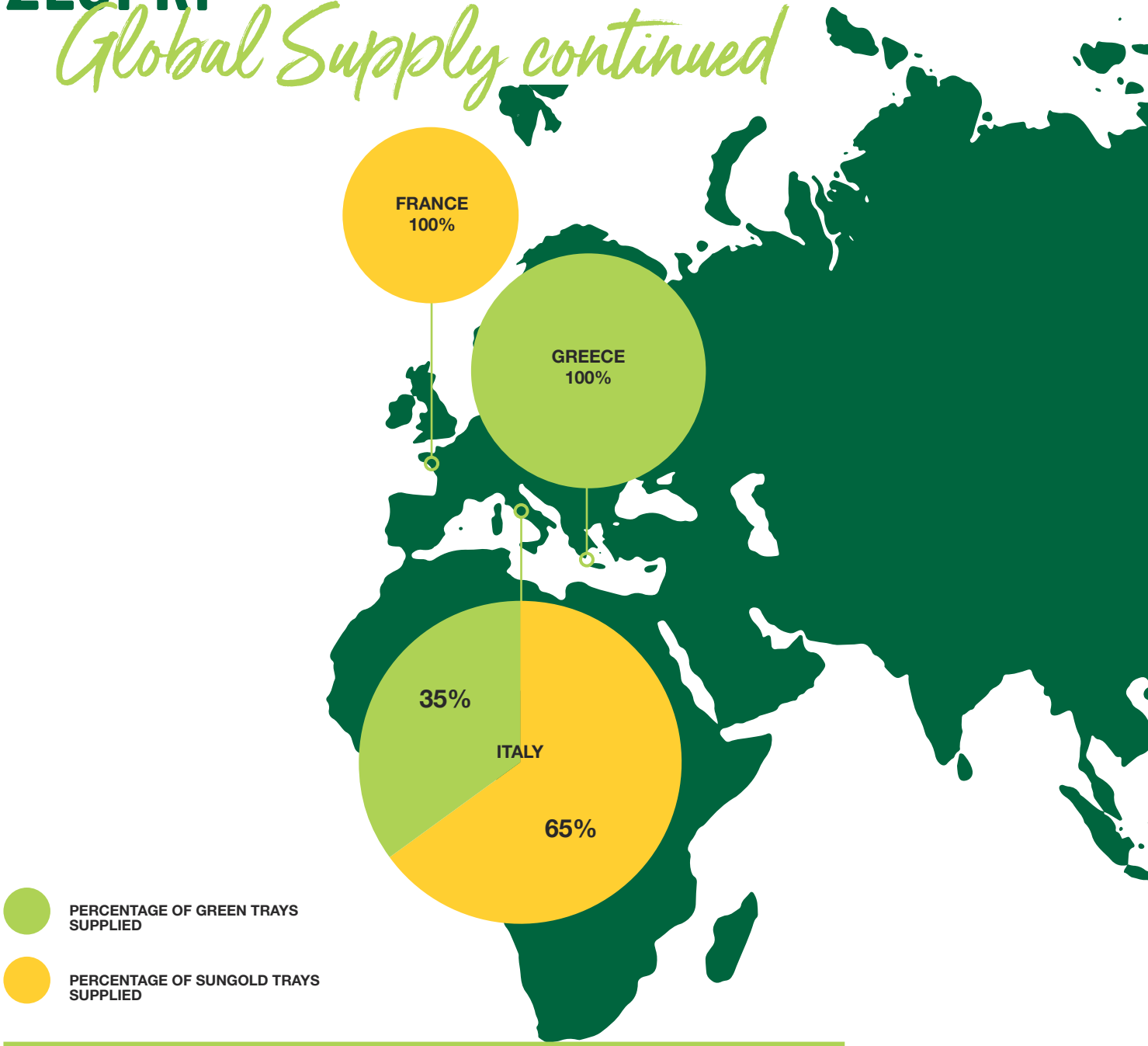
As we continue to work towards a 12-month supply strategy across all our markets to maximise benefits to New Zealand growers, there is a significant opportunity for ZGS to continue to grow.

As we bridge the gap between demand and supply, we expect ZGS to continue to grow the contribution it makes to our corporate profit in the mid- to long-term horizon, acknowledging short term headwinds are expected related to Italian frost impacted volumes and foreign exchange rates.

ZGS CONTRIBUTION TO CORPORATE PROFIT

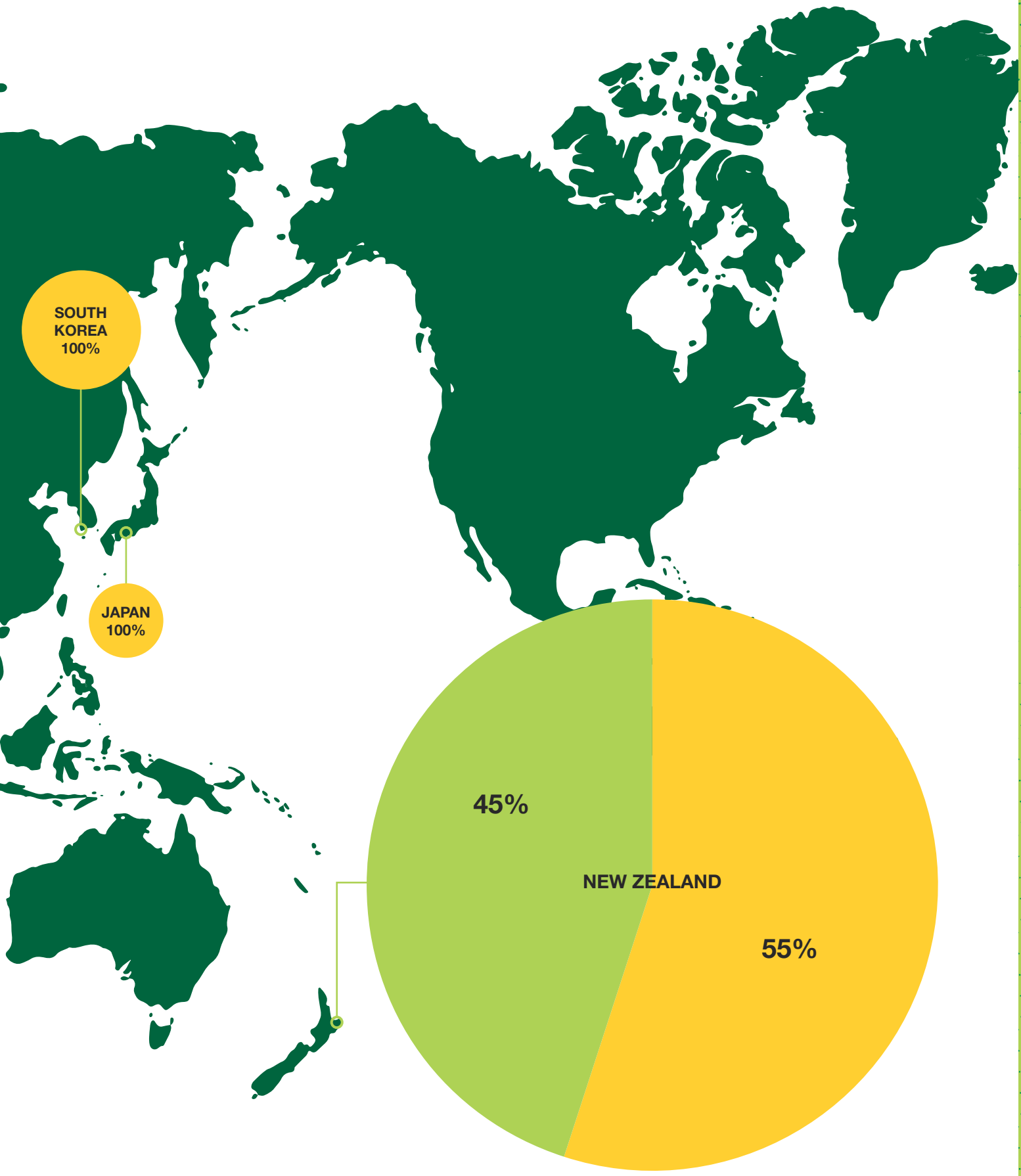


ZESPRI *Global Supply continued*



Region	Trays supplied ('000)	Percentage of supply	Producing hectares[1]	Number of orchards[1]
France	901	0.5%	267	81
Greece	3,027	1.7%	–	–
Italy	18,973	10.4%	2,230	735
Japan	211	0.1%	78	91
South Korea	559	0.3%	100	194
New Zealand	159,615	87.1%	13,334	3,101

[1] *ZGS producing hectares and orchards figures for regions other than New Zealand represent supply of Zespri licenced varieties only. Zespri also has a number of pre-commercial trial sites in the US and Greece.*



GRAPHIC IS NOT TO SCALE

WE VALUE *Innovation*

We're committed to creating healthier, better tasting and more sustainable varieties, and extending Zespri's position as the world's most innovative and successful kiwifruit marketer.

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Zespri was pleased to host the launch of the Agritech Industry Transformation Plan in Tauranga, alongside the agritech community.

Our industry continues to forge a strong reputation for innovation.

We're committed to creating healthier, better tasting and more sustainable varieties, and extending Zespri's position as the world's most innovative and successful kiwifruit exporter.

In 2020/21, our innovation programme accelerated, with a greater focus put on further exploring some of the promising new varieties in our research pipeline and looking at the benefits of our fruit.

Continued investment in this space remains crucial if we are to stay ahead of increasing competition, and to protect our environment which remains critical in generating even more value for our growers and communities.

Interest in the Zespri Red variety among growers, customers and consumers was strong in 2020/21, and we're continuing to invest in research to improve fruit quality and firmness, bringing even more customers to the category. Indications from sales trials in China, Singapore and Japan are that Zespri Red is bringing new and younger consumers into the category. Zespri Red has also been selling at a premium over Zespri SunGold Kiwifruit in all trial markets.

Following years of extensive research by Zespri and our research partners, along with rigorous trials through orchard, supply chain, and market phases, in 2022 Zespri Red will move from a trial environment to the onset of commercial orchard production from the first of the 150 hectares licence that were released back in 2020. The Zespri Red concept has been in development for more than 20 years, with the original Red19 seedling first planted at the Kerikeri Research Centre in 2007.

Last year we explored research on harvesting Zespri SunGold Kiwifruit earlier and we're considering new possibilities for the Taste Zespri Programme. Our knowledge on how to utilise Controlled Atmosphere (CA) storage to extend the packing window of SunGold Kiwifruit as volumes increase, without compromising fruit quality outcomes, has been expanded. This is through research trials and Post-harvest Innovation Fund trials (Zespri partnering with packhouses), which has built confidence in this approach. In 2020/21, 2.4 million trays of Zespri Green went through CA across the industry (up from 0.5 million trays in 2019, and 0.02 million trays in 2018).

"INTEREST IN THE NEW VARIETY IS INCREDIBLY HIGH AND WE'RE ENCOURAGED BY THE NEW CONSUMERS IT IS BRINGING TO THE CATEGORY."

The joint Zespri and Plant & Food Research (PFR) kiwifruit new cultivar development programme is the world's largest kiwifruit breeding programme, with Zespri investing more than $19 million into new cultivar development and commercialisation for the 2020/21 financial year.

We've increased our efforts in immunity research benefits of Zespri SunGold Kiwifruit with two projects underway assessing the beneficial impacts Zespri SunGold Kiwifruit have on immune endpoints. They are both human clinical studies that will measure how inclusion of two Vitamin C-rich SunGold Kiwifruit to our diet per day impacts our immune system.

We also announced our proposal to create a new dedicated Kiwifruit Breeding Centre in partnership with PFR. This is an exciting step forward for our industry and a natural evolution of the successful 30-year relationship between Zespri and PFR which has delivered great new varieties such as Hort16A, Zespri SunGold Kiwifruit and Zespri Red.

In the past year, the Innovation function of our business has been aligned under the leadership and expertise of Chief Growth Officer Jiunn Shih, whose role now covers both the marketing and innovation portfolios. This was a significant move, helping us get closer to the needs of our consumers.

We have made significant investment in a pan-industry, government funded Primary Growth Partnership programme called 'A Lighter Touch'. The objective of this programme is to support agroecological crop protection for the New Zealand horticultural sector which will be a step change in pest management, balancing improved productivity with a lighter touch on the environment. This is well aligned with our sustainability goals for climate resilience and guardianship of the land for future generations.

Further progress has also been made in the Digital Crop Estimation (DCE) programme with Innovation support to add a fruit sizing component to the crop counting model.

As we move forward into the future, our innovation programme continues to remain at the centre of our efforts to create ongoing value into the future for our growers, customers and consumers worldwide.

VALUE *Into the Future*

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The Horizon Programme will simplify and standardise our systems, increase automation and enable better decisions.

The industry's outlook for growth underpins the importance of investment in Zespri's business processes and systems. Many of our existing processes and systems were designed 20 years ago, supporting the needs of a much smaller industry.

During 2020/21 we commenced an ambitious programme of work called Horizon, which will transform how we operate in Zespri. Its scope is to modernise, standardise and digitalise our systems and processes in finance, grower enablement, supply chain, sales and operations planning. As well as mitigating the risk inherent in legacy systems, the programme will enable us to be more agile and efficient in delivering kiwifruit to our customers and sustaining strong returns to growers.

We've made good progress, having selected Deloitte as our design and implementation partner, leading a New Zealand-based consortium that combines expertise from Zag and Sysdoc. We have completed high-level design and detailed design for our finance and core supply chain processes and systems.

Over the next two to three years, the Horizon Programme will take a phased approach to a significant scope, ensuring that we manage programme delivery well and mitigate potential impacts on the business. Each phase of the programme requires a detailed business case and will be funded within the limits of our current funding model.

This work is critical to setting the business up for future growth. The first phase of the programme, focused on finance and core supply chain, will start to deliver increased visibility and synchronisation across the value chain, with completion targeted in 2022.

Running parallel to this work is the scoping stage for the second phase of the programme which looks at grower enablement, quality management and integrated business planning. In grower enablement, this means upgrading how we collect and provide information through platforms such as Canopy and Spray Diary.

The benefits of the investment are multiple. In finance, for example, it will deliver integrated systems that provide the foundation for value-adding insight from our financial data. Another example is in the supply chain, where Horizon will increase visibility into our data and improve global management of performance. Overall, it is about greater integration versus siloed information, more automation versus transactional tasks, scaleability and flexibility in our systems versus aging legacy systems.

Ultimately, the Horizon Programme will help define the future of Zespri. It will have a considerable impact on the industry as we set ourselves up for sustainable growth for decades to come.

→

This work is critical to setting up the business for future growth.

ZESPRI IN *China*

"WE HAVE FORGED STRONG RELATIONSHIPS OVER MANY YEARS IN CHINA WITH OUR COMMERCIAL PARTNERS AND CONSUMERS, AND WE REMAIN ABSOLUTELY COMMITTED TO THIS IMPORTANT MARKET."

We must continue to adapt as China changes. This includes taking into account our history, our investment and our relationships as we consider our approach to resolving the ongoing challenge we face in addressing unauthorised Gold3 plantings.

Growers have been deeply engaged on this issue, joining roadshows, grower meetings and online events and Zespri has appreciated the opportunity to discuss the issue, the risks involved and possible solutions such as the commercial trial which growers considered as part of the Producer Vote.

While more than 70 percent of growers and 68 percent by weight supported Resolution 1 to carry out a one-season orchard monitoring, procurement and sales and marketing trial in China, this fell short of the 75 percent required under the Kiwifruit Export Regulations meaning the commercial sales trial will not proceed. A total of 64.5 percent supported the second resolution to use the Zespri brand label as part of the sales trial to understand consumer response.

The strength of our industry is that it is built on consensus, on debate, and on coming together to find solutions and innovate and grow. This ethos has served us well for the past few decades and will enable the industry to continue to thrive in the years ahead.

Our focus now is on continuing with our core business and gathering information to discuss possible next steps with growers. This will include continuing with our R&D, progressing our efforts to understand the local kiwifruit production environment and engaging further in China to better understand the unauthorised plantings, their potential impact and possible ways forward.

We have forged strong relationships over many years in China with our commercial partners and consumers, and we remain absolutely committed to this important market. Zespri will continue to keep working to position our New Zealand-sourced fruit as a premium offering to our Chinese consumers and building our brand in China, as well pushing for greater IP protection across a range of channels.

ZESPRI *Board*

Zespri's eight Board Members bring a wide range of experience, from international marketing and corporate governance to industry knowledge and financial expertise.

FROM RIGHT TO LEFT

BRUCE CAMERON | CHAIRMAN

- ZGL/ZIL Grower Director since August 2010
- Zespri Chairman since February 2019

JONATHAN MASON | DIRECTOR

- ZGL/ZIL Independent Director since May 2013
- Chair of the Audit and Risk Management Committee
- Member of the People and Culture Committee

TERESA CIPRIAN | DIRECTOR

- ZGL/ZIL Independent Director since November 2014
- Member of the People and Culture Committee
- Member of the Board Innovation Subcommittee

PETER SPRINGFORD | DIRECTOR

- ZGL/ZIL Independent Director since May 2017
- Chair of the China Advisory Board

TONY HAWKEN | DIRECTOR

- ZGL/ZIL Grower Director since July 2018
- Chair of the Industry Advisory Council
- Member of the Audit and Risk Management Committee
- Member of the Board Innovation Subcommittee

CRAIG THOMPSON | DIRECTOR

- ZGL/ZIL Grower Director since July 2019
- Chair of the Zespri Global Supply Advisory Board
- Member of People and Culture Committee
- Zespri Board appointed Director of Kiwifruit Vine Health (KVH)

NATHAN FLOWERDAY | DIRECTOR

- ZGL/ZIL Grower Director since July 2012
- Chair of the Board Innovation Subcommittee
- Member of the Audit and Risk Management Committee
- Member of the Industry Advisory Council

PAUL JONES | DEPUTY CHAIR

- ZGL/ZIL Grower Director since July 2014
- Zespri Deputy Chair since February 2019
- Chair of the People and Culture Committee
- Member of the Industry Advisory Council
- Member of the Board Innovation Subcommittee
- Member of Audit and Risk Management Committee

ZESPRI Executive Team

TRACY SHERLOCK

CHIEF EXECUTIVE ASSISTANT

Tracy joined Zespri in April 2010 as the Chief Executive Assistant to the CEO and Board of Directors, and is responsible for managing the CEO's Office.

CAROL WARD

CHIEF GROWER, INDUSTRY AND SUSTAINABILITY OFFICER

Carol has impressive knowledge and experience in marketing, innovation, sustainability, global supply chain, stakeholder and grower engagement. She applies her broad experience into building Zespri's success for the future through grower engagement, and driving the sustainability strategy. Carol is very motivated about the opportunity we have in New Zealand to provide the world with healthy food and sustainable products and support our thriving primary sector with its deep respect for our Tangata Whenua and Te Taiao.

ALASTAIR HULBERT

CHIEF GLOBAL SUPPLY OFFICER

Alastair brings a huge amount of experience and knowledge into Zespri, with over 20 years of leadership in the fresh produce sector. His most recent position has been Chief Operating Officer in the US for Total Produce, which is one of the world's largest fresh produce companies.

DAN MATHIESON

CHIEF EXECUTIVE OFFICER

Dan has been with Zespri for 19 seasons, holding sales and marketing leadership roles across the company's major markets. His focus continues to be on developing outstanding teams that are committed to delivering sustainable value for growers, consumers and all stakeholders that support healthy growth of Zespri's ecosystem. Dan is a Board Member of the Produce Marketing Association (PMA).

RACHEL DEPREE

EXECUTIVE OFFICER SUSTAINABILITY

Rachel leads the global sustainability function. She is tasked with pan-industry leadership, and is focused on creating long-term positive change in areas of nutrition, packaging, water, climate change and labour.

RICHARD HOPKINS

CHIEF FINANCIAL OFFICER

Richard is responsible for Finance, Corporate Performance, Compliance and Legal Services. Prior to Zespri, he was CFO at Ballance Agri-Nutrients. Richard has a Degree in Chemistry from Warwick University and a MBA from Leeds University.

EDITH SYKES

CHIEF PEOPLE OFFICER

Edith brings a passion for organisations being more successful through a people-centric approach, leading best practice, cultural excellence and capability development – attributes that relate strongly to our values around people and performance.

LINDA MILLS

CHIEF MARKET PERFORMANCE OFFICER

Linda is responsible for the market allocation and optimisation function, as well as sales and operations planning. Linda has worked in the industry for over 15 years. She has a Master of Science Degree from the University of Auckland and a MBA from Southern Cross University.

DAVID SCULLIN

CHIEF DIGITAL OFFICER

David leads our Digital Services team which is at the heart of our goal of creating a digital business – delivering a personalised service for our growers and customers, real-time data to drive decision-making, and more simplified business processes.

ZESPRI Executive Team continued

JIUNN SHIH

CHIEF GROWTH OFFICER

Jiunn is responsible for leading Zespri's Growth function, which includes corporate strategy, innovation, global sales and our marketing centres of excellence. Prior to joining Zespri, Jiunn built a solid sales and marketing track record in senior roles at Unilever and L'Oreal.

ICHIRO ANZAI

EXECUTIVE OFFICER ASIA PACIFIC

Ichiro is responsible for driving business across Asia Pacific, including Japan, Korea and Australia. He first joined Zespri Japan in 2014 as a Country Manager. Ichiro has also held senior sales and marketing roles across a number of top FMCG organisations including Unilever and McDonald's.

MICHAEL JIANG

EXECUTIVE OFFICER GREATER CHINA

Michael is responsible for driving business in mainland China, Hong Kong and Taiwan. He has more than 20 years of marketing and sales experience, and enjoys an outstanding reputation in the FMCG industry. Michael is passionate about new channel development and integrated management.

GIORGIO COMINO

EXECUTIVE OFFICER EUROPE AND NORTH AMERICA

Giorgio's excellent leadership and communication skills are helping define the future growth strategy in Europe and North America. He brings 20 years of commercial experience and is passionate about sales and marketing. Prior to joining Zespri, Giorgio was Europe Sales and Trade Marketing Vice President in the Fabric Care Business Unit based in Switzerland.

NICK KIRTON

EXECUTIVE OFFICER NORTHERN HEMISPHERE SUPPLY

Nick was appointed Executive Officer Northern Hemisphere Supply in March 2021. He first joined Zespri in 2014, and has held a number of roles including Asia Regional Manager, Programme Director – China Supply and External Relations Manager.

CORPORATE *Governance*

Zespri is committed to providing a sustainable and safe business environment and adhering to the regulatory and legislative frameworks applicable to our business. We have clear written procedures and policies in place to ensure we meet and maintain a high standard of integrity, and a robust corporate governance framework.

ETHICAL STANDARDS

At Zespri, we are committed to demonstrating integrity and maintaining a high standard of business ethics. The development and maintenance of corporate governance policies and processes are integral to ensuring we are always achieving these high ethical standards. There are clear expectations on all Directors, executives and employees who represent and act for Zespri, to do so with integrity and in compliance with applicable law and company policy. Zespri's Code of Conduct and Directors Manual clearly articulate these expectations, together with training and presentations on a range of ethical and compliance issues throughout the Company.

Conflicts of interest: With five industry Directors on the Board, careful management of conflicts of interest is required. Zespri has comprehensive policies and practices in place to address existing and potential Board conflicts, which meet, and in some cases exceed, the requirements of the Companies Act 1993. All Directors are required to declare any actual or potential conflict of interest as soon as it arises, and Directors with relevant conflicts excuse themselves from meetings while issues which may present a significant conflict are discussed and decided. Where a conflict is considered unmanageable, a Director may have to choose whether to continue as a Zespri Director or pursue their other business interests. A Conflict of Interest Policy and associated record is also in place for employees.

COMPLIANCE

Zespri has policies and procedures in place that demonstrate our commitment to legal compliance including, among others, policies regarding gifts, anti-corruption, bribery, privacy and anti-competitive behaviour. Zespri staff are regularly trained across these policies to ensure communication and education of the latest compliance requirements. These policies are underpinned by audits and investigations conducted by an internal audit function, with exceptions being reported to the Audit and Risk Management Committee. Zespri has a dedicated and anonymous Speak Up line for anyone to report unethical or illegal behaviour, which enables the identification and proactive investigation of alleged misconduct. Zespri's expectations of compliant behaviour are also communicated to our customers and suppliers and we monitor such compliance through due diligence, and audits, on a risk basis, of compliance in target areas such as duty and customs declarations.

Confidentiality and privacy: Comprehensive policies support Zespri Directors and employees to ensure understanding of their legal obligations in the areas of confidentiality and privacy. Policies and procedures are periodically reviewed to ensure best practice, and training is provided to supplement understanding and adherence to policy. Consistent with the high degree of industry engagement, Zespri's Constitution also contains provisions pertaining to confidentiality and shareholder democracy. As a global business, Zespri is subject to extensive privacy legislation from many jurisdictions and continues to refine its processes to reflect changes associated with continually evolving international data privacy regulations and the collection, handling and processing of personal information as well as prioritising cybersecurity initiatives to bolster technical measures to support protection of personal and commercially sensitive information.

BOARD COMPOSITION AND PERFORMANCE

The Zespri Board comprises eight members. As required by the Zespri Constitution, five Directors are elected from the kiwifruit industry, with three Independent Directors. This combination of members gives Zespri the benefit of a Board with a wide range of experience across key areas. Independent Directors are recommended by the Board for election by shareholders in line with the skills desired for Zespri's future strategic direction, through a formal independent recruitment and assessment process. The Board has adopted processes to consider the skill sets required for the appropriate governance of Zespri, the contribution of Independent Directors, and the desirability of rotation. The Chair is elected each year following the Annual Meeting, providing an opportunity for managing succession as required. The Board provides strategic direction drawing

upon Directors' extensive collective knowledge, which includes expertise in the kiwifruit industry, international business, agribusiness, marketing and finance. Induction processes are in place for new Directors, as well as for each sub-committee when sub-committee memberships change. As part of a continuous improvement plan, the Board reviews its performance on an ongoing basis, and engages in director development activities at an individual level, through external presenters who support the Board on topical issues, and stakeholder engagement with, and facility visits to, industry and other stakeholders. In normal circumstances, the Board undertakes a series of market visits each year to better understand markets, assess execution against strategy, and engage with offshore-based staff to understand local capability, challenges and Zespri culture. These visits did not occur this year due to COVID-19 travel restrictions, and thus the Board increased online meetings with market-based teams to ensure ongoing engagement with key stakeholders and to maintain awareness of current conditions.

The Board has formally delegated decision-making to management through a comprehensive Global Delegated Authorities Manual, which sets out what decisions are reserved for the Board and committees, as well as a stepped qualitative and quantitative cascade of approval processes at different levels of management. Further policies pertaining to decisions made in the daily management of the business are also in place.

BOARD COMMITTEES

Board committees are convened in certain key areas to increase effectiveness, and include the Audit and Risk Management Committee, People and Culture Committee, and Board Innovation Sub-committee. Two Advisory Boards were formed to support the Board in relation to the China market and ZGS. The China Advisory Board is chaired by Peter Springford, and consists of independent members including Sir John Key, Dr. Anning Wei, David Mahon, Peter McBride and Cindy Lau. The ZGS Advisory Board is chaired by Craig Thompson, with independent members Kevin Murphy and Peter McBride providing additional insight.

Audit and Risk Management Committee: The Audit and Risk Management Committee reviews risk management strategies, internal controls and compliance processes with a view to monitoring Zespri's overall risk. It also reviews the Financial Statements with the assistance of management and the Company's external auditor, KPMG, and supports and oversees management in its evaluation of key accounting judgements. Jonathan Mason currently chairs the committee.

People and Culture Committee: The People and Culture Committee attends to strategic employment matters including general remuneration and incentive policy, employee engagement, organisational development strategy and the appointment and remuneration of senior executives. Paul Jones currently chairs the committee.

Board Innovation Sub-committee: Innovation is a key enabler of Zespri's business strategy, requiring innovation programmes to be aligned to Zespri's long-term strategic objectives. The Board Innovation Sub-committee reviews and endorses Zespri's strategy for science and innovation and applies appropriate governance principles to optimise innovation performance, challenge and guide future innovation vision and work with management to mitigate innovation risk. Nathan Flowerday currently chairs the committee.

Each board committee and advisory board has terms of reference articulating its scope of activity and authority, and all Directors receive copies of all papers and minutes. A verbal update on committee/advisory board meetings is also provided at each Board meeting, providing opportunity for discussion. A table displaying meeting attendance by each Director is provided on page 97.

The Board also convenes smaller informal committees and steering groups from time to time to address particular issues as the need arises. Directors also represent Zespri in industry bodies such as Kiwifruit Vine Health Incorporated (KVH) and the Industry Advisory Council (IAC) which is currently chaired by Zespri Director Tony Hawken.

REPORTING AND DISCLOSURE

Zespri is subject to reporting and disclosure obligations under the Companies Act 1993, Financial Markets Conduct Act 2013, and other relevant legislation, which governs the duties of Directors including, but not limited to, financial reporting, securities, health and safety, environment and employment. The Board works with management to ensure the Financial Statements are accurate and complete, including adoption of accounting policies and controls that mitigate against incorrect information or omissions. At the end of each financial year, the Chief Financial Officer and Chief Executive Officer ensure Zespri complies with accounting standards and controls.

In addition to normal corporate requirements of reporting and disclosure, the Kiwifruit Export Regulations 1999 (the Regulations) require Zespri to publicly disclose Financial Statements in accordance with the Kiwifruit Export Information Disclosure Handbook. The required disclosures are included within the New Zealand Industry Performance Section of the Annual Report, or within the Financial Statements of the Annual Report. Further disclosures are contained in the special purpose Financial Statements, including the Audit Report from KPMG.

Zespri seeks to communicate proactively and transparently to its shareholders and other stakeholders, in a manner largely consistent with the continuous disclosure obligations on public companies. This communication not only extends to updates regarding current matters, but also to future plans such as five-year plans, outlook documents and regular roadshows, newsletters and updates.

REMUNERATION

The maximum amount of remuneration payable to Directors is set by shareholders as provided for in Zespri's Constitution. This is done on the recommendation of the Director Remuneration Committee, which has regard to independent benchmarking information provided by organisations such as the Institute of Directors. The details of remuneration paid to Directors during the financial year are available on page 98. The committee also considers governance succession within the New Zealand kiwifruit industry as a whole, and works with the Board in respect of industry initiatives such as the Industry Governance Development Programme. The committee comprises three elected shareholder members (presently John Cook, Andre Hickson and Michelle Dyer) and one independent member appointed by the Board (Graeme Milne). The committee's 2020/21 report is published within the Annual Meeting booklet.

SAFETY AND WELLBEING

Zespri recognises that its most important asset is its people. This means that ensuring the safety and wellbeing of both Zespri's employees and other workers is critical. The Company has a Board Charter on Health and Safety that is reviewed as required by legislative or organisational requirements. The Board looks to fulfil its obligations by ensuring appropriate policies and procedures are adopted and implemented by fostering a strong culture of care for people, reviewing and monitoring the identification, reporting and management of critical risks. Directors receive targeted updates regarding health and safety matters at each Board meeting, and Zespri works with industry stakeholders to ensure the provision of safe workplaces. Directors also conduct health and safety visits to different working environments of Zespri.

During the financial year, the commitments made by Zespri pursuant to the enforceable undertaking entered into following a 2016 orchard fatality were confirmed by WorkSafe to have been fully satisfied and discharged. Initiatives associated with the enforceable undertaking continue to provide a critical platform to promote industry education, research and communication around health and safety.

As with all global businesses, over the past year many Zespri people have been subject to extended periods of lockdowns, difficult working conditions and potential direct health impacts through infection of Zespri people or their family members. The Board is exceptionally proud of Zespri's global workforce and its ability to deliver the outcomes contained in the Financial Statements in the face of these challenges.

Throughout the year, the Board and Zespri's management team maintained strong focus on the wellbeing of our people and those of our wider stakeholders, particularly in the area of mental health, resilience, and creating a network of support to ensure that all Zespri people were able to maintain their wellbeing through the personal, team and business environment challenges. Among other things, this included the introduction of Zespri's BOOST programme, bringing together our Five Ways of Wellbeing — Give, Be Active, Take Notice, Connect and Learn.

RISK MANAGEMENT

Risk management forms an integral part of the Board's activities, with a view to ensuring that Zespri and its stakeholders are not exposed to undue risk as a result of business operations. Zespri has a comprehensive Risk Management Policy based on AS/NZS ISO 31000:2009 and the risk matrix developed by management and reviewed by the Board, together with processes to monitor and assess such risks on a continual basis throughout the year. The Board maintains an issue watch register, which identifies and updates the Board regularly on current risk items in the business. The Audit and Risk Management Committee and Board receive focused updates on internal audit matters, together with regular updates on risk areas such as health and safety, foreign exchange, cyber security and information systems stability. Sustainability has also been added to the Audit and Risk Management Committee Terms of Reference. This enables strong governance and oversight of key sustainability risks, including climate change, water, and packaging.

The Board is committed to safeguarding the reputation and business of Zespri against instances of non-compliance by Zespri or our business partners. This initiative requires continuous improvement and monitoring of internal processes, as well as a sound understanding of the legal obligations throughout the distribution chain. Taking these steps enables Zespri to mitigate opportunities for unlawful conduct by third parties, which may affect Zespri's business or operations.

From time-to-time, Zespri is involved in commercial disputes relating to our business. We typically seek to resolve such disputes through commercial discussions or alternative dispute resolution processes such as mediation or arbitration. Where disputes are anticipated to have a quantifiable financial exposure or progress to formal proceedings, provisions are made for the costs of defending or pursuing such claims.

The Board works to ensure management has appropriate governance and discipline regarding the procurement of financially or strategically important suppliers. This includes competitive tendering or benchmarking, where appropriate, particularly around the renewal or expansion of high-value and long-term contracts or relationships. A strong focus is placed on areas of significant expenditure such as professional services, marketing and logistics, with higher value and longer-term contracts over defined thresholds requiring approval by the Board as part of the Global Delegated Authorities Manual. Particular strategic emphasis is placed on building strong supplier relationships that drive value and support the key initiatives of the business.

Zespri's crisis management team continue to work closely with the Audit and Risk Management Committee and the Board to ensure that appropriate and timely action is taken to manage risk associated with disruption and business impacts from COVID-19.

AUDITORS

The Board appoints the auditors for Zespri on an annual basis following approval from shareholders. KPMG have been Zespri's auditors since 2011 and operate a strict rotation of audit partners. This rotation means that Zespri's audit partner will change in 2022 to Laura Youdan. The Board extends its thanks and appreciation to Ian Proudfoot, whose extensive knowledge of global agribusiness has been immensely valuable over his tenure as Zespri's audit partner.

Controls are in place to restrict what non-audit work may be provided by the auditor. In the 2020/21 financial year, non-audit work and fees paid to KPMG are shown on page 77. Representatives of the auditors attend meetings of the Audit and Risk Management Committee periodically to discuss the audit plans and outcomes, and attend the Board meetings if their input is required on particular matters or queries. The Board has not identified any issues that have compromised auditor independence.

SHAREHOLDER RELATIONS

Zespri shares are listed on the USX share trading platform, which allows for a higher degree of transparency of information regarding share trading. USX is a Financial Product Market operating under an exemption from subpart 7 of Part 5 of the Financial Markets Conduct Act 2013. Craigs Investment Partners has been acting as market maker for Zespri shares since November 2016, which has led to increased market liquidity and a greater degree of share price stability.

Zespri has extensive approval and disclosure policies for trading in Zespri shares by its Directors and employees. These policies are largely consistent with the obligations for Director trading adopted by public companies, including prior notice of intention to trade, approval by an Independent Director and transparency of Director trading activities through regular reporting to shareholders. The policies also impose trading halts when any material information is known to Directors and employees. The Board considers at the end of each meeting whether any price-sensitive information should further preclude Directors or employees from trading Zespri shares. Details of share trading by Directors as well as their relevant interests are published on Zespri's corporate website (**www.zespri.com**) and on the grower website, the Canopy (**https://canopy.zespri.com**). The Board endeavours to operate a highly transparent disclosure programme to ensure that the market is as informed as possible, including via a Chairman's email following each Board meeting, virtual meetings, grower roadshows, regular updates of the USX platform (adhering to a market sensitive information policy), and publication of strategic information documents, including a five-year outlook document.

The Board is focused on ensuring that shareholders can engage fully with Zespri and its Board. As part of its shareholder meetings, Zespri offers shareholders hybrid meeting options including online streaming and voting to ensure that all shareholders have the best ability to participate fully in the meetings and decisions arising from them.

CLIMATE CHANGE AND SUSTAINABILITY

Since announcing its sustainability framework in February 2020, work has continued to embed our sustainability into Zespri's operations. At a Board level, this included formally agreeing Board level responsibility for sustainability. A Kiwifruit Industry Sustainability Position statement[1] has been developed that sets out Zespri's commitment to sustainability and demonstrates how appropriate management focus is being given to climate change and sustainability at Zespri and through the industry (see pages 36–37).

KIWIFRUIT INDUSTRY REGULATOR

Kiwifruit New Zealand (KNZ) is the independent statutory regulator for the kiwifruit industry. The regulatory framework is an important part of our industry structure which recognises the grower support for co-ordinated research and a unified brand in our export markets.

OTHER STAKEHOLDER INTERESTS

Kiwifruit industry stakeholder engagement: The kiwifruit industry is a uniquely integrated sector that requires significant co-operation between all industry participants; growers, post-harvest operators, Zespri, and industry bodies, such as New Zealand Kiwifruit Growers Incorporated (NZKGI) and KVH, together with our regulator KNZ and local and national Government. The Board is committed to working with all relevant stakeholders, within the regulatory framework, to achieve the best possible outcomes for shareholders, growers and the industry.

Labour compliance: Zespri seeks to ensure that all employees and workers within its supply chain are treated fairly and in accordance with applicable labour laws. The Board has committed to working with industry to protect workers' rights within the industry, including through adoption of the GRASP module of the Global GAP standard, focused on social responsibility. During the financial year, Zespri continued to work closely with industry and government stakeholders to support enforcement of labour laws.

Supply chain integrity: Zespri has global customer and supplier codes of conduct, which set expectations for supply chain participants, targeting a range of issues including legal and financial compliance, food safety and quality standards, fair competition, anti-bribery, anti-corruption, fair employment practices and labour standards, health and safety, and care for the environment. In addition, Zespri has published on its website, specific supplier policies covering anti-bribery and anti-corruption, conflicts of interest, gifts, benefits and hospitality, information system devices and security and privacy.

1 https://www.zespri.com/content/dam/zespri/nz/corporate-information/Zespri_Sustainability_Positioning_Statement_FINAL.pdf

GUIDED BY *Results*

Our results reflect the continued strong demand for Zespri Kiwifruit around the world, boosted by the industry's hard work and investment to increase demand and supply.

FINANCIAL STATEMENTS & Statutory Information

FOR THE YEAR ENDED 31 MARCH 2021

Your Directors take pleasure in presenting the Financial Statements of the Company and its subsidiaries (collectively Zespri Group) and Statutory Information for the year ended 31 March 2021.

For and on behalf of the Directors.

B L Cameron
Chairman

J P Mason
Director

KPMG

Independent Auditor's Report

To the shareholders of Zespri Group Limited

Report on the audit of the consolidated financial statements

Opinion

In our opinion, the accompanying consolidated financial statements of Zespri Group Limited (the 'Company') and its subsidiaries (the 'Group') on pages 71 to 95

i. Present fairly in all material respects the Group's financial position as at 31 March 2021 and its financial performance and cash flows for the year ended on that date; and

ii. Comply with New Zealand Equivalents to International Financial Reporting Standards and International Financial Reporting Standards.

We have audited the accompanying consolidated financial statements which comprise:

- The consolidated balance sheet as at 31 March 2021;
- The consolidated income statement, statements of comprehensive income, changes in equity and cash flows for the year then ended; and
- Notes, including a summary of significant accounting policies and other explanatory information.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (New Zealand) ('ISAs (NZ)'). We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

We are independent of the Group in accordance with Professional and Ethical Standard 1 International Code of Ethics for Assurance Practitioners (Including International Independence Standards) (New Zealand) issued by the New Zealand Auditing and Assurance Standards Board and the International Ethics Standards Board for Accountants' International Code of Ethics for Professional Accountants (including International Independence Standards) ('IESBA Code'), and we have fulfilled our other ethical responsibilities in accordance with these requirements and the IESBA Code.

Our responsibilities under ISAs (NZ) are further described in the auditor's responsibilities for the audit of the consolidated financial statements section of our report.

Our firm has also provided other services to the Group in relation to taxation consulting and compliance services, reasonable assurance engagements in relation to Kiwifruit pools and overhead allocations between segments, limited assurance over non-financial disclosures and agreed upon procedures related to the Unlisted submission, margin statement and the Annual Meeting. Subject to certain restrictions, partners and employees of our firm may also deal with the Group on normal terms within the ordinary course of trading activities of the business of the Group. These matters have not impaired our independence as auditor of the Group. The firm has no other relationship with, or interest in, the Group.

KPMG

Materiality

The scope of our audit was influenced by our application of materiality. Materiality helped us to determine the nature, timing and extent of our audit procedures and to evaluate the effect of misstatements, both individually and on the consolidated financial statements as a whole. The materiality for the consolidated financial statements as a whole was set at $10 million determined with reference to a benchmark of Total Fruit and Service Payments. We chose the benchmark because, in our view, this is a key measure of the Group's performance.

Key audit matters

Key audit matters are those matters that, in our professional judgement, were of most significance in our audit of the consolidated financial statements in the current period. We summarise below those matters and our key audit procedures to address those matters in order that the shareholders as a body may better understand the process by which we arrived at our audit opinion. Our procedures were undertaken in the context of and solely for the purpose of our statutory audit opinion on the consolidated financial statements as a whole and we do not express discrete opinions on separate elements of the consolidated financial statements.

The key audit matter	How the matter was addressed in our audit
Operating Revenue ($3.97 billion)	
Refer to Note 2(a) to the Financial Statements. Key operating revenue streams include sales of kiwifruit ($3.66 billion) and sales of Zespri Plant Variety Right licences ($307 million). The Group recognises revenue from sales of kiwifruit and licences when control has transferred, being when the goods are delivered to the customer. Sales revenue is recorded at the invoiced price of the kiwifruit less volume discounts provided to a customer. Sales revenue is generated from customers in many markets. There is a risk that revenue may be recognised or measured incorrectly due to the complexities of selling under a range of different commercial terms, currencies and shipping arrangements. Plant Variety Licences are allocated to growers who submit the highest bids in a tender process run by the Group. There is risk that licence revenue is incorrectly recognised as judgement is required to determine the point at which control of the license transfer to the successful growers.	Our audit procedures included: - Reviewing key financial controls over revenue systems. - Reviewing key terms of G3 and Red licence sales and timing of key milestones in the tender process to align with revenue recognition policy. - Reviewing licence sales to related parties to ensure these are at arm's length. - Testing a sample of sales revenue at a customer level and vouching receipt to bank. - Engaging with component auditors in market to understand and assess their audit of revenue in market. We did not identify any material misstatements in relation to operating revenue.

The key audit matter	How the matter was addressed in our audit
Intangibles ($58.9 million)	
Refer to Note 17 to the Financial Statements. During the year ended 31 March 2021, the Group had intangible additions of $34 million, the majority of which relate to computer software and process development. The Group is in the early stages of the Horizon Programme, a phased approach to modernise the Groups systems and processes to support future growth. This includes updating the technology platform to SAP S/4HANA and private cloud solutions. The Horizon Programme is the most significant component of intangible work in progress, the current amount being $24.9 million. Judgement must be applied to account for costs incurred in the development of computer systems and processes as either an asset or an expense. There is a risk that costs incurred on computer software development are incorrectly recorded as an asset, resulting in an overstatement of the Group's intangible assets.	Our audit procedures included: - Reviewing processes and approvals of key projects, including approval by those charged with governance. - Reviewing key project business cases to understand project objectives and timelines. - Reviewing relevant internal audit reports to understand controls over key project costs. - Enquire of and verify the status of various projects with key management personnel, project owners and those charged with governance. - Analysing key projects against applicable accounting standards to form a view of the appropriateness of accounting treatment adopted. - On a sample basis test the accuracy of project costs by obtaining 3rd party evidence. We did not identify any material misstatements in relation to intangibles.

Other information

The Directors, on behalf of the Group, are responsible for the other information included in the Annual Report. Other information includes the Season Overview and Annual Meeting, Financial Highlights, Orchard Gate Returns, Guided by our Connections, Guided by our Communities, Guided by our People, Guided by Guardianship, Guided by our Environment, Guided by Goodness, Zespri Global Supply, We Value Innovation, Value into the Future, Zespri in China, Zespri Board, Zespri Executive Team, Corporative Governance, Statutory Information, Industry Performance, Alternative Revenue Statement and Cause of Change. Our opinion on the consolidated financial statements does not cover any other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the consolidated financial statements our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated financial statements or our knowledge obtained in the audit or otherwise appears materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Use of this independent auditor's report

This independent auditor's report is made solely to the shareholders as a body. Our audit work has been undertaken so that we might state to the shareholders those matters we are required to state to them in the independent auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the shareholders as a body for our audit work, this independent auditor's report, or any of the opinions we have formed.

KPMG

Responsibilities of the Directors for the consolidated financial statements

The Directors, on behalf of the Company, are responsible for:

- The preparation and fair presentation of the consolidated financial statements in accordance with generally accepted accounting practice in New Zealand (being New Zealand Equivalents to International Financial Reporting Standards) and International Financial Reporting Standards;
- Implementing necessary internal control to enable the preparation of a consolidated set of financial statements that is fairly presented and free from material misstatement, whether due to fraud or error; and
- Assessing the ability to continue as a going concern. This includes disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless they either intend to liquidate or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the consolidated financial statements

Our objective is:

- To obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error; and
- To issue an independent auditor's report that includes our opinion.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs NZ will always detect a material misstatement when it exists.

Misstatements can arise from fraud or error. They are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

A further description of our responsibilities for the audit of these consolidated financial statements is located at the External Reporting Board (XRB) website at:

http://www.xrb.govt.nz/standards-for-assurance-practitioners/auditors-responsibilities/audit-report-1/

This description forms part of our independent auditor's report.

The engagement partner on the audit resulting in this independent auditor's report is Ian Proudfoot.

For and on behalf of

KPMG.

KPMG
Tauranga

2 July 2021

INCOME STATEMENT AND STATEMENT OF COMPREHENSIVE INCOME

Income Statement	Notes	2021 $'000	2020 $'000
Operating revenue	2(a)	**3,966,100**	3,340,542
Other revenue	2(b)	**53,184**	45,717
Operating expenses	3	**(3,558,863)**	(3,131,083)
Other net (losses)/gains	4	**(54,554)**	18,529
Operating profit before taxation		**405,867**	273,705
Finance revenue	5(a)	**2,633**	5,359
Finance expense	5(b)	**(3,183)**	(2,144)
Net profit before taxation		**405,317**	276,920
Taxation expense	6(a)	**(114,827)**	(76,099)
Net profit after taxation		**290,490**	200,821
Total comprehensive income for the year		**290,490**	200,821

The above Income Statement and Statement of Comprehensive Income should be read in conjunction with the accompanying notes.

BALANCE SHEET

Balance Sheet at 31 March	Notes	2021 $'000	2020 $'000
Current assets			
Cash and cash equivalents	10(a)	**414,643**	322,821
Accounts receivable	8	**110,882**	104,260
Income tax receivable		**133**	777
Other financial assets	10(a)	**140,326**	127,102
Prepayments	9	**59,616**	52,519
Inventories	11	**195,378**	178,627
		920,978	786,106
Non-current assets			
Other financial assets	10(a)	**231,360**	148,860
Property, plant and equipment	12	**70,037**	67,162
Intangibles	13	**58,916**	34,963
Deferred tax assets	6(b)	**10,250**	13,700
Prepayments	9	**2,022**	5,685
Right of use assets	14(a)	**15,860**	13,246
		388,445	283,616
Total assets		**1,309,423**	1,069,722
Current liabilities			
Accounts payable and accruals	16	**552,938**	484,109
Income tax payable		**16,126**	14,001
Provisions and insurance liabilities	17	**10,126**	1,433
Other financial liabilities	10(b)	**140,326**	127,102
Lease liabilities	14(c)	**4,431**	4,486
		723,947	631,131
Non-current liabilities			
Accounts payable and accruals	16	**2,541**	2,866
Interest bearing liabilities	20	**30,000**	30,000
Deferred tax liabilities	6(b)	**2,688**	1,474
Other financial liabilities	10(b)	**231,360**	148,860
Lease liabilities	14(c)	**11,655**	9,403
		278,244	192,603
Equity			
Share capital		**26,539**	26,539
Retained earnings		**280,693**	219,449
		307,232	245,988
Total liabilities and equity		**1,309,423**	1,069,722

The above Balance Sheet should be read in conjunction with the accompanying notes.

The Financial Statements were authorised for issue by the Directors of Zespri Group Limited on 2 July 2021.
Authorised for, and on behalf of, the Board:

B L Cameron
Chairman

J P Mason
Director

STATEMENT OF CHANGES IN EQUITY

Statement of Changes in Equity	Notes	Share capital $'000	Retained earnings $'000	Total $'000
Balance as at 1 April 2020		**26,539**	**219,449**	**245,988**
Comprehensive income:				
Net profit after taxation		**–**	**290,490**	**290,490**
Total comprehensive income for the year		**–**	**290,490**	**290,490**
Transactions with owners:				
Dividends paid during the year	7(c)	**–**	**(229,246)**	**(229,246)**
Balance as at 31 March 2021		**26,539**	**280,693**	**307,232**
Balance as at 1 April 2019		26,539	187,353	213,892
Comprehensive income:				
Net profit after taxation		–	200,821	200,821
Total comprehensive income for the year		–	200,821	200,821
Transactions with owners:				
Dividends paid during the year	7(c)	–	(168,725)	(168,725)
Balance as at 31 March 2020		26,539	219,449	245,988

The above Statement of Changes in Equity should be read in conjunction with the accompanying notes.

STATEMENT OF CASH FLOWS

Statement of Cash Flows	Notes	2021 $'000	2020 $'000
Cash flows from operating activities			
Cash was provided from:			
Receipts from sales		**3,660,048**	3,156,584
Receipts from sales of Zespri licences		**321,686**	231,938
Receipts from research co-funding		**5,625**	7,096
Proceeds from derivatives	4	**–**	3,553
Taxation refunded		**2,998**	3,953
		3,990,357	3,403,124
Cash was applied to:			
Payments to contracted suppliers – New Zealand-grown fruit		**2,233,208**	1,958,023
Payments to contracted suppliers – non-New Zealand-grown fruit		**339,016**	269,160
Payments to other suppliers and employees		**897,643**	794,059
Payments for derivatives	4	**12,510**	–
Insurance claims – reinsurance liabilities		**2,927**	4,731
Other sundry items		**229**	5,902
Taxation paid		**110,395**	86,990
		3,595,928	3,118,865
Net cash provided from operating activities	18	**394,429**	284,259
Cash flows from investing activities			
Cash was provided from:			
Proceeds from sale of property, plant and equipment, and intangibles		**191**	12
		191	12
Cash was applied to:			
Purchase of property, plant and equipment		**8,217**	14,713
Purchase of intangible assets		**33,963**	9,717
		42,180	24,430
Net cash used in investing activities		**(41,989)**	(24,418)
Cash flows from financing activities			
Cash was provided from:			
Proceeds from borrowings		**–**	30,000
Interest received		**2,349**	4,401
		2,349	34,401
Cash was applied to:			
Interest paid		**967**	329
Lease liabilities payments		**6,151**	3,700
Dividend payments	7(c)	**229,246**	168,725
		236,364	172,754
Net cash used in financing activities		**(234,015)**	(138,353)
Net increase in cash held		**118,425**	121,488
Effects of exchange rate changes on foreign currency cash balances		**(26,603)**	8,721
Add opening cash brought forward		**322,821**	192,612
Ending cash carried forward		**414,643**	322,821
Represented by:			
Cash and cash equivalents	10(a)	**414,643**	322,821
		414,643	322,821

The above Statement of Cash Flows should be read in conjunction with the accompanying notes.

NOTES TO THE FINANCIAL STATEMENTS

1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Statement of compliance and basis of preparation

The Financial Statements are a consolidation of Zespri Group Limited ('the Company') and its subsidiaries (collectively 'Zespri Group'). The Company is domiciled in New Zealand and is a profit-oriented entity incorporated under the Companies Act 1993 of New Zealand. Zespri Group's primary activity is the purchase, export and marketing of fresh kiwifruit.

The Company is an FMC reporting entity for the purposes of the Financial Markets Conduct Act 2013. The Financial Statements of the Group comply with the Financial Markets Conduct Act 2013 and Financial Reporting Act 2013.

The Financial Statements have been prepared in accordance with Generally Accepted Accounting Practice in New Zealand (NZ GAAP). They comply with New Zealand Equivalents to International Financial Reporting Standards (NZ IFRS), International Financial Reporting Standards (IFRS) and other applicable Financial Reporting Standards.

The Financial Statements and Notes to the Financial Statements are presented in New Zealand Dollars, the functional and presentational currency of the Company and each subsidiary.

The consolidated Financial Statements have been prepared according to historical cost basis, modified by the revaluation of certain items as identified in the specific accounting policies below.

Use of estimates and judgements

The preparation of the financial statements requires the use of judgements, estimates and applying assumptions that affect amounts reported in the financial statements.

Judgements and estimates are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances. Because judgement is applied, actual results could differ from estimates made. Estimates and assumptions are reviewed periodically and the effects of any changes are reflected immediately in the Income Statement.

The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year and the assumptions applied, methods used and uncertainties pertaining to these are discussed in the related accounting polices below and in the relevant notes:

- Accounts receivable estimation of expected credit losses (Note 8)
- Valuation of derivatives (Note 10)
- Capitalisation of intangible assets (Note 13)
- Leases incremental borrowing rate and lease terms (Note 14)
- Timing and amount of provisions and insurance liabilities (Note 17)
- Realisation of contingent assets and liabilities (Note 19)

Specific accounting policies

The principal accounting policies adopted in the preparation of the Financial Statements are set out below and in the relevant notes to the financial statements:

(a) Basis of consolidation

The consolidated Financial Statements include the results and balances of all entities over which the Company and its subsidiary companies have control (refer Note 15). All companies in Zespri Group are wholly owned by companies within the Group and, therefore, are ultimately fully controlled by the Company.

All subsidiaries have been incorporated and consolidated at inception by Zespri Group companies. No subsidiaries have been obtained by acquisition. The results and balances of subsidiaries are included in the consolidated Financial Statements of Zespri Group from the date of inception.

All inter-company transactions are eliminated on consolidation.

Accounting policies of subsidiaries have been changed where necessary to ensure consistency with the policies adopted by the Company.

(b) Foreign currency translation

Foreign currency transactions are translated into the functional currency of each entity using the exchange rates prevailing at the date of the transaction. Foreign exchange gains and losses resulting from the settlement of transactions during the year and from the translation of monetary assets and liabilities at balance date are recognised in the Income Statement.

Non-monetary items held at historical cost are translated using the historical exchange rate at the date of the transaction.

(c) Changes in accounting policies

The accounting policies applied in these consolidated financial statements are the same as those applied in the Group's consolidated financial statements for the year ended 31 March 2020. In April 2021 the International Financial Reporting Interpretations Committee (IFRIC), finalised its interpretation of the application of IAS 38 Intangible Assets to configuration or customisation costs in a cloud computing arrangement. Entities are required to apply accounting policy changes that result from an IFRIC agenda decision on a timely basis. Management is in the process of assessing the impact of this decision on its accounting for cloud computing arrangements. Any changes in accounting policy will be implemented retrospectively in the financial year ending 31 March 2022.

2 REVENUE

(a) Operating revenue	2021 $'000	2020 $'000
Sale of kiwifruit (at spot foreign exchange rates):		
New Zealand-grown kiwifruit	**3,150,561**	2,727,232
Non-New Zealand-grown kiwifruit	**474,118**	369,417
Collaborative marketing	**34,299**	27,513
Total revenue from kiwifruit product sales	**3,658,978**	3,124,162
Sale of Zespri Plant Variety Right licences	**306,627**	214,521
Revenue from branding royalties	**271**	189
Insurance revenue[1]	**224**	1,670
Total operating revenue	**3,966,100**	3,340,542

1 Insurance revenue includes revenue received or receivable on policies taken out for pre-'Free on board stowed' (FOBS) and post-FOBS kiwifruit losses.

(b) Other revenue	2021 $'000	2020 $'000
Gain on sale of assets	**76**	17
Zespri Plant Variety Right royalty income	**39,329**	32,713
Co-funding from Callaghan Innovation for research and development	**5,000**	5,000
Co-funding for other projects	**1,256**	1,028
Other income	**7,523**	6,959
Total other revenue	**53,184**	45,717

(c) Revenue recognition

Revenue is recognised as follows:

(i) Sale of goods and licences:

Sale of kiwifruit

The Group generates revenues primarily from the sale of kiwifruit to its customers. Sales of kiwifruit are recognised when control of the goods has transferred, being when the goods are delivered to the distributor or retailer. Delivery occurs when the goods have been shipped to the destination port and (if relevant) have received the relevant food safety approvals in the country of destination, the risks of loss have been transferred to the distributor, and the distributor has accepted the goods. Kiwifruit is often sold with volume incentives based on aggregate sales over a 12-month period. Revenue from these sales is recognised net of estimated volume discounts. Historical experience is used to estimate and provide for these incentives, using the expected value method, and revenue is only recognised to the extent that it is highly probable that a significant reversal will not occur.

Collaborative marketing

Revenue from the sale of kiwifruit under collaborative marketing agreements is recognised when the goods are delivered to the agreed destination and the risks of loss have been transferred to the collaborative marketer.

Licence and royalty sales

Revenue from sales of licences is recognised when control of the licence has transferred, being when the licence application has been accepted. Royalty income is recognised when the sales of licenced Plant Variety Right (PVR) kiwifruit occurs.

(ii) Interest:

Interest income is recognised on a time-proportion basis using the effective interest method.

(d) Co-funding

Co-funding is recognised as follows:

(i) Research co-funding, including research co-funding from government grants, relating to research and development costs is recognised over the period necessary to match it with the costs that it is intended to compensate.

Where research and development expenditure is expensed in the Income Statement, co-funding income to which it relates is shown separately as income.

(ii) Co-funding income is recognised only when there is reasonable assurance that any conditions attached to the co-funding have been complied with, and that the co-funding will be received.

3 OPERATING EXPENSES

Operating expenses include the following (at spot foreign exchange rates):	2021 $'000	2020 $'000
Commissions	25,081	23,124
Directors' fees	910	883
Donations	960	617
Employee remuneration and benefits	119,333	102,569
Employee remuneration and benefits – defined contribution plan	2,315	2,788
Fruit and service payments – New Zealand-grown kiwifruit[1]	2,190,089	1,917,453
Fruit purchases – non-New Zealand-grown kiwifruit	354,110	273,647
Innovation	29,453	31,137
Kiwifruit New Zealand[2]	664	640
Kiwifruit Vine Health Incorporated[3]	2,510	2,332
Loss on sale of assets	30	111
Loyalty premium – New Zealand-grown kiwifruit	62,619	45,475
New Zealand Kiwifruit Growers Incorporated[4]	1,569	1,457
Promotion	176,230	179,085

1 Contracted-supplier fruit returns by means of fruit and service payments reflect the value of sales from New Zealand-grown kiwifruit after deducting those expenses defined under the annual New Zealand Supply Agreement, including foreign exchange gains and losses.

Zespri Group is required to fund certain Statutory Board and Grower Representation industry initiatives. These are stated below:

2 The Company is required, under Regulation 39 of the Kiwifruit Export Regulations 1999, to fund the statutory board Kiwifruit New Zealand.

3 Zespri Group Limited pays two different levies to Kiwifruit Vine Health Incorporated on behalf of growers: (1) a Psa levy of $0.002 per tray of Class 1 Green and Class 1 Gold exported to markets other than Australia; and (2) a biosecurity levy of $0.014 per tray for all varieties exported to markets other than Australia.

4 Zespri Group Limited is required by The Commodity Levies (Kiwifruit) Order 2017 to pay a levy to New Zealand Kiwifruit Growers Incorporated on behalf of growers. The rate for 2020/21 was $0.01 per tray of kiwifruit grown in New Zealand and exported to markets other than Australia (2020: $0.01 per tray).

Fees paid to auditors

Fees were paid to KPMG as follows:

- Audit of financial statements: $496,000 (2020: $432,500)
- Other audit-related and assurance fees: $72,000 (2020: $44,000)[1]
- Non-audit fees: $152,000 (2020: $208,227)[2]

1 Other audit-related fees include fees for a reasonable assurance engagement in relation to the special purpose financial statements, greenhouse gas assurance and overhead allocation between segments, these also included agreed-upon engagements related to the Unlisted submission, 2020 Annual General Meeting, and the 2021 margin reset calculation.

2 Non-audit fees include tax consulting, climate change consulting and sustainability reporting.

Other audit fees of $82,068 (2020: $61,373) have been paid to other auditors to meet local requirements.

4 OTHER NET [LOSSES]/GAINS

	2021 $'000	2020 $'000
Net (losses)/gains from derivatives	(12,510)	3,553
Net foreign exchange (losses)/gains from non-derivatives[1]	(42,044)	14,976
Total other net (losses)/gains	(54,554)	18,529

1 Net foreign exchange (losses)/gains from non-derivatives relate to realised and unrealised translation of foreign currency balance sheet positions to New Zealand dollars.

5 FINANCE REVENUE AND EXPENSE

(a) Finance revenue	2021 $'000	2020 $'000
Interest revenue	2,633	5,359
Total finance revenue	2,633	5,359

(b) Finance expense	2021 $'000	2020 $'000
Interest expense	942	298
Interest on leases	397	389
Fee expense	1,844	1,457
Total finance expense	3,183	2,144

6 TAXATION

(a) Taxation expense	2021 $'000	2020 $'000
Net profit before taxation	405,317	276,920
Income tax using the New Zealand corporate tax rate – 28%	113,489	77,538
Tax effect of:		
Non-deductible or non-assessable items	317	930
Translation gain/(loss) differences on foreign tax	918	(881)
Tax over provided in prior year	(383)	(3,186)
Foreign income at different tax rates	(633)	836
Movement in distribution of accumulated retained earnings of subsidiaries	1,119	862
Taxation expense	114,827	76,099
Effective tax rate	28.33%	27.48%
Taxation expense is represented by:		
Current tax expense	110,332	86,429
Deferred tax expense/(income)	4,495	(10,330)
Taxation expense	114,827	76,099

(b) Components of deferred taxation	2021 $'000	2020 $'000
Property, plant and equipment, and intangibles	(2,626)	(1,752)
Inventories and receivables	1,242	4,701
Retained earnings in subsidiaries	(2,688)	(1,570)
Provisions and accruals	6,533	8,016
Other financial assets and liabilities	(529)	(1,663)
Employee entitlements	5,567	4,403
Tax losses carried forward	63	91
Net deferred tax assets	7,562	12,226
Deferred tax assets	10,250	13,700
Deferred tax liabilities	(2,688)	(1,474)
Net deferred tax assets	7,562	12,226

(c) Net change in deferred tax balances	2021 $'000	2020 $'000
Net deferred tax assets at 1 April	12,226	2,032
Charged to Income Statement	(4,495)	10,330
Exchange differences and other	(169)	(136)
Net deferred tax assets at 31 March	7,562	12,226

All movements have been charged to the Income Statement. No movements have been recorded directly within equity.

(d) Tax credits available to shareholders	2021 $'000	2020 $'000
New Zealand imputation credit account		
Imputation credits available for use at 31 March	1,867	1,880

Income tax expense comprises current and deferred tax and is calculated using rates enacted or substantively enacted at balance date. Current and deferred tax is recognised in the Income Statement unless the tax relates to items in other comprehensive income, in which case the tax is recognised as an adjustment in other comprehensive income against the item to which it relates.

7 EQUITY

(a) Basic earnings per share

	2021	2020
Net profit after taxation attributable to shareholders ($'000)	**290,490**	200,821
Weighted average shares ('000)	**183,252**	183,252
Basic average per share ($)	**1.59**	1.10

Basic earnings per share are calculated by dividing net profit after taxation by the weighted average number of shares outstanding during the year.

(b) Share capital

The total number of authorised and issued shares is 183,252,240 (2020: 183,252,240).

All ordinary shares are fully paid, rank equally subject to the voting cap and are classified as equity. Each shareholder is entitled to one vote per ordinary share up to a maximum that is calculated by reference to the lesser of the number of shares held or that shareholder's New Zealand production supplied to Zespri Group.

Capital management

The Company's activities are restricted under the Kiwifruit Export Regulations 1999 in order to protect shareholders and contracted suppliers.

Because Zespri Group is primarily a short-term borrower, capital management is restricted to the management of authorised and issued share capital and retained earnings.

Under its Constitution, the Company may issue, buy-back, consolidate or subdivide shares.

(i) Share capital

The Regulations do not restrict the levels of share capital able to be authorised for issue by the Company. The Company's Constitution provides some restriction over the scale of individual offers for shares. To date, in line with the Kiwifruit Export Regulations 1999, shares have been issued by the Company to producing New Zealand kiwifruit growers.

The voting rights of shareholders are capped by reference to the individual shareholder's share of total New Zealand production supplied to the Company during the year. Divergence between shareholdings and production can occur through the production impact of new plantings and as growers enter or exit the industry in New Zealand. This divergence is monitored by the Company at least annually, through the process of determining the voting caps of shareholders prior to the Annual Meeting of the Company.

(ii) Payment of dividends

Capital levels are monitored as part of the solvency tests required under the Companies Act 1993 to approve the payment of dividends to shareholders. Capital retained in the Company is measured for solvency purposes, and to determine whether the minimum level of equity retained in Zespri Group, as agreed by the Board of Directors, is maintained.

Following the approval of an updated constitution in March 2018, shares held by a person that becomes a non-producer subsequent to 14 March 2015 will not receive dividends for three years following becoming a non-producer. This does not apply to shareholders who were non-producers as of 14 March 2018 who will cease to receive dividends in 2025 if they remain non-producers.

(c) Dividends paid

	2021 $'000	2020 $'000
Ordinary dividends:		
On ordinary shares – final (prior year)	**34,818**	31,153
On ordinary shares – interim (current year)	**194,247**	137,439
Supplementary dividends (to non-residents)	**181**	133
Total dividends paid	**229,246**	168,725

During the year, the 2020 final dividend of 19 cents per share and the 2021 interim dividend of 95 cents per share were paid in August 2020. An additional 2021 interim dividend of 11 cents per share was paid in December 2020. All of these dividends are recognised in the Financial Statements and were fully imputed. Supplementary dividends of $181,196 were paid to shareholders that are not tax resident in New Zealand, for which Zespri Group received a foreign investor tax credit entitlement. An intention by the Board of Directors to pay a fully imputed final dividend is detailed in Note 22.

8 ACCOUNTS RECEIVABLE

	2021 $'000	2020 $'000
Current:		
Trade receivables	32,451	46,437
Other receivables[1]	35,764	23,347
	68,215	69,784
Indirect taxation	42,667	34,476
Total current account receivables	110,882	104,260

1 Other receivables include an amount of $9,352,916 (2020: Nil) of hail insurance receivable. An amount of $3,000,000 is receivable from Zespri insurers and the remainder is to be recovered from the New Zealand pool in accordance with the New Zealand Supply Agreement (refer note 17).

Accounts receivable are initially recognised at fair value and subsequently measured at amortised cost using the effective interest method and adjusted for credit impairment losses. Included in trade receivables are debtors which are past due at balance date for which no allowance for impairment has been made.

Accounts receivable past due but not impaired	2021 $'000	2020 $'000
Less than 3 months overdue	5,250	3,414
Between 3 and 6 months overdue	–	64
Between 6 and 12 months overdue	21	32
More than 12 months overdue	–	52
Accounts receivable past due but not impaired as at 31 March	5,271	3,562

The past due between 6 and 12 months has been fully paid in May 2021.

In certain regions a portion of accounts receivable amounts are secured by bank guarantees, trade credit insurance or other collateral, with all others being unsecured.

9 PREPAYMENTS

	2021 $'000	2020 $'000
Current:		
Prepaid submit payments for next season's fruit not recorded in inventory	42,634	34,866
Insurance	6,283	5,599
Option premiums	3,520	5,954
Other	7,179	6,100
Total current prepayments	59,616	52,519
Non-current:		
Option premiums	1,947	5,367
Other	75	318
Total non-current prepayments	2,022	5,685
Total prepayments	61,638	58,204

10 FINANCIAL ASSETS AND LIABILITIES

		Loans and receivables		Assets designated at fair value through the Income Statement		Total	
(a) Financial assets per Balance Sheet	Notes	2021 $'000	2020 $'000	2021 $'000	2020 $'000	2021 $'000	2020 $'000
Derivatives – held for trading		–	–	371,686	92,199	371,686	92,199
Contracted future suppliers		–	–	–	183,763	–	183,763
Accounts receivable	8	110,882	104,260	–	–	110,882	104,260
Cash and cash equivalents[1]		414,643	322,821	–	–	414,643	322,821
Total other financial assets		525,525	427,081	371,686	275,962	897,211	703,043
Represented by:							
Current		525,525	427,081	140,326	127,102	665,851	554,183
Non-current		–	–	231,360	148,860	231,360	148,860
Total other financial assets		525,525	427,081	371,686	275,962	897,211	703,043

		Liabilities at amortised cost		Liabilities designated at fair value through the Income Statement		Total	
(b) Financial liabilities per Balance Sheet	Notes	2021 $'000	2020 $'000	2021 $'000	2020 $'000	2021 $'000	2020 $'000
Derivatives – held for trading		–	–	62,185	275,962	62,185	275,962
Contracted future suppliers		–	–	309,501	–	309,501	–
Accounts payable and accruals	16	555,479	486,975	–	–	555,479	486,975
Lease liabilities	14(c)	16,086	13,889	–	–	16,086	13,889
Interest bearing liabilities	20	30,000	30,000	–	–	30,000	30,000
Total other financial liabilities		601,565	530,864	371,686	275,962	973,251	806,826
Represented by:							
Current		557,369	488,595	140,326	127,102	697,695	615,697
Non-current		44,196	42,269	231,360	148,860	275,556	191,129
Total other financial liabilities		601,565	530,864	371,686	275,962	973,251	806,826

1 Of the cash and cash equivalents, $172,046,520 is held in short term money market deposits with the balance being held in transactional bank accounts. 73 percent is held in NZD, 19 percent in CNY and the balance in other currencies that the Group trades with customers in.

Financial assets and financial liabilities, except for derivatives, are measured initially at fair value plus directly attributable transaction costs and subsequently measured at amortised cost and subject to regular review for impairment.

Derivatives

Zespri Group may reduce its exposure to fluctuations in foreign currency exchange rates and commodity prices affecting operating costs, through the use of derivatives. Derivatives are not entered into for speculative purposes.

Derivatives able to be utilised under the Treasury Management Policy include interest rate swaps, oil swaps, foreign exchange options and forward contracts.

Zespri Group's policy is to manage risk from an economic perspective. As a result, Zespri Group manages the risks of net positions subject to market risks. Hedge accounting has not been applied. As a result, all derivatives are required to be classified as 'held for trading'.

(i) Recognition and derecognition:

Derivatives are recognised initially and subsequently at fair value, with changes in fair value of derivatives recognised in the Income Statement. The fair value of all financial instruments is recorded in the Balance Sheet. Derivatives are derecognised when the contractual rights or obligations relating to the cash flow expire.

Fair value of financial assets and liabilities

The derivative financial instruments have been valued using a discounted cash flow valuation methodology.

Assets and liabilities are measured at fair value by the following fair value measurement hierarchy:

Level 1 – Quoted prices (unadjusted) in active markets for identical assets or liabilities;

Level 2 – Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices).

All financial instruments held by the Group and measured at fair value are classified as level 2 under the fair value measurement hierarchy.

10 FINANCIAL ASSETS AND LIABILITIES [CONTINUED]

Zespri Group is subject to a number of financial risks that arise as a result of its operational activities. To manage and limit the effect of these financial risks, the Board of Directors has approved policy guidelines and authorised the use of various financial instruments. The policies and financial instruments permitted are documented in the Treasury Management Policy which is reviewed and approved annually. The policies and financial instruments being utilised at balance date are discussed under the sections Liquidity risk, Credit risk and Market risk below.

(c) Liquidity risk

Zespri Group is exposed to liquidity risk where there is a risk that the Group may encounter difficulty in meeting its day to day obligations due to timing of cash receipts and payments. The objective is to ensure that cash is available to pay obligations as they fall due.

Contractual maturities as at 31 March

2021	Notes	< 1 year $'000	1 – 2 years $'000	2 – 5 years $'000	> 5 years $'000	Total $'000
Non-derivatives:						
Trade creditors	16	**62,673**	**–**	**–**	**–**	**62,673**
Accruals and other payables	16	**490,265**	**–**	**2,541**	**–**	**492,806**
Lease liabilities	14(b)	**4,507**	**3,389**	**6,534**	**2,502**	**16,932**
Interest bearing liabilities	20	**–**	**–**	**–**	**30,000**	**30,000**
		557,445	**3,389**	**9,075**	**32,502**	**602,411**
Derivatives:						
Derivatives – held for trading		**34,217**	**18,839**	**9,129**	**–**	**62,185**
Contracted future suppliers		**106,109**	**101,636**	**101,756**	**–**	**309,501**
		140,326	**120,475**	**110,885**	**–**	**371,686**
Total contractual maturities		**697,771**	**123,864**	**119,960**	**32,502**	**974,097**

2020						
Non-derivatives:						
Trade creditors	16	71,153	–	–	–	71,153
Accruals and other payables	16	412,956	–	2,866	–	415,822
Lease liabilities	14(b)	4,660	3,134	4,635	3,155	15,584
Interest bearing liabilities	20	–	–	–	30,000	30,000
		488,769	3,134	7,501	33,155	532,559
Derivatives:						
Derivatives – held for trading		127,102	88,616	60,244	–	275,962
Total contractual maturities		615,871	91,750	67,745	33,155	808,521

(d) Credit risk

Zespri Group is exposed to credit risk from transactions with trade debtors and financial institutions in the normal course of business.

Zespri Group has a credit approval policy which restricts the exposure to individual debtors and the Board of Directors reviews exposures to trade debtors. In certain regions a portion of amounts owed by trade debtors is secured by way of bank guarantees or other collateral, with all others being unsecured. Zespri Group does not require any collateral or security from financial institutions to support its transactions with those institutions. The counter-parties used for banking and finance activities are financial institutions with credit ratings ranging from A to AA–.

In assessing credit losses for trade receivables, the Group applies the simplified approach and records lifetime expected credit losses ("ECLs") on trade receivables. Lifetime ECLs result from all possible default events over the expected life of a trade receivable. The Group considers the probability of default upon initial recognition of the trade receivable, based on reasonable and available information on the customers. In assessing ECLs on trade receivables the Group considers both quantitative and qualitative inputs. Quantitative data includes past collection rates, industry statistics, ageing of receivables, and trading outlook. Qualitative inputs include past trading history with the Group.

(e) Market risk

Zespri Group is subject to market risks that arise as a result of its operational activities. The types of market risk to which Zespri Group is exposed include interest rate risk, currency risk and commodity price risk.

(i) Interest rate risk:

Zespri Group's policy relating to interest rate risk management aims to achieve the lowest cost of funds.

Zespri Group may put in place seasonal funding facilities if required (refer Note 20). Zespri Group is primarily a short-term borrower and investor and generally carries any interest rate risk itself. Investments consist of on-call funds and short-term deposits.

Zespri Group has put in place long term floating interest rate building funding, however has a $30,000,000 interest rate derivative contract in place (2020: Nil contracts).

10 FINANCIAL ASSETS AND LIABILITIES [CONTINUED]

(ii) Currency risk:

During the course of business, Zespri Group procures and exports fruit, incurs selling, marketing and administrative costs, and carries cash denominated in foreign currencies. As a result of these transactions, exposures to fluctuations in foreign currency exchange rates occur. The foreign currencies in which Zespri Group primarily deals are Euro (EUR), Japanese Yen (JPY), United States Dollars (USD), Chinese Yuan (CNY) and Korean Won (KRW).

Zespri Group's primary objective in managing foreign exchange risk is to mitigate excess volatility in the New Zealand Dollar return to shareholders and the New Zealand kiwifruit industry arising from foreign currency movements.

Net exposures of expected foreign currency income and expenditure are estimated. The Treasury Management Policy provides guidelines within which Zespri Group enters into contracts to manage the expected net exposures. Based on these guidelines, contracts are taken out up to 36 months in advance. With express Board approval, the Company can take out contracts that are in excess of 36 months in advance.

Foreign exchange contracts

As part of the foreign currency hedging strategy, Zespri Group has entered into forward exchange contracts and options. The value of these contracts held at balance date were:

	Notional value		Fair value gain/(loss)	
At fair value through the Income Statement – held for trading	**2021 $'000**	2020 $'000	**2021 $'000**	2020 $'000
Sell forward exchange contracts	**4,990,005**	5,239,332	**257,724**	(148,179)
Currency option contracts	**1,415,650**	1,065,722	**46,053**	(35,584)
	6,405,655	6,305,054	**303,777**	(183,763)
Represented by:				
Other financial assets			**365,962**	92,199
Other financial liabilities			**(62,185)**	(275,962)
			303,777	(183,763)
By currency:				
EUR/NZD	**1,684,858**	1,463,614	**82,122**	(25,763)
JPY/NZD	**1,694,355**	1,374,184	**145,101**	(65,497)
USD/NZD[1]	**1,764,512**	1,875,562	**124,770**	(144,275)
USD/KRW[1]	**281,657**	320,599	**1,295**	26,214
USD/CNY[1]	**980,273**	1,271,095	**(49,511)**	25,558
	6,405,655	6,305,054	**303,777**	(183,763)

[1] *A portion of the USD/NZD transactions are utilised in conjunction with the USD/KRW and USD/CNY transactions to translate these currencies back to NZD.*

	Notional value		Fair value gain/(loss)	
Maturity of foreign exchange contracts	**2021 $'000**	2020 $'000	**2021 $'000**	2020 $'000
Less than one year	**3,720,877**	2,438,881	**100,385**	(91,745)
One to two years	**1,673,183**	1,930,910	**101,636**	(63,459)
More than two years	**1,011,595**	1,935,263	**101,756**	(28,559)
	6,405,655	6,305,054	**303,777**	(183,763)

(iii) Commodity Price Risk

During the course of business, Zespri Group exports fruit, incurring significant freight expenses which are impacted by fluctuations in the price of oil.

As part of the Group's commodity hedging strategy, oil price forward contracts may be transacted to reduce the exposure to oil price risk. The value of these contracts held at balance date were:

	Notional value		Fair value gain/(loss)	
At fair value through the Income Statement – held for trading	**2021 $'000**	2020 $'000	**2021 $'000**	2020 $'000
Oil price forward contracts	**16,487**	–	**5,724**	–
	16,487	–	**5,724**	–
Represented by:				
Other financial assets			**5,724**	–
			5,724	–

	Notional value		Fair value gain/(loss)	

10 FINANCIAL ASSETS AND LIABILITIES [CONTINUED]

Maturity of oil price forward contracts	2021 $'000	2020 $'000	2021 $'000	2020 $'000
Less than one year	**16,487**	–	**5,724**	–
	16,487	–	**5,724**	–

(f) Market risk sensitivity as at 31 March

Zespri Group is exposed to various market risks in relation to balances held as at 31 March.

As a result of the seasonal nature of the business, the impact on the Income Statement and equity resulting from movements in foreign exchange rates that could have occurred at 31 March is unrepresentative of the exposure during the year and is immaterial to the results for the year ended 31 March 2021.

Management has considered the seasonal risk to the business and the sensitivity using average balances held during the year.

Under the terms of the New Zealand Supply Agreement, the supplier assumes the risk of foreign exchange, and any change in foreign currency rates on average balances would not be material to the pre-tax profit of the Group. The effect of exchange rate movements is managed by the use of forward contracts and options to mitigate excess volatility.

Under the terms of the New Zealand Supply Agreement, interest costs incurred on the seasonal funding facility and interest income earned on short-term deposits are largely assumed by the Registered Supplier. A change in interest rates using average funding facility and short-term deposit balances for the year would not be material to the pre-tax profit of the Group.

(g) Embedded derivatives

Embedded derivatives are derivatives that are included within the terms of a non-derivative host contract. They affect the cash flows of the combined instrument in a way similar to a stand-alone derivative. An embedded derivative causes some or all of the cash flows that otherwise would be required by the contract to be modified according to a specified index, price, rate or other variable.

Companies within Zespri Group enter into contracts in the normal course of their operations. Within some of these contracts are embedded derivatives. Where the embedded derivatives are deemed to be closely related to the host contract, they are not valued or recognised separately from the accounting required for the host contract in the Financial Statements. Embedded derivatives deemed not to be closely related to the host contract are accounted for as if they were stand-alone derivatives.

Zespri International Limited acts as treasury agent for Zespri Group and the Company is responsible for paying New Zealand-contracted suppliers (supply entities which have signed the New Zealand Supply Agreement) based on the net results earned by Zespri Group.

The Company has entered into back-to-back arrangements with New Zealand-contracted suppliers and Zespri International Limited, primarily reflecting the results of any derivatives taken out for the purposes of managing risk to the New Zealand fruit return.

	Notional value		Fair value (loss)/gain	
	2021 $'000	2020 $'000	2021 $'000	2020 $'000
Contracted future suppliers	**6,422,142**	6,305,054	**(309,501)**	183,763

11 INVENTORIES

	2021 $'000	2020 $'000
New Zealand-grown kiwifruit inventory (next season)	**176,735**	161,064
Non-New Zealand-grown kiwifruit inventory	**5,778**	4,876
Packaging materials	**12,818**	12,602
Other	**47**	85
Total inventories	**195,378**	178,627

Inventories are valued at the lower of cost or net realisable value. Costs incurred in bringing inventory to its present location and condition are accounted for at purchased cost on a first-in first-out basis. Borrowing costs are excluded.

12 PROPERTY, PLANT AND EQUIPMENT

2021	Land and improvements $'000	Leasehold improvements $'000	Buildings $'000	Plant and equipment $'000	Motor vehicles $'000	Work in progress $'000	Total $'000
Net book value as at 1 April 2020	**9,463**	**1,603**	**46,049**	**9,477**	**193**	**377**	**67,162**
Depreciation expense	**–**	**(635)**	**(1,476)**	**(3,062)**	**(67)**	**–**	**(5,240)**
Additions	**1,990**	**1,192**	**799**	**3,384**	**–**	**807**	**8,172**
Disposals (net)	**–**	**(13)**	**–**	**(20)**	**(24)**	**–**	**(57)**
Net book value as at 31 March 2021	**11,453**	**2,147**	**45,372**	**9,779**	**102**	**1,184**	**70,037**
Cost	**11,453**	**5,063**	**48,181**	**19,676**	**327**	**1,184**	**85,884**
Accumulated depreciation	**–**	**(2,916)**	**(2,809)**	**(9,897)**	**(225)**	**–**	**(15,847)**
Net book value as at 31 March 2021	**11,453**	**2,147**	**45,372**	**9,779**	**102**	**1,184**	**70,037**

2020							
Net book value as at 1 April 2019	9,548	1,475	–	5,154	193	40,697	57,067
Depreciation expense	–	(648)	(1,333)	(2,414)	(78)	–	(4,473)
Additions	–	891	9,733	4,364	93	378	15,459
Disposals (net)	(423)	(180)	–	(273)	(15)	–	(891)
Transfers	338	65	37,649	2,646	–	(40,698)	–
Net book value as at 31 March 2020	9,463	1,603	46,049	9,477	193	377	67,162
Cost	9,463	4,612	47,382	16,791	444	377	79,069
Accumulated depreciation	–	(3,009)	(1,333)	(7,314)	(251)	–	(11,907)
Net book value as at 31 March 2020	9,463	1,603	46,049	9,477	193	377	67,162

Policies

The cost of purchased property, plant and equipment is the value of the consideration given to acquire the assets and the value of other directly attributable costs which have been incurred in bringing the assets to the location and condition necessary for their intended use.

The cost of assets constructed by Zespri Group includes the cost of all materials used in construction and direct labour on the project, and financing costs that are directly attributable to the project. Costs cease to be capitalised as soon as the asset is ready for productive use.

Depreciation is provided on a straight-line basis at rates calculated to allocate the cost of assets over their estimated useful lives. Capital work in progress is not depreciated until the work is complete and the asset is fit for productive use.

The estimated useful lives used for depreciation purposes are as follows:

Buildings	Lower of 50 years or useful life of the building
Leasehold improvements	Lower of 10 years or unexpired portion of lease
Plant and equipment	2–25 years
Motor vehicles	5 years
Building fit-out	5–25 years
Land	Not depreciated

The useful life and residual value of property, plant and equipment are reviewed annually. Any change required as a result in the change of these estimates is recognised in the Income Statement during the period.

Property, plant and equipment commitments

As at 31 March 2021 there are outstanding capital commitments totalling $792,733 for property, plant and equipment (2020: $45,308).

13 INTANGIBLES

2021	Development costs $'000	Computer software $'000	Work in progress $'000	Total $'000
Net book value as at 1 April 2020	**3,946**	**21,734**	**9,283**	**34,963**
Amortisation expense	**(1,284)**	**(8,725)**	**–**	**(10,009)**
Additions	**1,996**	**8,272**	**23,821**	**34,089**
Disposals (net)	**–**	**(127)**	**–**	**(127)**
Net book value as at 31 March 2021	**4,658**	**21,154**	**33,104**	**58,916**
Cost	**17,147**	**73,060**	**33,104**	**123,311**
Accumulated amortisation	**(12,489)**	**(51,906)**	**–**	**(64,395)**
Net book value as at 31 March 2021	**4,658**	**21,154**	**33,104**	**58,916**

2020				
Net book value as at 1 April 2019	3,305	15,303	18,534	37,142
Amortisation expense	(1,320)	(10,571)	–	(11,891)
Additions	1,961	4,411	3,345	9,717
Disposals (net)	–	(5)	–	(5)
Transfers	–	12,596	(12,596)	–
Net book value as at 31 March 2020	3,946	21,734	9,283	34,963
Cost	21,429	66,332	9,283	97,044
Accumulated amortisation	(17,483)	(44,598)	–	(62,081)
Net book value as at 31 March 2020	3,946	21,734	9,283	34,963

Policies

(i) Research and development costs:

Research expenditure is expensed in the period incurred. Development costs are capitalised as internally generated intangible assets upon commercialisation where future benefits are expected to exceed those costs; otherwise, development costs are expensed in the period incurred.

Development costs include costs relating to the development and production for Zespri-developed cultivars. Costs capitalised include those of budwood, legal fees and costs of obtaining PVRs less any research co-funding received in respect of this expenditure. Development costs capitalised as an internally generated intangible asset have finite useful lives and are carried at cost less accumulated amortisation.

Amortisation is calculated using the straight-line method to allocate the cost over the estimated useful life of five years.

(ii) Computer software:

Zespri Group purchases and develops software for use in its own business only. Because the software is without physical substance, it is classified as an intangible asset.

The cost of computer software acquired is the value of the purchase price to acquire the assets, and the value of other directly attributable costs which have been incurred in bringing the assets to the location and condition necessary for their intended use.

The cost of software developed by, and for the use of, Zespri Group includes the cost of all materials used to develop the software, direct labour on the project and financing costs that are directly attributable to the project. The amount initially recognised as an intangible asset is the sum of this expenditure incurred from the date the above recognition criteria is met. Computer software has a finite useful life and is carried at cost less accumulated amortisation.

Amortisation is calculated using the straight-line method to allocate the cost over the estimated useful life of three to five years.

(iii) Intangibles work in progress:

Intangibles work in progress is not amortised until work is complete and the asset is fit for its intended use.

The useful life and residual value of intangibles are reviewed annually. Any change required as a result in the change of these estimates is recognised in the Income Statement during the period.

Intangibles work in progress

As at 31 March 2021, 100 percent (2020: 100 percent) of the Group intangibles work in progress relates to ongoing computer software projects. Of this, $24,888,140 relates to the Horizon Programme.

Intangible commitments

As at 31 March 2021 there are outstanding capital commitments totalling $37,446,052 for intangible assets (2020: $697,602). Of this, $36,777,662 relates to the Horizon Programme. The Horizon Programme is a phased approach to modernise our systems and processes to support future growth. Deloitte are our implementation partner leading a New Zealand-based consortium. SAP S/4HANA, private cloud edition, is the technology platform.

14 LEASES

(a) Right of use assets	Buildings $'000	Land $'000	Motor Vehicles $'000	Office Equipment $'000	Total $'000
2021					
Net book value as at 1 April 2020	**9,533**	**2,507**	**1,076**	**130**	**13,246**
Additions	**8,174**	**774**	**393**	**57**	**9,398**
Depreciation expense	**(4,226)**	**(318)**	**(596)**	**(77)**	**(5,217)**
Derecognition	**(1,332)**	**(212)**	**–**	**(23)**	**(1,567)**
Net book value as at 31 March 2021	**12,149**	**2,751**	**873**	**87**	**15,860**
Cost	**16,073**	**3,326**	**1,955**	**216**	**21,570**
Accumulated depreciation	**(3,924)**	**(575)**	**(1,082)**	**(129)**	**(5,710)**
Net book value as at 31 March 2021	**12,149**	**2,751**	**873**	**87**	**15,860**
2020					
Net book value as at 1 April 2019	–	–	–	–	–
Movements on transition	11,338	2,778	1,414	201	15,731
Additions	1,507	-	237	14	1,758
Depreciation expense	(3,312)	(271)	(575)	(85)	(4,243)
Net book value as at 31 March 2020	9,533	2,507	1,076	130	13,246
Cost	12,845	2,778	1,651	215	17,489
Accumulated depreciation	(3,312)	(271)	(575)	(85)	(4,243)
Net book value as at 31 March 2020	9,533	2,507	1,076	130	13,246

(b) Maturity analysis – contractual undiscounted cash flows from minimum lease payments	2021 $'000	2020 $'000
Less than one year	**4,507**	4,660
One to five years	**9,923**	7,769
More than five years	**2,502**	3,155
Total contractual undiscounted cash flows from minimum lease payments	**16,932**	15,584

(c) Lease liabilities	2021 $'000	2020 $'000
Current	**4,431**	4,486
Non-current	**11,655**	9,403
Total lease liabilities	**16,086**	13,889

(d) Lease expenses included in the Income Statement	2021 $'000	2020 $'000
Short term leases	**986**	1,131
Variable lease payments	**15**	11
Interest on leases	**397**	389
Gain on leases	**(86)**	(7)
Total lease expenses	**1,312**	1,524

(e) Lease cash flows included in the Statement of Cash Flows	2021 $'000	2020 $'000
Total cash outflow in relation to leases	**7,152**	5,131

Policies

Lease liabilities are initially measured at the present value of future lease payments discounted using the Group's incremental borrowing rate. As at 1 April 2021, the weighted average rate applied was 2%. The lease liability is subsequently measured at amortised cost using the effective interest method. It is remeasured when there is a change in future lease payments arising from a change in an index or rate, if there is a change in the Group's estimate of the amount expected to be payable if the Group changes its assessment of whether it will exercise purchase, extension or termination options.

Right of use (ROU) assets are initially recognised at cost, comprising the initial amount of the lease liability less any unamortised lease incentives. ROU assets are subsequently depreciated using the straight-line method from the commencement date to the end of the lease term.

In considering the lease term, the Group applies judgement in determining whether it is reasonably certain that an extension or termination option will be exercised.

14 LEASES [CONTINUED]

Lease income from lease contracts in which the Group acts as a lessee:

(f) Lessor income	2021 $'000	2020 $'000
Operating lease income[1]	81	61
Total lessor income	81	61

[1] The Group leases out part of the head office building to New Zealand Kiwifruit Growers Incorporated and Kiwifruit Vine Health Incorporated.

(g) Maturity analysis – contractual undiscounted lessor income	2021 $'000	2020 $'000
Less than one year	81	81
One to five years	406	406
More than five years	568	649
Total contractual undiscounted lessor income	1,055	1,136

15 INVESTMENTS IN SUBSIDIARY COMPANIES

Zespri Group Limited is the ultimate holding company for the Zespri Group of companies.

The Group's subsidiaries are involved in exporting, importing, selling, marketing, investing, researching and management of New Zealand-grown and Non-New Zealand-grown kiwifruit.

The Group holds investments in certain countries that have some limited restrictions on the repatriation of funds back to New Zealand. This does not result in any significant restrictions on the flow of funds for the Group.

Zespri Group is relying on the Financial Markets Conduct (Overseas Subsidiary Balance Date Alignment) Exemption Notice 2016 in respect of the accounting period to which these financial statements relate.

All Group subsidiaries have a 31 March balance date with the exception of Shaanxi Zespri Fresh Produce Company Limited, Zespri Jia Pei Fruit (Shanghai) Co. Limited, Zespri Fruit (Shanghai) Co. Limited, Zespri Fruit Industry (Shanghai) Co. Ltd and Zespri Fruit Consultoria (Brasil) Ltda which all have a 31 December balance date due to local requirements.

The significant subsidiaries of the Group are listed below:

Subsidiary	Incorporated
Zespri Global Supply Holding Company Limited	New Zealand
Zespri Innovation Company Limited	New Zealand
Zespri International (Asia) Limited	New Zealand
Zespri International Limited	New Zealand
Zespri New Zealand Limited	New Zealand
Zespri International (Australia) Pty Limited	Australia
Zespri International (Europe) N.V.	Belgium
Zespri Service Centre N.V.	Belgium
Zespri Fruit Consultoria (Brasil) Ltda	Brazil
Shaanxi Zespri Fresh Produce Company Limited	China
Zespri Fruit Industry (Shanghai) Co. Ltd (incorporated March 2021)	China
Zespri Fruit (Shanghai) Co Limited	China
Zespri Fresh Produce France S.A.R.L.	France
Zespri International France E.U.R.L.	France
Zespri International Germany GmbH	Germany

Subsidiary	Incorporated
Zespri International (India) Pvt Ltd	India
Zespri Fresh Produce Italy S.r.l.	Italy
Zespri International Italy S.r.l.	Italy
Zespri Fresh Produce (Japan) K.K.	Japan
Zespri International (Japan) K.K.	Japan
Zespri International (Malaysia) Sdn. Bhd (incorporated July 2020)	Malaysia
Zespri Fresh Produce (Korea) Co. Limited	South Korea
Zespri International (Korea) Co. Limited	South Korea
Zespri International (Singapore) Pte Limited	Singapore
Zespri International Iberica SL	Spain
Zespri International Nordic AB	Sweden
Zespri International (United Kingdom) Limited	United Kingdom
New Zealand Kiwi Holdings Inc.	United States of America
Zespri International (Vietnam) Company Limited	Vietnam

16 ACCOUNTS PAYABLE AND ACCRUALS

	2021 $'000	2020 $'000
Current:		
Trade creditors	**62,673**	71,153
Loyalty accrual[1]	**46,899**	30,907
Accrued expenses	**145,625**	113,162
New Zealand fruit and service payments – current season	**45,115**	49,551[2]
New Zealand fruit and service payments – next season	**197,057**	165,673[2]
Income in advance	**27,108**	30,744
Payroll tax deductions payable	**2,521**	1,318
Employee entitlements	**25,940**	21,601
Total current accounts payable and accruals	**552,938**	484,109
Non-current:		
Employee entitlements	**2,541**	2,866
Total non-current accounts payable and accruals	**2,541**	2,866
Total accounts payable and accruals	**555,479**	486,975

1 The loyalty premium is paid to the New Zealand growers who have signed a three-year rolling grower contract and met the conditions of that contract. The loyalty premium is 40.0 cents (2020: 31.0 cents) per tray equivalent of New Zealand Class 1 kiwifruit supplied to the Company. The premium is paid in two instalments. The first instalment of 10.0 cents per Class 1 tray equivalent was paid 20 January 2021 (2020: 20 January 2020). The remaining 30.0 cents (2020: 21.0 cents) of loyalty premium per Class 1 tray equivalent will be paid on 15 June 2021 (2020: 15 June 2020).

2 The comparatives have been updated to present the split between current season and next season New Zealand fruit and service payments on a consistent basis to the current year presentation.

17 PROVISIONS AND INSURANCE LIABILITIES

	Insurance liabilities $'000	Other provisions $'000	Total $'000
Value as at 1 April 2020	**–**	**1,433**	**1,433**
Amounts charged	**–**	**(848)**	**(848)**
Reversal of provision	**–**	**(348)**	**(348)**
Additional provision	**9,353**	**549**	**9,902**
Exchange differences	**–**	**(13)**	**(13)**
Value as at 31 March 2021	**9,353**	**773**	**10,126**
Represented by:			
Current	**9,353**	**773**	**10,126**
Value as at 31 March 2021	**9,353**	**773**	**10,126**

Insurance liabilities

Hail insurance

The Company insures New Zealand Registered Suppliers to the New Zealand Supply Agreement annually for kiwifruit lost as a result of hail during the New Zealand growing period. The terms of cover are contained in the annual New Zealand Supply Agreement.

An insurance liability is recognised to the extent of the estimated future cash flows that may be required to settle claims and related costs. An expense is recognised for known liabilities under the terms of insurance, and estimated for claims made but not yet settled. Claims are settled at the end of the insurance period.

During the year, a number of orchards were affected by hail events around New Zealand. An amount of $9,352,916 (2020: Nil) has been recognised as an insurance liability in the Zespri Group accounts as at 31 March 2021.

Other provisions

Kiwifruit Breeding Centre

The Boards of Zespri and Plant & Food Research (PFR) in March 2021 approved the establishment of a new entity called the Kiwifruit Breeding Centre (KBC). The KBC will be an equally owned entity with the aim of building on the current strong plant breeding partnership, to bring the best kiwifruit cultivars to the market faster. The KBC is proposed to open in the latter half of 2021, but the entity establishment is subject to Ministerial approval as PFR is a government owned Crown Research Institute. A provision of $429,611 relates to Zespri's estimated half share of the committed KBC establishment and employment transition costs.

17 PROVISIONS AND INSURANCE LIABILITIES [CONTINUED]

Other provisions (continued)

Other provisions include legal costs relating to the ongoing New Zealand Court of Appeal proceedings (refer note 19) and an ongoing proceeding in Europe. In the normal course of business, the Zespri Group is party to various lawsuits and claims (refer Note 19).

Policies

Zespri Group records provisions when it has a legal or constructive obligation to satisfy a claim as the result of a past event, it is more likely than not that an outflow of resources will be required to satisfy the obligation and a reliable estimate of the amount can be made.

18 RECONCILIATION OF NET PROFIT AFTER TAXATION WITH NET CASH FROM OPERATING ACTIVITIES

	2021 $'000	2020 $'000
Net profit after taxation	**290,490**	200,821
Non-cash items:		
Net (gain)/loss on sale of property, plant and equipment, and intangibles	**(91)**	139
Net loss/(gain) on foreign currency cash balances	**26,603**	(8,721)
Depreciation of property, plant and equipment	**5,240**	4,473
Depreciation of, and interest on leases	**5,614**	4,632
Amortisation of intangibles	**10,009**	11,891
Movement in deferred taxation	**4,664**	(10,194)
	52,039	2,220
Movement in working capital:		
(Increase)/decrease in receivables and prepayments	**(533)**	8,872
Increase in net current income tax	**2,769**	3,256
Increase in other financial assets	**(95,724)**	(157,715)
Increase in inventories	**(16,751)**	(88,524)
Increase in payables to contracted suppliers	**58,958**	97,468
Increase in other financial liabilities	**95,724**	157,715
Increase in accounts payable, accruals, provisions and employee entitlements	**8,839**	64,218
	53,282	85,290
Items classified as financing activities	**(1,382)**	(4,072)
Net cash available from operating activities	**394,429**	284,259

19 CONTINGENT ASSETS AND LIABILITIES

The Group has assessed its previous contingent liabilities and has determined that the possibility of an outflow of resources embodying economic benefits is remote and therefore no material contingent liabilities have been identified.

Zespri received a judgement of $14,849,000 from the New Zealand High Court against the New Zealand grower who infringed Zespri's PVRs. The grower has appealed this judgement to the Court of Appeal, and has been granted a partial stay of execution against their home, which is a large portion of their assets in New Zealand of approximately $1,000,000 to $1,500,000. In the meantime, Zespri is progressing the enforcement of this judgement against those assets which are not subject to the stay and considering potential options for enforcement of the judgement against assets located in China.

In the normal course of business, Zespri Group is party to various lawsuits and claims, both as a plaintiff and as a defendant. It is not possible to predict with certainty whether Zespri Group will ultimately be successful and what the impact might be. Provisions are made in accordance with accounting policy and disclosed in Note 17.

Contingent liabilities with respect to guarantees extended total $9,317,122 (2020: $10,091,690).

Zespri has recently commercialised the Red19 variety. Should the company decide to withdraw the variety for any reason, and the licence holder has not accepted a new licence under the terms of the Licence Agreement, the Company is required to reimburse the licence holder a calculated rate of $5,000 (including GST) per hectare of licenced area, provided that no more than four whole years have elapsed between the date of the original allocation of the licence by the Company and the date of notice of decommercialisation given by the Company. In addition, the Company is required to refund a percentage of the original licence price paid. As at 31 March 2021, the maximum exposure under the decommercialisation scenario is $11,279,653.

20 LOANS AND BORROWINGS

2021	Maturity Date	Committed Facilities $'000	Undrawn Facilities $'000	Carrying Value $'000
Current:				
Seasonal funding facilities – variable rate	September 2021	**200,000**	**200,000**	**–**
Total current		**200,000**	**200,000**	**–**
Non-current:				
Bank loan – variable rate	March 2027	**30,000**	**–**	**30,000**
Total non-current		**30,000**	**–**	**30,000**
Total loans and borrowings		**230,000**	**200,000**	**30,000**

2020				
Current:				
Seasonal funding facilities – variable rate	October 2020	350,000	350,000	–
Total current		350,000	350,000	–
Non-current:				
Bank loan – variable rate	March 2027	30,000	–	30,000
Total non-current		30,000	–	30,000
Total loans and borrowings		380,000	350,000	30,000

Policies

Borrowings are initially recognised at fair value net of attributable transaction costs, and are subsequently measured at amortised cost using the effective interest rate method. Loans and borrowings are derecognised if the Group's obligations as specified in the contract expire or are discharged or cancelled.

Seasonal funding facilities

Seasonal funding arrangements for Zespri Group Limited are made when required following the assessment of cash requirements for the season.

Bank loan

In March 2020 Zespri received a loan of $30,000,000 to finance the head office land and buildings at 400-410 Maunganui Road, Mount Maunganui, New Zealand.

Security

The security for the day-to-day operational treasury activities and the funding facilities is a first-ranking general security deed in favour of Rabobank, China Construction Bank, HSBC and BNZ entered into by the Zespri Group of companies that form a Guaranteeing Group. Pursuant to the general security deed the collateral at risk is all property for those entities within the Guaranteeing Group, other than the Head Office Assets (described below) and other assets over which another creditor has a higher ranking claim.

In March 2020, Zespri granted security over its head office land and buildings at 400-410 Maunganui Road, Mt Maunganui, New Zealand together with its rights under its lease (to Zespri International Limited) and all related insurances, contracts and its designated head office account with Cooperatieve Rabobank U.A., New Zealand Branch (together the 'Head Office Assets'). Rabobank has a first ranking security interest over those assets, which is provided on a limited recourse basis in relation to the specific loan provided by it.

Covenants

Borrowings are subject to various lending covenants. Zespri has complied with all covenants during the reporting period.

21 RELATED PARTY TRANSACTIONS

(a) Key management personnel

Zespri Group's key management personnel include:

- Directors of the Company; and
- Members of the senior executive of the Company

During the year, key management personnel received the following:

	2021 $'000	2020 $'000
Short-term employee benefits paid and/or payable for key management personnel	**11,963**	10,052
Directors' fees paid	**910**	883
Short-term employee benefits payable as at 31 March for key management personnel	**4,004**	3,726

(b) External related parties through common directorship, control or significant influence by key management personnel

Directors are required to record all interests in the Company's Interests Register and key management personnel must disclose any conflict of interests.

These entities are, or were, related to the Company by virtue of shareholding, control, significant influence or common directorship.

(i) Types of transactions with external related parties include the following:

- The Company pays fruit and service payments and loyalty premium under the terms of the New Zealand Supply Agreement;
- The entities are charged penalties and other charges under the terms of the New Zealand Supply Agreement and the Quality Manual. There are standard dispute procedures which may be enacted if the entities receiving the charges do not agree with these charges;
- Under the terms of the New Zealand Supply Agreement, growers and contracted suppliers are able to make insurance claims to the Company for specific risks. In certain cases, the Company pays out insurance for losses under these claims; and
- The Company may, at its discretion, sell licences for kiwifruit varieties for which it controls the PVRs.

All of the transactions above, including any disputes, were entered into under the same contracted and commercial terms as for all other growers and contracted suppliers in New Zealand.

(ii) Transactions during the year and balances outstanding as at 31 March with external related parties. All related party disclosures are GST exclusive.

	Notes	2021 $'000	2020 $'000
Revenue/(expenses):			
Sale of Zespri Plant Variety Right licences[1]		**21,205**	12,657
Sundry income		**307**	965
Fruit and service payments	21(c)	**(304,451)**	(314,992)
Loyalty premium	21(d)	**(7,941)**	(6,691)
Expenses paid to KVH		**(2,586)**	(2,365)
Dividends paid		**(16,314)**	(17,880)
Other expenses		**(4,375)**	(7,120)
Balances receivable/(payable):			
Sundry income		**110**	3
Fruit and service payments		**(11,520)**	(11,859)
Loyalty premium		**(5,924)**	(4,545)
Other expenses		**–**	(198)

[1] *In 2020/21, external related parties purchased 56.72 ha of new variety licences (2020: 44.13 ha). Licence fee revenue of $21,204,771 (2020: $12,657,420) has been recognised. As at 31 March 2021 there was no licence fee revenue due in future years (2020: $360,797).*

In 2020/21, external related parties conducted no new variety block trials (2020: 0.75 ha). Payments are made to trialists when crops are producing. Upon completion or termination of a trial, trialists can generally obtain, at no cost, a licence to cultivate a Zespri commercial kiwifruit variety for an agreed area. For pre-commercial blocks, this is for a new or existing variety upon commercialisation or an existing variety on trial completion or early termination by Zespri. For demonstration blocks, this is for an existing variety on completion of each year of the trial or early termination by Zespri. in 2020/21, external related parties obtained 2.73ha of new variety licence from trialist entitlement (2020: 2.07ha).

21 RELATED PARTY TRANSACTIONS [CONTINUED]

(c) Fruit and service payments	Expense 2021 $'000	Expense 2020 $'000	Payable 2021 $'000	Payable 2020 $'000
Paid to related party supply entities on behalf of related party grower entities	**70,692**	66,548	**2,296**	1,767
Paid to related party supply entities on behalf of non-related party grower entities	**202,564**	187,918	**8,375**	6,967
Total fruit and service payments to related party supply entities	**273,256**	254,466	**10,671**	8,734
Paid to non-related party supply entities on behalf of related party grower entities	**31,195**	60,526	**849**	3,125
Total related party fruit and service payments	**304,451**	314,992	**11,520**	11,859

(d) Loyalty premium	Expense 2021 $'000	Expense 2020 $'000	Payable 2021 $'000	Payable 2020 $'000
Paid to related party supply entities on behalf of related party grower entities	**2,063**	1,598	**1,539**	1,086
Paid to related party supply entities on behalf of non-related party grower entities	**4,920**	3,838	**3,670**	2,603
Total loyalty payments to related party supply entities	**6,983**	5,436	**5,209**	3,689
Paid to non-related party supply entities on behalf of related party grower entities	**853**	1,153	**636**	787
Related party grower entities paid directly	**105**	102	**79**	69
Total related party loyalty premium payments	**7,941**	6,691	**5,924**	4,545

22 EVENTS OCCURRING AFTER BALANCE DATE

On 27 May 2021 the Board of Directors of Zespri Group Limited announced its intention to pay a final dividend of 27.0 cents per fully paid ordinary share (2020: 19.0 cents) to be paid in August 2021. As the intention was announced after balance date, the financial effect has not been recognised in the Financial Statements.

In April 2021, 700 hectares of Gold3, 50 hectares of Gold3 Organic and 350 hectares of Red19 licences were released. The total revenue (excluding GST) was $430,036,540. Full settlement of the related licence receivables is due by 20 July 2021.

The New Zealand kiwifruit industry continues to monitor and work through the effects COVID-19 has on its business and operations. As an essential service the kiwifruit industry operated through the differing COVID-19 alert levels. Through its efforts, the industry ensured packout rates and timings were not materially impacted. Beyond the packhouse, fruit has flowed well through the supply chain and into our markets. Early season sales have started well and we will continue to monitor the situation throughout the season and regularly update shareholders and growers on progress.

Subsequent to 31 March 2021, no other events have occurred which require adjustment or disclosure in the Financial Statements.

23 GROUP SEGMENT RESULTS

Zespri Group determines its reportable segments by reference to the internal reporting of the activities of the Group to the Board of Directors, the chief operating decision-maker, as defined in NZ IFRS 8 (Operating Segments). Reportable segments have been determined to follow the strategic business lines of the Group, which also reflect groups of similar products and services. Zespri Group has four reportable segments:

(i) New Zealand kiwifruit: all activities related to the production and sale of New Zealand-grown kiwifruit varieties, other than activities included in the new cultivar segment. Activities include but are not limited to innovation, procurement, transport, marketing, selling and administration overheads.

(ii) Non-New Zealand supply: all activities related to the production and sale of non-New Zealand-grown kiwifruit varieties, other than activities included in the new cultivar segment. Activities include but are not limited to innovation, production, procurement, transport, marketing, selling and administration overheads.

(iii) New cultivars: all pre-commercialised activities related to any Zespri PVR kiwifruit. Activities include but are not limited to innovation, production, procurement, transport, marketing, selling and administration overheads. This segment also covers activities related to the selling and administration of PVR licences, and the associated ongoing royalty income.

(iv) All other segments: all other segments not covered above including ownership of land and buildings.

The internal management information on which segment results are based uses a different method for allocating realised gains and losses on treasury activities. For internal management reporting, realised gains and losses from the management of foreign exchange risk are allocated to the business unit's individual revenue and expense lines based on the underlying currencies of the transactions to effect what would be a 'hedged' rate on the cumulative transactions. For financial reporting purposes, these net realised foreign exchange gains/(losses) on derivatives are disclosed separately from the operating revenue and operating expense within other net (losses)/gains (refer Note 4).

23 GROUP SEGMENT RESULTS [CONTINUED]

2021	New Zealand kiwifruit $'000	Non-New Zealand kiwifruit $'000	New cultivars $'000	All other segments $'000	Eliminations $'000	Total $'000
Total sales revenue – external customers	3,109,881	472,827	–	–	–	3,582,708
Inter-segment revenue	–	–	39,329	2,862	(42,191)	–
Interest revenue	–	–	–	983	–	983
Licence income	–	–	306,926	–	–	306,926
Other revenue	5,692	93	5,945	–	–	11,730
Total revenue	3,115,573	472,920	352,200	3,845	(42,191)	3,902,347
Freight	166,211	13,757	–	–	–	179,968
Insurance (onshore and offshore)	5,163	–	–	–	–	5,163
Duty and customs	48,361	6,280	–	–	–	54,641
Promotion	167,437	11,702	–	–	–	179,139
Other direct costs – onshore	69,877	–	–	–	–	69,877
Other direct costs – offshore	124,779	22,441	–	–	–	147,220
Fruit and service payments	2,190,089	354,005	–	–	–	2,544,094
Loyalty premium	62,619	–	–	–	–	62,619
Innovation	12,907	1,064	14,014	–	–	27,985
Depreciation and amortisation	17,251	1,098	1,543	629	–	20,521
Inter-segment expense	36,758	5,371	62	–	(42,191)	–
Inter-segment interest (income)/expense	(630)	–	–	630	–	–
Other onshore overhead costs	80,090	13,586	15,611	205	–	109,492
Other offshore overhead costs	80,321	13,069	1,195	–	–	94,585
Other expenses	–	1,726	–	–	–	1,726
Total expense	3,061,233	444,099	32,425	1,464	(42,191)	3,497,030
Segment profit before taxation	54,340	28,821	319,775	2,381	–	405,317

2020						
Total sales revenue – external customers	2,770,323	369,384	–	–	–	3,139,707
Inter-segment revenue	–	–	32,901	2,208	(35,109)	–
Interest revenue	–	–	–	3,635	–	3,635
Licence income	–	–	215,513	–	–	215,513
Other revenue	5,348	467	5,549	–	–	11,364
Total revenue	2,775,671	369,851	253,963	5,843	(35,109)	3,370,219
Freight	169,102	11,740	–	–	–	180,842
Insurance (onshore and offshore)	6,604	–	–	–	–	6,604
Duty and customs	45,414	10,973	–	–	–	56,387
Promotion	170,546	10,819	–	–	–	181,365
Other direct costs – onshore	57,564	–	–	–	–	57,564
Other direct costs – offshore	110,155	18,816	–	–	–	128,971
Fruit and service payments	1,917,709	273,647	–	–	–	2,191,356
Loyalty premium	45,475	–	–	–	–	45,475
Innovation	14,601	855	17,857	–	–	33,313
Depreciation and amortisation	17,511	934	1,613	549	–	20,607
Inter-segment expense	31,028	4,081	–	–	(35,109)	–
Inter-segment interest (income)/expense	(1,444)	–	–	1,444	–	–
Other onshore overhead costs	76,461	7,583	9,087	247	–	93,378
Other offshore overhead costs	78,152	17,370	–	–	–	95,522
Other expenses	–	1,915	–	–	–	1,915
Total expense	2,738,878	358,733	28,557	2,240	(35,109)	3,093,299
Segment profit before taxation	36,793	11,118	225,406	3,603	–	276,920

23 GROUP SEGMENT RESULTS [CONTINUED]

Group sales revenue – by location of external customers	2021 $'000	2020 $'000
Total Europe and North America	**1,415,537**	1,105,782
Total Europe	**1,208,132**	950,581
Spain	**355,534**	288,435
Germany	**252,385**	203,730
France	**184,877**	142,587
Italy	**163,368**	120,863
Netherlands	**134,844**	105,591
Belgium	**117,124**	89,375
Total North America	**207,405**	155,201
USA	**174,522**	132,514
Canada	**32,883**	22,687
Total Asia Pacific	**1,061,714**	935,023
Japan	**739,313**	667,283
South Korea	**206,032**	175,195
Australia	**62,326**	42,745
Singapore	**31,071**	28,467
Vietnam	**22,972**	21,333
Total Greater China	**913,846**	926,483
China	**731,689**	735,635
Taiwan	**137,179**	149,248
Hong Kong	**44,978**	41,600
Total Other	**191,611**	172,419
New Zealand	**957**	1,012
Other[1]	**190,654**	171,407
Total revenue from product sales to external customers	**3,582,708**	3,139,707

1 Other markets include sales in markets where sales revenue is less than $20.0m in each market.

In 2020/21, there are no customers which account for at least 10 percent of sales across the group. In 2019/20, Joy Wing Mau, accounted for 11 percent of group sales ($344,071,951).

Non-current assets – by location of asset	2021 $'000	2020 $'000
New Zealand	**125,665**	103,116
Other	**21,170**	17,940
	146,835	121,056
Other non-current assets (no assigned location):		
Deferred tax assets	**10,250**	13,700
Other financial assets	**231,360**	148,860
Total non-current assets	**388,445**	283,616

STATUTORY *Information*

SHAREHOLDER INFORMATION

Top 20 shareholders as at 31 March 2021	Number of shares	%
Trinity Lands Limited	4,428,838	2.42
Whitehall Fruitpackers Holdings Limited	3,064,738	1.67
Liberty Foundation 1977 Limited	2,451,968	1.34
Jace Orchards Limited	2,093,524	1.14
Mangatarata Farms Limited	2,036,976	1.11
Progeny Kiwifruit Limited	1,680,893	0.92
Mangatarata Orchards Limited	1,627,965	0.89
Fruit Force Partnership	1,600,476	0.87
Ngai Tukairangi No.2 Trust	1,545,855	0.84
Birdhurst Limited	1,262,598	0.69
Frontier Orchards Limited Partnership	1,221,277	0.67
Cooper Coolpac Limited	1,186,482	0.65
The Wotton Trust	1,095,135	0.60
Golf Course Orchard Limited Partnership	1,065,000	0.58
High Fives Orchard Limited	1,018,773	0.56
Strathboss Kiwifruit Limited	994,695	0.54
Cameron Orchards Limited	976,029	0.53
Aerocool Developments Limited	908,205	0.50
D M & B A Reid Family Trust	894,675	0.49
Cherrymount Trust	852,773	0.47
	32,006,875	17.48

Distribution of ordinary shares and registered shareholders as at 31 March 2021

Size of holding	Number of shareholders	%	Number of shares	Size of holding %
1 – 10,000	244	13.16	1,155,729	0.63
10,001 – 75,000	973	52.51	35,656,618	19.46
75,001 – 200,000	445	24.02	53,021,850	28.93
200,001 – 300,000	77	4.16	18,514,304	10.10
Over 300,000	114	6.15	74,903,739	40.88
Total	1,853	100.00	183,252,240	100.00

Shareholder statistics	2021	2020
Number of shares ('000)	183,252	183,252
Interim and final dividend (per share) – fully imputed	$1.33	$0.94
Share price at year-end	$9.70	$7.80
Earnings per share	$1.59	$1.10
Net dividend yield	13.71%	12.05%
Gross dividend yield at 28% tax rate	19.04%	16.74%
Share trading		
Number of shares sold and/or transferred: on-market trades	3,450,422	1,747,965
Number of shares sold and/or transferred: off-market trades	10,314,992	12,741,562
Equity ratio	23.46%	23.00%
Net tangible assets value (per share)	$1.36	$1.15

DIRECTORS' DISCLOSURES

Directors' meeting attendances and business travel overseas

Name	B L Cameron – Chairman	J P Mason	N W Flowerday	P R Jones	C M Thompson	P M Springford	T Ciprian	A J Hawken
Zespri Group Limited Board[1]	17	17	17	17	17	17	17	16
Audit and Risk Management Committee	5	5	5	5	5	1	–	5
People and Culture Committee[2]	7	7	–	7	7	–	7	7
Industry Advisory Council	4	–	4	5	2	–	–	5
Board Innovation Subcommittee	5	1	5	5	4	3	4	5
China Advisory Board	4	–	–	1	3	4	1	3
Zespri Global Supply (ZGS) Advisory Board	4	–	–	1	4	–	–	–
Number of business travel overseas[3]	–	–	–	–	–	–	–	–

1 In addition to the scheduled Board meetings, there were postal resolutions circulated at short notice, and six special meetings held as a consequence of industry wide events that required immediate consideration by the Board (14 April 2020, 23 April 2020, 30 April 2020, 22 May 2020, 10 June 2020 and 3 August 2020). There are no official Board meetings in April and July as part of a new cadence for Board meetings.

All Directors have a standing invitation to attend meetings of all committees, irrespective of whether or not they are a member of that committee. In addition to the meetings detailed above, Directors' attendances included planning meetings, Directors' conferences, grower meetings and Special and Annual Meetings.

2 In addition to the scheduled People and Culture Committee, there were two special meetings convened at short notice (17 June 2020 and 20 October 2020) that required immediate consideration by the People and Culture Committee.

3 Due to COVID-19.

Committee members – Directors

Audit and Risk Management Committee

J P Mason (Chair)
N W Flowerday
P R Jones
A J Hawken

People and Culture Committee

P R Jones (Chair)
T Ciprian
J P Mason
C M Thompson

Industry Advisory Council

A J Hawken (Chair)
P R Jones
N W Flowerday

Board Innovation Subcommittee

N W Flowerday (Chair)
T Ciprian
P R Jones
A J Hawken

China Advisory Board

P M Springford (Chair)

Zespri Global Supply (ZGS) Advisory Board

C M Thompson (Chair)

KVH Board

C M Thompson

DIRECTORS' DISCLOSURES [CONTINUED]

Remuneration of Directors	2021 $	2020 $
B L Cameron	213,492	210,787
T Ciprian	90,772	87,781
N W Flowerday	95,772	93,067
A J Hawken	95,772	95,275
P R Jones	116,272	113,689
J P Mason	106,272	103,567
P J McBride	–	31,266
P M Springford	95,772	87,781
C M Thompson	95,772	59,474
Total	909,896	882,687

The Chair of each committee receives $5,000 of remuneration per annum, except for the Chair of the Audit and Risk Management Committee who receives $15,500 remuneration per annum.

Directors' interests – shareholdings

The following table sets out the shareholdings in Zespri Group Limited held by each Director or related entity as at 31 March 2021.

	Shareholding as at 31 March 2020	Date of transaction	Share price $	Number purchased and transferred	Number sold	Interest commenced/ (ceased)	Shareholding as at 31 March 2021
B L Cameron	1,277,429		–	–	–	–	1,277,429
T Ciprian	–		–	–	–	–	–
N W Flowerday	1,080,984	24/12/2020	9.25	23,000	–	–	–
		26/03/2021	9.65	20,000	–	–	1,123,984
A J Hawken	75,000	10/07/2020	9.10	25,000	–	–	–
		07/07/2020	8.75	17,000	–	–	–
		13/10/2020	–	–	–	360,601	477,601
P R Jones	7,330,102[1]	10/07/2020	9. 10	25,000	–	–	–
		07/10/2020	8.75	17,000	–	–	7,372,102
J P Mason	–		–	–	–	–	–
P M Springford	–		–	–	–	–	–
C M Thompson	1,750,195		–	–	–	–	1,750,195

1 The opening shareholding of P R Jones has been adjusted to remove shareholdings of Progeny Kiwifruit Limited in which P R Jones has a relevant interest.

The above table includes shareholdings and share trades by relevant interests of Directors, as defined in the Financial Markets Conduct Act 2013.

A full list of Directors' interests is included on the following pages.

DIRECTORS' DISCLOSURES [CONTINUED]

Directors' interests – Directors in office as at 31 March 2021

B L Cameron

Director and Chairman of, and shareholder in, Zespri Group Limited

Director of Zespri International Limited and other Zespri subsidaries

Chairman and Trustee of Waipuna Hospice Foundation Board

Director of Eves Realty Group Ltd

Director and Chairman of Realty Service Holdings Limited

Director of, and shareholder in, Cameron Dairy Farms Limited

Director of, and shareholder in, Cameron Farms Limited

Director of, and shareholder in, Cameron Orchards Limited (Shareholder in EastPack Limited and DMS Progrowers Limited)

Director of, and shareholder in, Gilston Mains Limited and subsidiary

Director of, and shareholder in, Strathlea Holdings Limited

Trustee of B L and G M Cameron Family Trust

Trustee of Rawenga Trust

T Ciprian

Director of Zespri Group Limited

Director of Zespri International Limited

Director of Aspeq Limited and subsidiaries

Director of Bluerock Limited (interest commenced April 2020)

Director of Firstlight Foods Limited

Director of Food Standards Australia New Zealand

Director of Prolife Foods Limited

Director of, and shareholder in, Superthriller Jet Sprint Limited

Director of, and shareholder in, Zenoch Management Limited

N W Flowerday

Director of, and shareholder in, Zespri Group Limited

Director of Zespri International Limited

Director of, and shareholder in, High Fives Orchard Limited (Shareholder in Apata Group Limited)

Director of, and shareholder in, NWF Holdings Limited (Shareholder in Apata Group Limited)

Director of, and shareholder in, Pro Kiwi Limited

A J Hawken

Director of, and shareholder in, Zespri Group Limited

Director of Zespri International Limited

Chairman of Tapawera Hops Limited Partnership

Chairman of Heretaunga Orchard Limited Partnership (interest commenced December 2020)

Director and Chairman of Korokipo Apple GP Limited

Director and Chairman of Rakete Orchards GP Limited

Director and Chairman of Wairau Hops Limited

Director of, and shareholder in, Eastern Gold Limited (Shareholder in EastPack Limited and DMS Progrowers Limited)

Director of, and shareholder in, Hawken Farm Limited

Director of, and shareholder in, Pipt Limited

Director of, and shareholder in, Rochford Farms Limited

Director of, and shareholder in, Willows Rd Gold Limited

Director of Tirohanga Fruit Company (interest commenced August 2020)

Shareholder in EastPack Limited

Shareholder in Ryan Hawken Enterprises Limited

Trustee of Kenmore Trust (Shareholder in EastPack Limited)

Advisor to Origin Capital Fund

Business Development Manager at Trinity Lands Limited

DIRECTORS' DISCLOSURES [CONTINUED]

Directors' interests – Directors in office as at 31 March 2021 (continued)

P R Jones

Director of, and shareholder in, Zespri Group Limited

Director of Zespri International Limited

Director of DMS Group Limited and subsidiaries

Director of DMS Progrowers Supply Entity Limited

Director of Mangatarata Orchards Limited and Mangatarata Orchard Partnership

Director of New Zealand Avocado Marketing Limited

Director of Tane-Mahuta Orchard Developments Limited

Director of Willow Rd Gold Limited

Director and shareholder of Anamata 100 Limited

Director of, and shareholder in, Direct Management Services Limited

Director of, and shareholder in, DMS Progrowers Limited

Director of, and shareholder in, Eastern Gold Limited

Director of, and shareholder in, Elizabeth Heights Limited

Director of, and shareholder in, Fraser Rd Orchard GP Limited and Limited Partnership

Director of, and shareholder in, Fruit Force Partnership

Director of, and shareholder in, Golf Course Orchard GP Limited and Limited Partnership

Director of, and shareholder in, Origin Capital Partners Management Limited (interest commenced May 2020)

Director of, and shareholder in, OTK Orchards Limited

Director of, and shareholder in, TKG Agent Limited and TKG Partnership

Shareholder in Hopai Holdings Limited

Shareholder in Mangatarata Farms Limited

Shareholder in Progeny Kiwifruit Limited

Trustee of, and beneficiary of, the Patricia Jones Trust

Trustee of, and beneficiary of, the P R Jones Family Trust

J P Mason

Director of Zespri Group Limited

Director of Zespri International Limited

Director and Chairman of Vector Limited and certain subsidiaries

Director of Air New Zealand Limited

Director of Allagash Limited

Director of Alvarium Wealth NZ Limited (Interest ceased November 2020)

Director of Westpac New Zealand Limited

Member of the Board of Directors of the American Chamber of Commerce

Member of Institute of Directors of NZ National Council

Trustee of University of Auckland Endowment Fund

Trustee of Beloit College (USA)

Trustee of Dilworth School

Trustee of World Wildlife Fund for Nature (NZ)

P M Springford

Director of Zespri Group Limited

Director of Zespri International Limited

Director of Aussie Frost Fans 2012 Limited (interest ceased March 2021)

Director of Infratil Limited

Director of Loncel Technologies 2014 Limited (interest ceased March 2021)

Director of New Zealand Frost Fans Limited (interest ceased March 2021)

Director of Omahu Ventures Limited

Director of Springford and Newick Limited

Director, and shareholder, of Cerbere Investments Limited

Director of, and shareholder in, Charlie Farley Forestry Limited

Director of, and shareholder in, Medicann Investments Limited

Shareholder of New Zealand Wood Products Limited

Trustee of The Dunstan Trust

Trustee of The Springford Family Trust

C M Thompson

Director of, and shareholder in, Zespri Group Limited

Director of Zespri International Limited

Director of DCD Orchards Limited

Director of Kaiaponi Farms

Director of Kiwifruit Vine Health Incorporated

Director of Ohiwa Hort Limited

Director of Ohiwa Investments Limited

Director of OPAC Properties Limited

Director of Paradise Kiwis Limited

Director, and shareholder of, Alandale Farms Limited (Shareholder in Seeka Limited)

Director, and shareholder, of Double M Orchards Limited

Director, and shareholder of, Opotiki Packing & Coolstorage Limited

Shareholder of CVC Orchards Limited (interest commenced October 2020)

Shareholder of G.I.K. ss

Trustee of CM Thompson Family Trust

Trustee of Gibbons Family Trust

Trustee of ID & N Greaves Family Trust

EMPLOYEE REMUNERATION

For the year ended 31 March 2021, the number of employees whose total remuneration and value of any benefits received or receivable exceeded $100,000 between the following bands was:

Number of non-New Zealand-based employees	Number of New Zealand-based employees	Total remuneration and benefits ($)
23	17	$100,000 to $109,999
14	21	$110,000 to $119,999
14	20	$120,000 to $129,999
14	14	$130,000 to $139,999
12	7	$140,000 to $149,999
18	7	$150,000 to $159,999
3	10	$160,000 to $169,999
11	5	$170,000 to $179,999
6	8	$180,000 to $189,999
4	5	$190,000 to $199,999
6	3	$200,000 to $209,999
4	2	$210,000 to $219,999
6	7	$220,000 to $229,999
2	5	$230,000 to $239,999
4	3	$240,000 to $249,999
–	1	$250,000 to $259,999
1	3	$260,000 to $269,999
4	–	$270,000 to $279,999
2	3	$290,000 to $299,999
1	–	$300,000 to $309,999
4	–	$310,000 to $319,999
2	–	$320,000 to $329,999
1	1	$330,000 to $339,999
1	–	$340,000 to $349,999
1	–	$350,000 to $359,999
–	1	$360,000 to $369,999
1	–	$370,000 to $379,999
1	–	$380,000 to $389,999
2	–	$390,000 to $399,999
4	1	$400,000 to $409,999
–	1	$430,000 to $439,999
–	1	$460,000 to $469,999
–	1	$490,000 to $499,999
2	–	$500,000 to $509,999
1	1	$510,000 to $519,999
–	1	$540,000 to $549,999
1	–	$550,000 to $559,999
1	1	$560,000 to $569,999
–	1	$580,000 to $589,999
1	–	$590,000 to $599,999
–	1	$610,000 to $619,999
–	1	$670,000 to $679,999
–	1	$790,000 to $799,999
1	–	$800,000 to $809,999
1	–	$850,000 to $859,999
–	1	$880,000 to $889,999
1	–	$1,880,000 to $1,889,999

Note: These bands are in New Zealand Dollar equivalents and reflect foreign exchange fluctuations.

INDUSTRY *Performance*

REGIONAL PRODUCTION ANALYSIS – NEW ZEALAND-GROWN KIWIFRUIT

Tray Equivalents (TEs) supplied to Zespri	2020/21		2019/20		2018/19		2017/18	
	Producing ha	**TE supplied per ha**	Producing ha	TE supplied per ha	Producing ha	TE supplied per ha	Producing ha	TE supplied per ha
ZESPRI GREEN KIWIFRUIT								
Northland	**81**	**8,829**	100	6,835	106	8,498	109	5,779
Auckland	**243**	**8,030**	256	7,175	262	9,974	273	7,719
Bay of Plenty								
– Katikati	**859**	**8,011**	830	8,960	859	9,882	940	7,678
– Ōpōtiki	**436**	**10,735**	444	10,834	455	11,315	457	8,917
– Tauranga	**996**	**10,625**	1,066	9,773	1,087	12,014	1,086	9,193
– Te Puke	**3,079**	**11,551**	3,190	11,058	3,292	12,380	3,419	9,641
– Waihi	**106**	**7,608**	132	7,771	138	9,858	100	6,569
– Whakatāne	**309**	**7,434**	331	8,369	366	10,541	402	7,728
Waikato	**202**	**8,297**	204	9,113	203	9,076	200	8,339
Poverty Bay	**40**	**6,054**	44	6,801	52	7,745	54	8,366
Hawke's Bay	**41**	**6,005**	41	6,916	45	7,358	43	6,620
Lower North Island	**69**	**8,623**	69	9,062	70	9,291	70	8,696
South Island	**197**	**6,226**	208	6,519	223	7,258	229	5,663
Total producing hectares	**6,659**		6,915		7,158		7,382	
Average TE supplied per hectare		**10,133**		9,932		11,320		8,812
ZESPRI ORGANIC GREEN KIWIFRUIT								
Northland	**–**	**–**	–	–	–	–	–	–
Auckland	**1**	**5,118**	1	2,626	1	5,364	1	2,614
Bay of Plenty								
– Katikati	**29**	**6,427**	30	6,095	30	9,061	30	6,593
– Ōpōtiki	**22**	**7,400**	21	7,092	21	7,493	22	5,786
– Tauranga	**177**	**7,333**	174	6,599	182	8,604	203	6,033
– Te Puke	**35**	**8,276**	37	7,924	38	8,775	42	6,979
– Waihi	**22**	**3,961**	22	5,077	22	6,589	19	3,964
– Whakatāne	**4**	**2,742**	4	3,178	4	4,594	4	4,197
Waikato	**147**	**4,875**	147	6,047	148	6,885	151	5,310
Poverty Bay	**–**	**–**	0	2,728	1	4,042	1	3,676
Hawke's Bay	**–**	**–**	–	–	–	–	–	–
Lower North Island	**2**	**3,330**	2	3,763	2	4,439	2	5,552
South Island	**–**	**–**	–	–	–	–	–	–
Total producing hectares	**439**		437		448		475	
Average TE supplied per hectare		**6,296**		6,386		7,863		5,802
ZESPRI SUNGOLD KIWIFRUIT [GOLD3][1]								
Northland	**386**	**13,251**	368	11,738	356	12,327	319	8,044
Auckland	**234**	**14,312**	227	12,865	214	12,143	206	10,701
Bay of Plenty								
– Katikati	**597**	**13,285**	537	13,421	497	13,531	525	11,299
– Ōpōtiki	**571**	**13,901**	543	14,132	520	13,871	506	12,172
– Tauranga	**517**	**14,580**	500	13,133	476	14,100	437	12,320
– Te Puke	**2,402**	**15,252**	2,085	14,228	1,811	13,744	1,655	12,390
– Waihi	**97**	**12,256**	105	11,887	92	12,811	53	9,168
– Whakatāne	**341**	**13,405**	274	12,074	240	11,931	211	13,211
Waikato	**185**	**12,773**	197	11,239	192	10,712	183	7,937
Poverty Bay	**311**	**10,727**	267	12,321	244	11,937	208	9,740
Hawke's Bay	**165**	**11,034**	156	12,559	152	10,840	149	8,263
Lower North Island	**1**	**10,096**	1	11,093	2	5,955	2	7,799
South Island	**241**	**15,189**	224	14,897	200	14,135	176	8,693
Total producing hectares	**6,047**		5,483		4,996		4,630	
Average TE supplied per hectare		**14,130**		13,443		13,216		11,292

Tray Equivalents (TEs) supplied to Zespri	2020/21 Producing ha	2020/21 TE supplied per ha	2019/20 Producing ha	2019/20 TE supplied per ha	2018/19 Producing ha	2018/19 TE supplied per ha	2017/18 Producing ha	2017/18 TE supplied per ha
ZESPRI ORGANIC SUNGOLD KIWIFRUIT [GOLD3][1]								
Northland	9	7,579	–	–	–	–	–	–
Auckland	4	8,687	–	–	–	–	–	–
Bay of Plenty								
– Katikati	2	7,868	–	–	–	–	–	–
– Ōpōtiki	11	7,939	–	–	–	–	–	–
– Tauranga	30	10,618	–	–	–	–	–	–
– Te Puke	52	12,350	–	–	–	–	–	–
– Waihi	13	9,307	–	–	–	–	–	–
– Whakatāne	–	–	–	–	–	–	–	–
Waikato	18	8,263	–	–	–	–	–	–
Poverty Bay	3	4,871	–	–	–	–	–	–
Hawke's Bay	–	–	–	–	–	–	–	–
Lower North Island	–	–	–	–	–	–	–	–
South Island	–	–	–	–	–	–	–	–
Total producing hectares	142		–		–		–	
Average TE supplied per hectare		10,253		–		–		–
ZESPRI SWEET GREEN KIWIFRUIT [GREEN14]								
Northland	–	–	–	–	1	5,809	1	3,041
Auckland	12	3,088	14	2,894	18	4,916	14	5,238
Bay of Plenty								
– Katikati	8	4,307	9	4,718	8	5,871	11	7,377
– Ōpōtiki	5	5,687	5	7,353	8	8,003	12	7,790
– Tauranga	1	5,771	1	7,380	4	7,254	6	5,845
– Te Puke	9	8,719	17	7,778	59	6,944	80	7,711
– Waihi	–	–	–	–	–	–	–	–
– Whakatāne	5	5,844	7	5,674	17	6,863	18	7,550
Waikato	–	–	8	6,248	11	5,032	15	5,428
Poverty Bay	–	–	–	–	3	5,298	4	6,985
Hawke's Bay	7	7,831	7	5,920	8	3,682	8	4,415
Lower North Island	1	2,471	2	3,181	4	2,602	4	6,486
South Island	–	–	–	–	2	4,013	2	2,789
Total producing hectares	48		70		145		175	
Average TE supplied per hectare		5,608		5,668		6,150		6,925
ALL ZESPRI KIWIFRUIT[2]								
Northland	476	12,391	467	10,694	463	11,440	440	7,481
Auckland	494	10,886	497	9,642	494	10,716	494	8,887
Bay of Plenty	10,736	12,111	10,363	11,537	10,227	12,264	10,237	9,978
– Katikati	1,493	10,068	1,407	10,575	1,395	11,140	1,505	8,916
– Ōpōtiki	1,046	12,341	1,012	12,510	1,004	12,533	996	10,486
– Tauranga	1,722	11,470	1,741	10,420	1,750	12,215	1,733	9,599
– Te Puke	5,577	13,127	5,328	12,266	5,200	12,767	5,197	10,465
– Waihi	238	9,250	259	9,218	253	10,656	172	7,071
– Whakatāne	659	10,484	614	9,962	626	10,940	634	9,528
Waikato	551	8,883	555	9,016	554	8,978	549	7,291
Poverty Bay	353	10,155	312	11,526	300	11,123	267	9,399
Hawke's Bay	212	9,966	204	11,197	205	9,802	203	7,757
Lower North Island	73	8,392	75	8,749	78	8,720	78	8,463
South Island	438	11,157	433	10,861	426	10,473	425	7,101
Total producing hectares	13,334		12,905		12,747		12,693	
Average TE supplied per hectare		11,804		11,281		11,883		9,579

1 The 2017/18 to 2019/20 comparatives presented here for Zespri SunGold kiwifruit (Gold3) reflect the combined pool of Zespri SunGold and Organic SunGold kiwifruit (Gold3). These varieties have been split into separate pools for the 2020/21 year.

2 The 2017/18 comparative includes 30 producing hectares of Hort16A, with an average TE supplied per hectare of 9,689 not separately presented in the table above.

TE/ha = tray equivalents of supplied Class 1 standard supply sizes per hectare.
Producing hectares includes all hectares producing fruit in the relevant season.
Producing hectare amounts are not rounded to whole numbers; therefore, rounding differences may apply to totals.

INDUSTRY *Performance* CONTINUED

NEW ZEALAND KIWIFRUIT INDUSTRY STATISTICS

	2020/21	2019/20	2018/19	2017/18	2016/17	2015/16	2014/15	2013/14
Distribution to growers/suppliers								
Fruit and service payments (excluding loyalty premium)	**13.72**	12.94	11.52	11.53	9.21	9.27	9.57	9.02
Loyalty premium	**0.39**	0.31	0.30	0.27	0.25	0.24	0.24	0.24
Total payments per tray all classes[1]	**14.11**	13.25	11.83	11.80	9.46	9.51	9.81	9.26
Crop volumes ('000)								
Trays submitted (gross)	**160,977**	150,341	157,715	125,822	148,902	123,763	97,304	87,725
Trays supplied[3]	**159,649**	148,134	154,058	124,433	145,871	120,145	95,683	86,510
Trays sold[3]	**158,077**	145,223	148,843	123,246	137,748	117,094	95,187	86,094
Trays sold as a percentage of trays supplied	**99.0%**	98.0%	96.6%	99.0%	94.4%	97.5%	99.5%	99.5%
General statistics								
Production per hectare (trays submitted)	**12,072**	11,650	12,373	9,913	11,838	10,157	8,662	8,016
Producing hectares	**13,334**	12,905	12,747	12,692	12,578	12,185	11,233	10,944
Orchard Gate Return per hectare (average)	**123,041**	107,142	96,033	79,361	68,868	60,758	57,369	49,385
Number of producers[2]	**2,813**	2,792	2,756	2,405	2,435	2,516	2,540	2,350
Average number of trays supplied per producer	**56,754**	53,057	55,899	51,739	59,906	47,752	37,670	36,813
Number of orchards registered								
0 – 2 hectares	**734**	738	717	774	791	807	834	802
2 – 5 hectares	**1,554**	1,540	1,575	1,509	1,508	1,499	1,428	1,458
5 – 10 hectares	**720**	693	702	607	589	568	515	487
Over 10 hectares	**214**	211	207	165	161	147	128	126
Total (KPINs)	**3,222**	3,182	3,201	3,055	3,049	3,021	2,905	2,873
Average orchard size (hectares)								
Green	**3.3**	3.3	3.4	3.5	3.5	3.5	3.6	3.6
Gold*	**3.5**	3.3	2.8	2.7	2.6	2.3	1.9	2.0
* Includes Gold3, Hort16A and Gold9 (decommercialised 2015/16)								
Number of packhouses used								
0 – 500,000 trays	**6**	10	7	15	16	17	15	20
500,001 – 1,000,000 trays	**3**	3	6	6	7	5	8	9
1,000,001 – 2,000,000 trays	**8**	9	8	4	5	9	8	7
Over 2,000,000 trays	**24**	22	23	22	22	20	19	18
Total	**41**	44	44	47	50	51	50	54
Average trays stored per packhouse ('000)	**3,926**	3,417	3,584	2,677	2,978	2,427	1,956	1,626
Number of coolstores used								
0 – 500,000 trays	**17**	22	25	31	35	29	26	33
500,001 – 1,000,000 trays	**10**	8	6	8	10	5	9	8
1,000,001 – 2,000,000 trays	**7**	9	8	6	7	9	8	11
Over 2,000,000 trays	**25**	24	25	22	21	21	19	16
Total	**59**	63	64	67	73	64	62	68
Average trays stored per coolstore ('000)	**2,728**	2,386	2,464	1,878	2,040	1,934	1,577	1,291
Number of employees								
New Zealand based (includes seasonal employees)	**343**	294	251	239	233	194	184	163
Non-New Zealand based	**345**	284	279	239	203	159	133	123
Total	**688**	578	530	478	436	353	317	286
Global revenue per employee ($'000), including seasonal employees	**5,675**	5,830	5,952	5,244	5,379	5,457	5,062	4,764
Global revenue (adjusted to 31 March 2021 7-year average foreign exchange rates) per employee ($'000) – including seasonal employees	**5,386**	5,554	5,703	5,171	5,318	5,392	5,452	4,682

1 Per tray amounts are not rounded to two decimal places; therefore, rounding differences may apply to totals.

2 In accordance with the revised Constitution definition of Producer, from 2018/19 the number of producers includes lessees. The historical numbers exclude lessees.

3 Volumes relate to the supply season.

NEW ZEALAND TOTAL FRUIT AND SERVICE PAYMENTS INCLUDING LOYALTY PREMIUM

		Return $m 2020/21	$ PER TE[1] 2020/21	$ PER TE 2019/20	$ PER TE 2018/19	$ PER TE 2017/18
CLASS 1 KIWIFRUIT						
	Total tray equivalents supplied (millions)		67.5	68.7	81.0	65.1
	Fruit payments	584.2	8.65	4.10	4.10	5.35
	Fruit incentives	24.4	0.36	4.15	3.01	2.96
	Service payments	94.2	1.39	1.59	1.67	1.55
	Loyalty premium	26.8	0.40	0.31	0.31	0.28
	Total fruit and service payments (including loyalty premium)	729.7	10.80	10.16	9.09	10.14
	Total tray equivalents supplied (millions)		2.8	2.8	3.5	2.8
	Fruit payments	31.9	11.54	5.64	6.74	7.72
	Fruit incentives	1.3	0.46	5.71	4.10	2.84
	Service payments	2.2	0.81	0.90	1.00	0.87
	Loyalty premium	1.1	0.40	0.31	0.31	0.28
	Total fruit and service payments (including loyalty premium)	36.5	13.21	12.56	12.14	11.71
	Total tray equivalents supplied (millions)		85.5	73.7	66.0	52.6
	Fruit payments	1,212.4	14.18	6.32	7.17	6.86
	Fruit incentives	70.7	0.83	8.14	6.31	5.76
	Service payments	121.1	1.42	1.57	1.58	1.28
	Loyalty premium	34.0	0.40	0.31	0.31	0.28
Notes 2, 3	**Total fruit and service payments (including loyalty premium)**	1,438.2	16.82	16.35	15.37	14.18
	Total tray equivalents supplied (millions)		1.5			
	Fruit payments	24.6	16.95			
	Fruit incentives	0.8	0.55			
	Service payments	1.4	0.96			
	Loyalty premium	0.6	0.40			
Notes 2, 3	**Total fruit and service payments (including loyalty premium)**	27.4	18.85			
	Total tray equivalents supplied (millions)		0.3	0.4	0.9	1.2
	Fruit payments	3.5	12.70	6.59	6.53	5.68
	Fruit incentives	0.1	0.50	3.92	3.37	2.70
	Service payments	–	–	–	0.12	0.22
	Loyalty premium	0.1	0.40	0.31	0.31	0.28
	Total fruit and service payments (including loyalty premium)	3.7	13.61	10.82	10.34	8.88
CLASS 2 KIWIFRUIT						
	Total tray equivalents supplied (millions)		1.1	1.1	1.4	0.7
	Fruit payments	8.1	7.32	7.01	5.97	6.18
	Service payments	0.1	0.13	–	0.04	–
	Total fruit and service payments	8.2	7.45	7.01	6.01	6.18
	Total tray equivalents supplied (millions)		0.1	0.1	0.1	0.1
	Fruit payments	0.5	10.02	10.02	9.86	9.67
	Service payments	–	0.15	0.13	0.19	0.22
	Total fruit and service payments	0.5	10.17	10.15	10.05	9.89
	Total tray equivalents supplied (millions)		0.8	0.5	0.7	1.1
	Fruit payments	7.0	9.02	8.44	7.68	6.20
	Service payments	0.1	0.16	0.03	0.08	0.13
Note 4	**Total fruit and service payments**	7.1	9.18	8.47	7.76	6.33
	Total tray equivalents supplied (m)		0.0			
	Fruit payments	0.4	13.42			
	Service payments	–	0.04			
Note 4	**Total fruit and service payments**	0.4	13.47			
NON-STANDARD SUPPLY						
	Total tray equivalents supplied (millions)		0.1	0.8	0.5	1.0
	Fruit payments	1.4	9.71	4.20	5.60	7.66
	Fruit incentives	–	–	3.49	2.79	–
	Service payments	0.1	0.77	0.96	0.54	0.05
	Total fruit and service payments	1.5	10.48	8.65	8.93	7.71
TOTAL ALL POOLS						
	Total tray equivalents supplied (millions)		159.6	148.1	154.1	124.4
	Fruit payments	1,873.9	11.74	5.28	5.53	6.08
	Fruit incentives	97.4	0.61	6.12	4.41	4.07
	Service payments	219.3	1.37	1.54	1.59	1.38
	Loyalty premium	62.6	0.39	0.31	0.30	0.27
	Total fruit and service payments (including loyalty premium)	2,253.2	14.11	13.25	11.83	11.80
	Total fruit and service payments 2019/20 (NZ IFRS)	1,962.5				
	Total fruit and service payments 2018/19 (NZ IFRS)	1,821.8				
	Total fruit and service payments 2017/18 (NZ IFRS)	1,468.1				

1 $ Per TE Amounts are not rounded to two decimal places; therefore, rounding differences may apply to totals.

2 The 2017/18 comparatives include Hort16A within the Class 1 SunGold numbers presented above.

3 The 2017/18 to 2019/20 comparatives presented here for Zespri SunGold Kiwifruit reflects the combined pool of Zespri SunGold and Organic SunGold Kiwifruit (Gold3). These varieties have been split into separate pools for the 2020/21 year.

4 The 2017/18 to 2019/20 comparatives presented here for Zespri Class 2 SunGold Kiwifruit reflects the combined results of Zespri Class 2 SunGold and Class 2 Organic SunGold Kiwifruit (Gold3). These varieties have been presented separately for the 2020/21 year.

ALTERNATIVE *Revenue Statement*

	2020/21	2019/20	2018/19
Zespri global kiwifruit sales – net ($'000)	**3,582,708**	3,139,707	2,943,870
New Zealand grown kiwifruit tray equivalents supplied (millions)	**159.6**	148.2	154.1
Non-New Zealand grown kiwifruit tray equivalents supplied (millions)	**23.7**	19.3	18.5

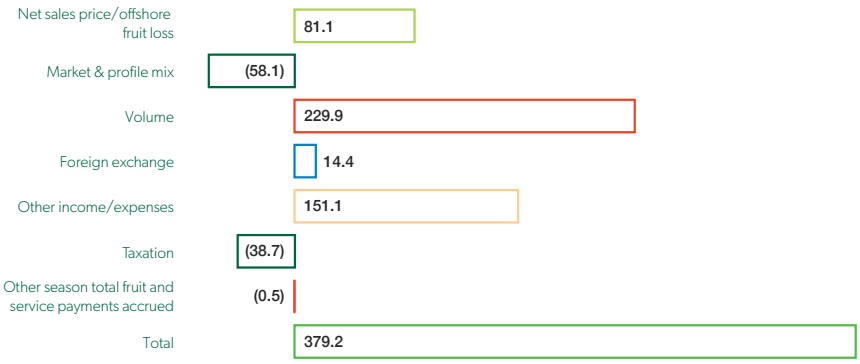
NEW ZEALAND KIWIFRUIT SEGMENT	$'000		$'000		$'000	
Gross sales of New Zealand kiwifruit		**3,334,563**		2,966,543		2,839,871
Promotional rebates, claims and discounts		**(258,894)**		(223,988)		(230,270)
Net sales of New Zealand kiwifruit		**3,075,669**		2,742,555		2,609,601
Net fruit return through collaborative marketers		**34,212**		27,768		22,595
Other pool income		**877**		990		1,662
Revenue attributable to New Zealand pools[1]		**3,110,758**		2,771,313		2,633,858
Less New Zealand pool costs:						
Freight	**166,211**		169,102		172,701	
Insurance (onshore and offshore excluding hail)	**4,718**		3,939		3,591	
Hail self-insurance	**445**		2,665		326	
Duty and customs	**48,361**		45,414		94,776	
Other direct pool costs – onshore[2, 3, 4, 6]	**103,835**		86,384		78,613	
Other direct pool costs – offshore	**124,779**		110,155		95,659	
Promotion	**167,437**		170,546		161,180	
Interest income[5]	**(630)**		(1,444)		(1,022)	
Total pool costs		**615,156**		586,761		605,824
Return from fruit sales		**2,495,602**		2,184,552		2,028,034
New Zealand fruit and service payments[11]		**2,190,089**		1,917,709		1,775,408
Zespri margin[7]		**305,513**		266,843		252,626
Other non-pool revenue		**2,478**		2,303		2,579
Innovation funding[9]		**2,678**		2,446		2,509
New Zealand kiwifruit corporate revenue		**310,669**		271,592		257,714
Less corporate overhead expenses:						
Innovation	**13,326**		15,073		15,762	
Overhead costs – onshore	**93,989**		91,540		81,201	
Overhead costs – offshore	**86,395**		83,093		76,950	
Allocated excess taxation	**–**		(382)		2,636	
New Zealand kiwifruit corporate overhead expense		**193,710**		189,324		176,549
Zespri EBIT and loyalty premium from New Zealand kiwifruit segment		**116,959**		82,268		81,165
Loyalty premium		**62,619**		45,475		46,347
Zespri EBIT from New Zealand kiwifruit segment		**54,340**		36,793		34,818

NON-NEW ZEALAND SUPPLY SEGMENT[8]						
Net sales of non-New Zealand supply kiwifruit		**472,827**		369,384		311,674
Less non-New Zealand supply costs:						
Direct costs including fruit purchases	**413,556**		330,074		277,307	
Overhead costs	**28,816**		26,743		25,823	
Other expense/(income)	**1,634**		1,449		463	
		444,006		358,266		303,593
EBIT from non-New Zealand supply segment		**28,821**		11,118		8,081

	2020/21		2019/20		2018/19	
NEW CULTIVARS SEGMENT	$'000		$'000		$'000	
New cultivars licence revenue		**306,926**		215,513		194,420
New cultivars royalty income[2]		**39,600**		32,901		28,400
New cultivars Innovation Income[9]		**5,674**		5,549		4,911
Revenue attributable to new cultivars		**352,200**		253,963		227,731
Less new cultivars costs:						
Amortisation of new cultivars	**1,284**		1,320		1,323	
New cultivars costs[10]	**31,141**		27,237		19,005	
		32,425		28,557		20,328
Zespri EBIT from new cultivars segment		**319,775**		225,406		207,403
LAND AND BUILDINGS SEGMENTS						
Income		**2,862**		2,590		525
Overhead costs	**834**		796		593	
		834		796		593
Zespri EBIT from land and buildings segment		**2,028**		1,794		(68)
Zespri Group EBIT		**404,964**		275,111		250,234
Net interest income		**353**		2,191		2,764
Add back allocated excess taxation		**–**		(382)		2,636
Zespri Group profit before taxation		**405,317**		276,920		255,634
Taxation		**114,827**		76,099		75,828
Zespri Group profit after tax		**290,490**		200,821		179,806
Total fruit and service payments		**2,190,089**		1,917,709		1,775,408
Loyalty premium		**62,619**		45,475		46,347
Total fruit and service payments (including loyalty premium)		**2,252,708**		1,963,184		1,821,755

The Alternative Revenue Statement is used for management information and is the basis for the calculation of the fruit and service payments. Foreign exchange gains and losses are allocated differently from the way that they are treated in the Financial Statements in that they are apportioned to the relevant line items above. For more detail on segment EBITs, refer to Note 23 of the Financial Statements.

CAUSE OF CHANGE 2020/21 VS 2019/20 $MILLIONS



The 'Cause of Change' chart outlines the increase in the return to the industry this financial year to $2,543 million from $2,164 million in 2019/20.

	$'000
Total fruit and service payments 2019/20 (including loyalty premium)	1,962,508
Add other seasons total fruit and service payments accrued	676
Add Zespri net profit after tax 2019/20	200,821
Return to industry 2019/20 financial year	**2,164,005**
Movements due to change in:	
Net sales price/offshore fruit loss	81,071
Market and profile mix	(58,065)
Volume	229,922
Foreign exchange	14,363
Other income/expenses	151,082
Taxation	(38,728)
Return to industry 2020/21 season	**2,543,650**
Other seasons total fruit & service payments accrued	(452)
Return to industry 2020/21 financial year	**2,543,198**
Total fruit and service payments 2020/21 season	2,190,541
Add other season total fruit and service payments accrued	(452)
Add Zespri loyalty premium 2020/21	62,619
Total fruit and service payments 2020/21 (including loyalty premium)	2,252,708
Add Zespri net profit after tax 2020/21	290,490
Return to industry 2020/21 financial year	**2,543,198**

NEW ZEALAND POOL COSTS AS A PERCENTAGE OF POOL REVENUE

	2020/21	2019/20	2018/19
Zespri margin (net of loyalty premium)*	**7.8%**	8.0%	7.8%
Freight	**5.3%**	6.1%	6.6%
Insurance	**0.2%**	0.2%	0.1%
Duty and customs**	**1.6%**	1.6%	3.6%
Other direct pool costs – onshore	**3.3%**	3.1%	3.0%
Other direct pool costs – offshore	**4.0%**	4.0%	3.6%
Promotion	**5.4%**	6.2%	6.1%
Interest (Income)/Charge	**0.0%**	(0.1%)	0.0%
Total fruit and service payments (including loyalty premium)	**72.4%**	70.9%	69.2%
	100.0%	100.0%	100.0%
Revenue attributable to New Zealand pools ($'000)[1]	**3,110,758**	2,771,313	2,633,858

* Zespri margin (net of loyalty premium) as a percentage of pool revenue is lower in 2020/21 due to higher loyalty premium paid resulting from a combination of higher per tray loyalty rate and higher tray volumes. Zespri margin in 2020/21 and 2019/20 was 7.25% (2018/19: 7.50%).

** Duties and customs as a percentage of pool revenue reduced in 2019/20 with removal of tariffs in Japan and reduction in tariffs in South Korea.

1 Net revenue attributable to the pools includes sales of New Zealand-grown kiwifruit, income from New Zealand collaborative marketing programmes and other pool income as noted in the Alternative Revenue Statement.

2 Within 'Other direct pool costs – onshore' is the 3.0 percent royalty from new cultivars on net sales for Gold3 and Green14. This royalty is made up of two components: 1.35 percent of this royalty is paid to The New Zealand Institute for Plant & Food Research Limited and 1.65 percent royalty cost charged by the new cultivars segment in Zespri Group Limited.

3 Other direct pool costs – onshore include: KVH Funding, KNZ Fees and NZKGI funding.

4 Zespri Group Limited pays two different levies to Kiwifruit Vine Health Incorporated (KVH) on behalf of growers, for kiwifruit grown in New Zealand and exported to markets other than Australia: (1) a Psa levy of $0.002 per tray and (2) a biosecurity levy of $0.014 per tray.

5 Interest income is made up of interest income of $0.92 million and an interest charge from Zespri corporate of $0.29 million. This results in an overall interest income to the pools of $0.63 million.

6 Zespri Group Limited is required, under Regulation 39 of the Kiwifruit Export Regulations 1999, to fund the statutory board, Kiwifruit New Zealand. New Zealand Kiwifruit Growers Incorporated (NZKGI) is the kiwifruit grower representation body and Zespri Group Limited is required by The Commodity Levies (Kiwifruit) Order 2017 to pay a levy to NZKGI on behalf of growers. The rate for the 2020/21 year was $0.01 per tray of kiwifruit grown in New Zealand and exported to markets other than Australia.

7 Zespri margin is calculated in accordance with the New Zealand Supply Agreement, being 5.0 percent of net sales (excluding collaborative marketing programmes) and 7.25 percent of fruit payments to suppliers.

8 Further analysis of non-New Zealand-grown supply is available within the segment reporting in Note 23 of the Financial Statements.

9 Innovation funding has been split between the New Zealand kiwifruit segment and the new cultivars segment based on the segment activity (refer Note 2(b) and Note 23 of the Financial Statements).

10 New cultivars costs include – overhead costs and innovation costs (refer to Note 23 of the Financial Statements).

11 Fruit and service payments include a net movement of $452k relating to early seasons sales across financial years.

VALUES AND *Value*

ANNUAL REPORT 2020/21

Zespri created this document using local and environmentally friendly suppliers. WAVE Creative Communications Agency designed the document and Kale Print used environmentally responsible paper, produced using Elemental Chlorine Free (ECF), FSC® mixed source pulp from responsible sources.

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ATTACHMENT B

ZESPRI - PLANTS WITH PURPOSE – NATIVE AND SHELTERBELT PLANTING GUIDE FOR KWIIFRUIT ORCHARDS

Plants WITH PURPOSE

A guide for native and shelterbelt plantings on New Zealand kiwifruit orchards.

Zespri™ KIWIFRUIT

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- Zespri staff
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Mahi Tahi
Working Together

NZKGI
NEW ZEALAND KIWIFRUIT GROWERS

MĀORI KIWIFRUIT
GROWERS INCORPORATED

Zespri
KIWIFRUIT

A Water Strategy for the kiwifruit industry was developed in 2019 by NZKGI, Zespri, Māori Kiwifruit Growers Incorporated (MKGI), and growers. Together, we are committed to working collaboratively with the entire kiwifruit industry to protect water quality, use water efficiently, and build soil health on orchards.

Contents

1 Introduction

This planting guide has been prepared mainly to assist kiwifruit growers and others in the industry, to establish native plantings on kiwifruit orchards. It also suggests some non-native species that have commonly been used on kiwifruit orchards for erosion control, shelterbelts or other purposes. The guidance is intended to support natural processes as much as possible without compromising kiwifruit orchard productivity. It includes advice to assist with the planning, implementation and management of a native planting project, as well as plant descriptions and selection lists to help growers choose the most suitable plant types for their specific site conditions and objectives. All kiwifruit growing regions in New Zealand are covered. Discussion on kiwifruit vines, cover crops, and plants primarily used in aesthetic gardens is outside the scope of this document.

There are many direct benefits for kiwifruit growers, as well as the people and places they care about, that come from the establishment of native plants on kiwifruit orchards. These include:

Improving wildlife habitats, such as for native plants, insects, birds, fish and other animals

Protection and improvement of waterways and water quality

Management of erosion risks and reducing the impact of extreme weather events such as flooding

Capturing of carbon from the atmosphere to reduce greenhouse gases (carbon sequestration)

Planting offers many other benefits too, such as improving the aesthetic environment around orchards, replacing potential weed and pest habitats with native plantings, providing shelter for orchards, creating a source of food for humans and animals, and, creating an environment for recreation and other cultural uses.

However there are some issues that need to be considered when planning native or other plantings near kiwifruit orchards, including:

- the management of risks to kiwifruit production, for example:
    - plantings can block airflow and create increased frost risk
    - some plants can be hosts to kiwifruit pests and diseases, or they may create other biosecurity risks
- balancing the opportunities to enhance kiwifruit production — for example through establishing food sources for bees, other pollinators and beneficial insects — while limiting the risks of plant flowering competition with kiwifruit pollination.

Appropriate planting on orchards can also assist Zespri growers to contribute to our goal of helping people, communities and the environment to thrive. Through our Sustainability Strategy and industry-wide Water Strategy we have set the following targets:

- that Zespri and its supply chains will be carbon neutral by 2030 and carbon positive by 2035. Native and shelterbelt planting may be able to assist with off-setting carbon emissions from orchard operations.
- that by 2025 Zespri growers will be more effectively balancing nutrient inputs and losses, and so better protecting and improving water quality. Native and shelterbelt planting may trap and filter any unused nutrients, to help avoid losses to the environment.
- to support the increasing resilience of kiwifruit production to climate variability. Native and shelterbelt planting may improve orchard resilience to increased risks of erosion, drought, flooding and other climate change impacts.

Increasingly, government policies and regulations are also encouraging the establishment of native plants including: *the Aotearoa New Zealand Biodiversity Strategy*[1], *He Waka Eke Noa — Primary Sector Climate Action Partnership*[2] and the *2020 National Environmental Standards for Freshwater*[3].

A large number of existing native planting guides and information have already been developed by other organisations for a range of general regional and other land-use contexts. These have been reviewed to obtain the information contained in this guide, and those that offer further information most likely to be of value for kiwifruit growers have been listed specifically in the relevant sections of this guide.

[1] https://www.doc.govt.nz/nature/biodiversity/aotearoa-new-zealand-biodiversity-strategy/
[2] https://www.mfe.govt.nz/climate-change/he-waka-eke-noa-primary-sector-climate-change-action-partnership
[3] https://www.mfe.govt.nz/fresh-water/freshwater-acts-and-regulations/national-environmental-standards-freshwater

2

Step-by-step guide TO PLANTING PROJECTS

Planning ahead and taking a step-by-step approach will help you to make the most of the time, money and effort that goes into a native or shelterbelt planting project, and achieve your goals. The following six steps provide an easy guide to successful planting projects.

2.1 DECIDE YOUR PLANTING PURPOSE

There are a number of reasons for taking on a planting project and many have overlapping benefits. These include:

Supporting kiwifruit production through kiwifruit pollination, pest management, and/or wind protection

Improving resilience to climate change impacts such as increased erosion, drought and flood risks

Carbon sequestration, with the potential for related financial benefits

Supporting local catchment restoration and water quality improvement initiatives

Cultural and recreational benefits, such as through restoring natural areas that are a source of kai (food), important wildlife breeding and feeding areas, and support people's well-being and enjoyment

Demonstrating good practice to meet community and customer expectations

Depending on the planting project, it may be useful to discuss your plans with your neighbours, workers and your local community. This can help you to secure their support and check the project lines up with what they see as important. They may even help with planting!

The most common reasons for establishing native plants within or near kiwifruit orchards are discussed further in sections 2.1.1-2.1.7 as follows.

2.1.1 Supporting bees and other pollinators

Kiwifruit pollination relies mainly on honey bees, however a range of other pollinating insects such as bumble bees, March flies, and native bees including *Lasioglossum* and *Leioprotcus* bees[4,5], can complement honey bee pollination of kiwifruit orchards[6].

Native plants can act as a habitat and food source for both bees and native pollinators. However, flowering plants can also draw bees away from kiwifruit flowers if they bloom at the same time and are a preferred food source. To reduce the chances of this happening, tailor your plant selection so that most of the flowering plants bloom before or after the critical times for kiwifruit pollination. Appendices have been added to the back of this guide to assist with this:

- *Appendix* 1 compares typical flowering periods of kiwifruit varieties with those of common native plants.
- *Appendix 3* offers provisional native plant selection and composition mixes for Bay of Plenty and Northland that are currently being trialled through the Syngenta Operation Pollinator® project. The lists have been developed by Plant & Food Research scientists, based on review of current knowledge about the preferences of pollinating and pest insects. These mixes have been planted at several orchard test sites and are now being monitored to assess their efficacy in encouraging beneficial insects while minimising pest insects such as passion vine hopper and scale that can be a problem for kiwifruit.

Loss of bees to native plantings during kiwifruit pollination can also be reduced by:

- placing hives in orchards when kiwifruit is 40-50% flowering (depending on variety).
- the use of pollination enhances such as Bee-Scent,[7,8]
- splitting the placement of hives, and
- providing bees with water within the orchard.

Planting to support honey production on land near orchards can also be used to provide additional income and decrease the need to bring in bees for pollination. This can help to reduce or offset pollination costs. It may also reduce the risk of Psa and other diseases that may otherwise be spread when bees are transferred between orchards.

RESOURCES

- Canopy Pollination Basics page: Canopy > Growing Kiwifruit > Orchard Management > Pollination > Pollination Basics
- *Trees for Bees*[9]. This initiative does research into the value of bee forage plants and has created templates for beekeepers and landowners to design and grow plantations of bee feed to maximise bee health and survival.
- *Trees for Bees*[10]*– Riparian Planting Handbook (2019)* .
- New Zealand Tree Crops Association Bees and Trees webpage. Information on plants for pollinators and bees[11].

[4] Howlett B et al *Diversifying pollinators and natural enemies in kiwifruit orchards*: Designing native plantings Presentation Plant and Food Research and Howlett, Brad & Todd, Jacqui & Willcox, Bryony & Rader, Romina & Nelson, Warrick & Gee, Megan & Schmidlin, Franziska & Read, Sam & Walker, Melanie & Gibson, D & Davidson, Melanie. (2021). Using non-bee and bee pollinator-plant species interactions to design diverse plantings benefiting crop pollination services. Advances in Ecological Research. 10.1016/bs.aecr.2020.11.002.
[5] https://www.landcareresearch.co.nz/tools-and-resources/education/pollination/
[6] Howlett, B.G., S.F.J. Read, L.K. Jesson, A. Benoist, L.E. Evans, and D.E. Pattemore. "Diurnal Insect Visitation Patterns to 'Hayward' Kiwifruit Flowers in New Zealand". New Zealand Plant Protection 70 (August 8, 2017): 52– Accessed March 22, 2021. https://journal.nzpps.org/index.php/nzpp/article/view/27.
[7] https://nz.grochem.com/wp-content/uploads/2018/05/BeeScent_infosheet.pdf
[8] https://www.far.org.nz/assets/files/uploads/25801_FAR_focus_7_-_crop_pollination.pdf
[9] https://treesforbeesnz.org
[10] https://static1.squarespace.com/static/5c354d3031d4df3e72d75662/t/5d13c1c42f91ef0001d1f74f/1561575885543/Handbook+for+Riparian+Planting+final+for+web.pdf
[11] https://treecrops.org.nz/crops/other-crops/bees-trees/
[12] FAR Focus Issue 07, 2012 Crop Pollination .
[13] From the presentation *Increasing the Contribution of Key Unmanaged Pollinators* - Howlett et al
[14] https://www.stuff.co.nz/environment/111835393/4000-native-species-still-under-threat-of-extinction-despite-change-new-report-shows
[15] https://www.doc.govt.nz/globalassets/documents/getting-involved/landowners/your-land-our-support/restoring-the-balance.pdf
[16] https://www.aucklandcouncil.govt.nz/environment/plants-animals/plant-for-your-ecosystem/Documents/nativeforestrestorationguide.pdf
[17] https://www.waikatoregion.govt.nz/environment/biodiversity/planting-guides/native-planting-programme-planting-for-soil-conservations-biodiversity-and-water-quality/
[18] https://www.gdc.govt.nz/__data/assets/pdf_file/0013/8032/streamside-planting-guide.pdf
[19] https://www.biodiversityhb.org
[20] https://www.hbrc.govt.nz/environment/farmers-hub/biodiversity-on-my-farm/
[21] https://www.doc.govt.nz/get-involved/run-a-project/restoration-advice/native-plant-restoration/local-planting-guides/ecological-restoration-in-nelson-marlborough/
[22] http://www.nelson.govt.nz/environment/nelson-nature/
[23] http://www.nelson.govt.nz/assets/Environment/Downloads/living-heritage-nelson-native-plants.pdf
[24] https://www.landcareresearch.co.nz/discover-our-research/biodiversity/

2.1.2 Biodiversity enhancement and vine protection

A mix of native plants such as *Coprosma* species and flaxes can provide a year-round food source to native birds. This is an important factor during kiwifruit budbreak as it provides an alternative food source that distracts birds from feeding on kiwifruit in spring. Birds such as wax-eyes (tauhou), grey warblers (riroriro) and sparrows can also feed on passion vine hopper, leafrollers and cicadas, helping to reduce pest pressure. Native plants can also act as reservoirs for beneficial insects including native pollinators such as native bees (as discussed on page 8) and predators of kiwifruit pest species[13]. Native plants are often less likely to host exotic insect pests than introduced plants such as blackberry, because of their established insect–plant associations

Establishing native vegetation creates a habitat for native birds, animals, insects and plants. There are almost 4,000 New Zealand native species that are threatened with extinction[14] including 46 percent of indigenous plants. Native revegetation projects along with pest control can help to halt and reverse this decline.

RESOURCES

Regional guides

- DOC. *Restoring the balance: Northland biodiversity self-help-kit*[15].
- Auckland Council. *Native Forest Restoration Guide*[16].
- Waikato Regional Council. *Native planting programme: planting for soil conservation, biodiversity and water quality*[17] and guide.
- Gisborne District Council. *Streamside planting guide*[18]
- *Biodiversity Hawkes Bay*[19]. The regional initiative linking many groups to enhance the protection and restoration of biodiversity.
- Hawkes Bay Regional Council. *Biodiversity on my Farm* webpage[20].
- DOC. *Ecological restoration in Nelson/ Marlborough*[21] website.
- Nelson City Council. *Nelson Nature*[22] website. *DOC. Living Heritage Growing Native Plants in Nelson*[23].

Other guides

Manaaki Whenua/Landcare Research. Biodiversity[24] website.

2.1.3 Wind protection

The benefits of providing shelter for kiwifruit orchards are well understood, and protection of kiwifruit vines from wind damage is also important for the management of Psa and other diseases that can gain entry through broken stems and branches.

However there is a growing awareness of the complex relationships between the type and management of shelter and its impacts on a kiwifruit orchard. Some key considerations for kiwifruit shelter include:

- Shelter should keep wind below a light breeze (less than 10km/hr). Wind reduction is affected by the height, length and porosity of the shelterbelt. An effective shelterbelt acts as a filter rather than a solid barrier: it should be continuous since wind will funnel through gaps with increased speed.
- The selection of shelter plant varieties:
  - should not compete with kiwifruit growth
  - should not host kiwifruit pests, for example, willows, poplars, Leyland cypress and *Pittosporum* can host high numbers of scale; in contrast *Cryptomeria*, and *Casuarina* do not harbour high numbers.
- In the past, deciduous species such as *Salix* and *Populus* were used as they are very fast to establish, but they are now known to cause problems in the longer term (see section 2.1.4). More suitable exotic plants used for shelterbelts in New Zealand include *Casuarina, Cryptomeria, Alnus* and *Pinus* species.
- Any shelterbelt plant moved into a kiwifruit orchard must meet the National (Kiwifruit) Pathway Management Plan rules[25].

Interest in the use of native plants for kiwifruit shelter is relatively recent with limited research or examples available. However native plant species that potentially could be used to complement shelter provided by the exotic species noted above include *Podocarpus totara* for tall shelter, and *Coprosma* and *Olearia* as low shelter (see further details in the plant selection guide in *Section 4*).

RESOURCES

- KiwiTech Bulletin E1 (NZ) *Orchard Shelter*. August 2015.
- ARGOS Research Note Number 25 2006 *Biodiversity on Kiwifruit Orchards: the importance of shelterbelts*[26] .

[25] https://www.kvh.org.nz/biosecurity
[26] http://www.argos.org.nz/uploads/2/3/7/3/23730248/argos-1.org.nz.pdf
[27] Erosion and Climate Change - https://www.mpi.govt.nz/dmsdocument/26962/direct
[28] Mauchline NA, Hill MG, Stannard KA, Zhuang QG 2012. Susceptibility of kiwifruit shelter species to two armoured insects. New Zealand Plant Protection 65: 29-34.
[29] Jamieson, L.E., S. Dobson, J. Cave, and P.S. Stevens. "A Survey of Armoured Scale Insects on Kiwifruit Shelter". *New Zealand Plant Protection* 55 (August 1, 2002): 354–360. Accessed April 16, 2021. https://www.journal.nzpps.org/index.php/nzpp/article/view/3932.
[30] https://www.nrc.govt.nz/environment/land/planting/poplars-for-erosion-control/
[31] https://www.nrc.govt.nz/environment/land/planting/trees-for-erosion-control/

2.1.4 Erosion control

Gullies, hillsides and stream banks near kiwifruit orchards can be prone to erosion, with these risks increasing as a result of climate change[27] and the projected increase in storms and drought. Growing native plants in these areas helps to retain precious topsoil, and reduce erosion and the associated damage to productive land, fences, accessways and waterways.

Plants with fibrous roots are very effective at preventing soil erosion and promoting slope stability because of the formation of fibrous root systems near the soil surface that help to hold soil in place and take up water from the soil. Leaf cover also helps to diffuse rainfall and slow down the movement of runoff water.

Poplars (non-native species) have been traditionally used for hill country erosion control since they are fast growing and have an extensive and deep root network. A number of poplar varieties have been selected and developed in New Zealand that are more drought tolerant, less attractive to possums and provide erosion control and timber. There are however some issues with planting poplars near kiwifruit orchards as they tend to drop branches and can be hosts to pests such as scale[28] and giant willow aphid. They could also be a host to potential pests such as the brown marmorated stink bug (BMSB), which is a serious pest elsewhere in the world but has not yet established in New Zealand.

Willows were also often recommended for similar reasons in other land-use contexts, however they are **not** recommended for planting close to kiwifruit orchards as they are known hosts of kiwifruit pests such as armoured scale[29], chorus cicada and *Armillaria* root disease.

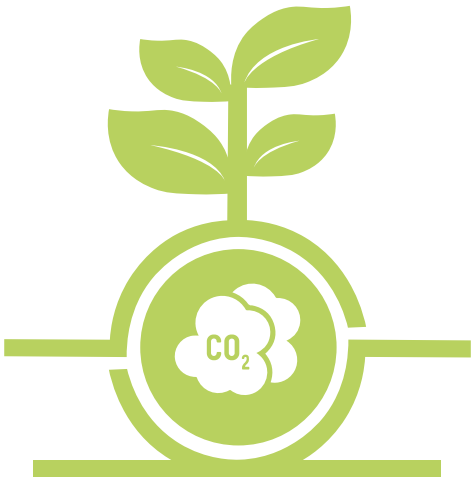
Regional or unitary councils are a key resource for advice on erosion control, and many provide funding, practical assistance and/or material support for erosion control projects.

RESOURCES

- Northland Regional Council. *Planting poplars and willows for soil conservation*[31] website . Trees for erosion control guide.
- Bay of Plenty Regional Council. *Future Proof Your Land Erosion Toolkit*[32] and *Land management – poplars and willows for soil conservation factsheet*[33].
- Gisborne District Council. Erosion Management[34] webpage.
- Hawkes Bay Regional Council. *Planting eroding hill country in the Hawke's Bay Region* webpage[35] and guide[36], *NZ Native Plants for Erosion Control*[37].
- Nelson City Council. *Soil Erosion*[38] website.
- Poplar & Willow Research Trust[39].

[32] https://cdn.boprc.govt.nz/media/273658/futureproof_erosion_web.pdf
[33] https://www.boprc.govt.nz/media/2905/4975-land-management-poplars-and-willows-for-soil-conservation-factsheet-web.pdf
[34] https://www.gdc.govt.nz/erosion-management/
[35] https://www.hbrc.govt.nz/assets/Uploads/Summary-report-Right-Tree-Right-Place-Dec-2019.pdf
[36] https://www.waikatoregion.govt.nz/assets/WRC/WRC-2019/6519-Plant-ID-Booklet.pdf
[37] https://www.hbrc.govt.nz/assets/Document-Library/Information-Sheets/Land/LMNT1.pdf
[38] http://www.nelson.govt.nz/environment/sustainable-land-management/our-soils/soil-erosion/
[39] https://www.poplarandwillow.org.nz

"Zespri has set a target to work with its partners to be climate positive by 2035."



2.1.5 Carbon sequestration

Increasingly the kiwifruit industry is being called on by our customers, communities and regulators to account for and reduce or offset the carbon emissions we produce, in order to reduce the impacts of global warming and climate change.

In response to that call, Zespri has set a target to work with its partners to be climate positive by 2035, achieving milestones of: Zespri corporate being carbon neutral by 2025; and, the industry being carbon positive to our retailers by 2030.

The establishment of native and exotic forest areas adjacent to a kiwifruit orchard could become a potential 'sink' for carbon, and (at sufficient scale) also a source of income. In the future this could provide growers with a way to offset the carbon from orchard emissions generated through fuel, electricity and fertiliser use, though the policies in this area are still in development. Zespri is currently researching options for the establishment of a voluntary industry offsetting scheme[40].

If the planting is over one hectare (ha) in size, mainly consists of tree species that can reach five metres, and meets other criteria, it could be classified as an eligible forest and provide a source of income through the Emissions Trading Scheme (ETS).

Different types of trees store carbon at different rates. Exotic forests, such as pine, sequester carbon faster than native trees, so will earn more carbon credits faster. However, native trees continue to take up and store carbon over a longer period of time than exotic species. It should be noted that the planning and entry of a forest into an ETS is complex, with returns dependant on your location, species of trees planted and your planting area. The benefit of any potential carbon units generated should also be considered alongside the potential costs of participation in the ETS. Climate change policies and emissions trading are evolving areas and growers that are interested in this are advised to undertake further research to clarify ETS requirements.

Permanent native forests are probably more desirable for most locations, rather than plantings for timber production. This is due the potential negative impacts resulting from timber harvesting, particularly in areas close to streams.

RESOURCES

- Ministry of Primary Industry. *Forestry in the Emissions Trading Scheme*[41].
- Tane's Tree Trust. *Reducing our carbon footprint*[42].
- Tane's Tree Trust. *Carbon calculator*[43]. This tool can be used to work out how much carbon a planted native forest is storing over a defined period of time.
- Hawkes Bay Regional Council. *Carbon Forestry*[44] webpage.

[40] From https://www.mpi.govt.nz/forestry/getting-started-forestry/forestry-rules-regulations/introduction-emissions-trading-scheme-ets-forestry/
[41] https://www.mpi.govt.nz/forestry/forestry-in-the-emissions-trading-scheme/
[42] https://www.tanestrees.org.nz/resource-centre/carbon-calculator/trees-that-count-planting-natives/
[43] https://www.tanestrees.org.nz/resource-centre/carbon-calculator/
[44] https://www.hbrc.govt.nz/environment/farmers-hub/treesonfarm/carbon-forestry/
[45] *Means fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the Coastal Marine Area.*
[46] Seepages are located primarily where groundwater diffuses to the surface, especially at a change of slope, or where an impermeable basement raises the water table
[47] *Includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.*
[48] https://www.stuff.co.nz/business/farming/dairy/102326878/wetlands-hold-secret-ingredient-of-future-water-quality
[49] https://www.stuff.co.nz/business/farming/dairy/102326878/wetlands-hold-secret-ingredient-of-future-water-qualityhttps://www.nrc.govt.nz/media/cyjbyxfg/nrccleanstreamsguide2018.pdf
[50] https://www.stuff.co.nz/business/farming/dairy/102326878/wetlands-hold-secret-ingredient-of-future-water-qualityhttps://www.aucklandcouncil.govt.nz/environment/plants-animals/plant-for-your-ecosystem/Documents/streamside-planting-guide.pdf

2.1.6 Caring for wetlands and waterways

Clean, healthy waterways are important to all of our lives and livelihoods; they can be a source of drinking and irrigation water, food, and a place to swim or enjoy leisure time, as well as supporting cultural connections and overall well-being. Many of New Zealand's game species, and threatened native plants and animals including whitebait, rely on healthy streams, lakes, rivers or wetlands for their survival.

Kiwifruit orchards can include or neighbour a water body[45], seepage[46] or wetland[47] within their property boundary. Whether located right beside a waterway or not, many orchards have the potential to impact on local water quality if nutrient use is inefficient, resulting in unused nutrients being carried below the rootzone in drainage water that is lost to the environment.

The establishment of native plantings in riparian (beside waterway) areas can act as a buffer between the orchard and local waterway(s), helping to capture and filter sediment, *E. coli* and nutrients such as nitrogen and phosphorus, so that water quality and wildlife are protected.

The movement of water over land through an orchard and into a waterway is a significant potential source of pollution. It is important that this overland flow of water from an orchard is intercepted *before* it can enter a water body – the plants on gully and stream banks and in wetlands can provide this buffer by trapping and absorbing sediment and nutrients[48]. Planting these areas can also help to:

- improve shading, thus keeping water cool, oxygenated and healthy for fish and invertebrates
- stabilise stream banks and steep areas so that the risk of erosion (and associated loss of fences, accessways, etc.) and sediment release (which can smother shellfish and other wildlife) are reduced
- reduce flood risk due to the ability of wetlands to absorb rain water and release it slowly.

Regional and unitary councils are a key resource for information on riparian and wetland planting and many provide funding support and appropriate planting materials for suitable projects.

RESOURCES

Regional Guides

- Northland Regional Council. *Clean Streams — A guide to Riparian Management in Northland*[49]
- Auckland Council. *Riparian facts*[50].
- Bay of Plenty Wetlands Forum. *Wetland Restoration Guide*[51].
- Waikato Regional Council. *Wetland planting guide*[52].
- Gisborne District Council. *Working with Wetlands*[53].
- Hawkes Bay Regional Council. *Riparian planting*[54] and *Riparian Planting Guide in Hawkes Bay*[55].
- Nelson City Council. *Healthy streams*[56] website and *Healthy Stream Field Guides*[57].

Other Guides

- QEII Trust. *Wetlands protection on private land*[58].
- *Te reo o te repo*: *The voice of the wetland*[59] an online wetland handbook that highlights a range of mahi undertaken by iwi and hapū to increase the health and well-being of their repo (wetlands).
- NZ Landcare Trust. *Wetlands*[60] webpage with information and planting guides for wetlands.
- NZ Landcare Trust. *Hooked on Native Fish* Facts Sheets[61] provide information on New Zealand's unique freshwater fish and highlight factors that impact on their survival.
- Dairy NZ. *Planting waterways technical note*[62].

2.1.7 Cultural and other objectives

There are other reasons why you may want to establish a planting project including:

- for food production: a planting project can establish habitats for game birds such as ducks as well as for edible native species of plants, and animals such as watercress and kōura (freshwater crayfish).

[51] https://atlas.boprc.govt.nz/api/v1/edms/document/A563889/content
[52] https://www.waikatoregion.govt.nz/environment/biodiversity/planting-guides/wetland-planting-guide/
[53] https://www.gdc.govt.nz/assets/Files/Conservation/WorkingWithWetlands.pdf
[54] https://www.hbrc.govt.nz/environment/farmers-hub/riparian-planting/
[55] https://www.hbrc.govt.nz/assets/Document-Library/Guides/18449-HBRC-RiparianBro-WEB.pdf
[56] http://www.nelson.govt.nz/environment/healthy-streams/
[57] http://www.nelson.govt.nz/environment/healthy-streams/healthy-streams-field-guides/
[58] https://qeiinationaltrust.org.nz/wp-content/uploads/2018/02/QEII-Wetlands-FS.pdf
[59] https://www.landcareresearch.co.nz/publications/te-reo-o-te-repo/
[60] https://www.landcare.org.nz/resource-item/wetlands
[61] https://www.landcare.org.nz/resource-item/hooked-on-native-fish
[62] https://www.dairynz.co.nz/media/2071981/planting-waterway-technote.pdf

- social licence: to support the positive positioning of the kiwifruit sector within local communities and enhance the industries social licence to operate by proactively enhancing the aesthetic and biodiversity values of the kiwifruit production landscape.

- supporting Māori cultural and environmental values: Māori recognise the need to care for the well-being of the land, wildlife and waterways and how this helps to nurture the people (if you look after the land and waterways, they'll look after you). A planting project can be a key way for some growers to exercise their kaitiakitanga (stewardship) role and 'give back' to the land and waterways that sustain their livelihoods.

There are four major components of kaitiakitanga, all of which can be supported through a planting project:

- protecting cultural values of tangata whenua. Awa (rivers and wetlands) play an important role in establishing the whakapapa and sense of identity and spiritual well-being of Māori. A planting project can help to restore the life force (mauri) of a waterway that has become degraded.

- conservation of taonga raranga / whatu (plants for manufacturing and weaving) such as harakeke (flax).

- conservation of mahinga kai (food sources) such as whitebait (kokopu, inanga and koaro) or kōura (freshwater crayfish). Edible plants such as puha (*Sonchus oleraceus*) or the rarer native puha, New Zealand sow thistle (*Sonchus kirkii*) can be established in waterways.

- conservation of rongoā Māori (traditional Māori medicinal plants and herbs). There are a wide range of native plants that have been used as traditional medicines by Māori including koromiko, harakeke, rata and manuka.

RESOURCES

- Manaaki Whenua Landcare Research. *Ngā Tipu Whakaoranga (Māori Plant Use Database)*[63]. This is an excellent resource with detailed information on Māori traditional uses of New Zealand native plants.
- Science Learning Hub / Pokapū Akoranga Pūtaiao. *Rongoā Māori*[64]
- Northland Regional Council. *Trees for shelter belts, shade and stock food*[65].
- Agricultural Research Group on Sustainability (ARGOS). Research Note 25 *Biodiversity on Kiwifruit Orchards: the importance of shelterbelts*[66].

2.2 CREATE A PLAN

Creating a planting plan at the start of your project helps you to anticipate potential benefits, costs and effort involved, identify and seek out opportunities for assistance, and put steps in place to avoid or manage any potential risks.

Regional or unitary councils offer a range of support to landowners with planning and working through native planting projects. It's usually best to contact the relevant council staff (often a land management officer) to discuss your plans and clarify what local support is available before you begin your project.

Other sources of advice and assistance can include local landcare or community catchment groups, Department of Conservation and a wide range of non-government organisations, such as the NZ Landcare Trust. It is also very useful to visit and discuss your plans with other local growers who have already established a planting project — their experience and insights can be invaluable.

Key things that are useful to include in your plan are outlined as follows.

Regulations

Check and seek advice from council on any regulations associated with your planting project, such as the need for a resource consent[67] to undertake vegetation clearance or earthworks near a waterway.

Mapping

Create a map of your planting area that identifies:

- pre-existing landscape features and vegetation

- planting zones (these may be based on slope, aspect, frost risk, or soil type)

- potential risks such as from flooding, fire, frost flow blockage or access by grazing animals.

Biosecurity risks

There are a number of existing and potential pests of kiwifruit. It is important therefore that your plan identifies and considers how to manage these biosecurity risks, such as through careful plant selection, and that these are included in your plan (see section 2.3).

[63] https://maoriplantuse.landcareresearch.co.nz/WebForms/PeoplePlantInformation.aspx
[64] https://www.sciencelearn.org.nz/resources/185-rongoa-maori
[65] https://www.nrc.govt.nz/environment/land/planting/trees-for-shelter-belts-shade-and-stock-food/
[66] http://www.argos.org.nz/uploads/2/3/7/3/23730248/argos-1.org.nz.pdf
[67] https://www.boprc.govt.nz/environment/resource-consents

Timing schedule

A timing schedule for your planting project should take into account:

- timeframes for checking and obtaining council consents if required
- site preparation needs including weed and pest control (see *section 2.4)*
- ordering and delivery of plants
- organising labour for planting
- ongoing maintenance of your planting project.

Your schedule should take into account:

- the costs and cashflow considerations relating to plant purchases, fencing, site preparation, plant establishment and follow-on maintenance. A staged approach over several years can help to manage this.
- the time and effort that you or others have available to establish and maintain the planting project.
- priority sites such as those with the most significant issues (e.g. erosion risks) or that offer the greatest potential benefits or opportunities for success. It can be useful to start with small, high priority areas to build experience and confidence for further planting projects.

Planting stages and spacing

Depending on the site and the aims of your project it may be necessary to establish plantings in stages.

- Early stage plantings may focus on pioneer species such as manuka, lemonwood and flax that can quickly establish cover to suppress weed reinvasion and create better conditions for the next stages of planting.
- Later stage or secondary planting usually comprises larger and more long-lived tree species that, for example, might form the permanent canopy of a forest regeneration project. These plantings can be timed to follow early stage plantings once a good level of weed suppression and shelter have been achieved.

See Section 3 for more information on plant suitability for different stages.

Also consider what spacing or planting density you want to aim for. Guideline densities are:

- Plant native grasses and ground cover 1 m apart.
- Establish coloniser plants and shrubs 2 m+ apart (<2,500 stems per ha) in all directions so that they can suppress weeds quickly through shading. To obtain the best long term results it is very important that time is taken to gain control of weeds *before* planting. There are however significant cost savings from using wider plant spacing with planting densities down to 1,000 plants per ha possible on sites where there is good weed control.
- Plant larger tree species 5–10 m apart in suitably sited groves amongst the smaller early stage species, typically done 3–5 years after initial early stage (pioneer) planting.

Project budget

A budget can be based on the factors and choices noted in your plan. The establishment cost of native plantings can range from $5,000 to $25,000 per hectare. Costs can often be reduced by adjusting the plant density and grade, accessing available funding support (see references on page 16), use of volunteer labour, and careful planning and organisation (such as ordering seedlings in bulk from a wholesale nursery).

RESOURCES

Planning support

- Northland Regional Council: Land Management Team[68].
- Bay of Plenty Regional Council: Land Management Officers[69] BOPRC: Biodiversity management plan development process[70].
- Hawkes Bay Regional Council: Catchment Staff[71].
- Coastal Restoration Trust of NZ: *Planting Calculator*[72].

Other planning support

- DOC *Biodiversity New Zealand Resources*[73].
- Farm Forestry Association[74].
- Tane`s Tree Trust[75].
- New Zealand Landcare Trust[76].
- QEII National Trust[77]: An independent charitable trust that partners with private landowners to protect sites on their land with covenants. They have over 4,700 protected areas in place covering more than 180,000 ha of private land.
- New Zealand Plant Conservation network[78]: A network promoting and supporting native plant conservation and restoration.
- Fish and Game New Zealand[79].

Funding support

There is a range of potential support for developing and/or implementing a biodiversity planting plan. Similarly, there are possible funding sources to support native plantings, as follows.

Regional and unitary councils

If your site has high biodiversity value, there can be assistance available for preparing a management plan. Also, financial, technical and practical assistance can be provided for implementing the plan.

- Northland Regional Council. *Environment Fund*[80] and *Grants for planting on erosion prone land*[81].
- Bay of Plenty Regional Council. *Biodiversity* and *Focus Catchments programmes*[82]
- Gisborne District Council: *Natural heritage fund*[83].
- Hawkes Bay Regional Council. Among other support they organise community planting days, mostly on private land[84].
- Nelson City Council. *Environmental Grants Scheme*[85] and *Fencing grants for landowners*[86].

Government funding

- *Nature Heritage Fund*[87]. This DOC managed fund helps private landowners, local government, community groups and others protect high value ecosystems and since 1990 the fund has protected over 340,000 ha of indigenous ecosystems through legal and physical protection.
- The Ministry for Primary Industries (MPI) administer a number of grants schemes that support tree planting. These include:
  - *One Billion Tree Programme*[88]. This scheme provided grants to help with the costs of planting trees or assisting reversion to native forests. Applications for funding were however closed in December 2020.
  - *Hill Country Erosion (HEC) Programme*[89]. Provides funding to Councils (and landowners) for erosion control projects.

Other funding support

- The Landcare Trust. *Funding Options in the BOP and Beyond, 2020*[90] lists funding sources for mainly community environmental schemes.
- The Landcare Trust. *Funding Options in the Waikato and Beyond, 2020*[91] lists funding sources for mainly community environmental schemes.
- Local catchment groups e.g. Wai Kokopu Inc[92] and Project Parore[93] potentially can provide funding support and project advice.
- *Trees that Count*[94]. A conservation charity bringing together business, community and everyday Kiwis, with the vision of helping plant 200 million native trees across the country. Landowners can be eligible for free native trees through the online market place that has been established[95].
- DOC. *Other funding organisations*[96]. Lists other possible funding organisations that support conservation projects.

In addition to the above there are forestry funding schemes targeted to help Māori landowners. They include:

- *Ngā Whenua Rāhui Fund*[97]. This Department of Conservation (DOC) managed fund supports the protection of indigenous biodiversity on Māori-owned land while honouring the rights guaranteed to landowners under Te Tiriti o Waitangi.
- *Mātauranga Kura Taiao Fund*[98]. This DOC administered fund supports whānau, hapū and iwi to revive, retain and promote traditional Māori knowledge and its practical use in the management of indigenous biodiversity.
- MPI *Māori Agribusiness Programme*[99]. This offers funding to Māori land owners to understand land use options, including how trees can contribute to their business model and where trees best fit within the overall landscape.
- *Whenua Māori Fund*[100]. This supports Māori land owners to explore different uses of land and ways of boosting its productivity.

2.3 SELECT SUITABLE PLANTS

Your planting project will have the best chance of success if you select plants that are native to the area, are suitable for the site, and that provide the benefits you want. If revegetating with native plants, use hardy, colonising species to establish the primary canopy first, then add tree species three to five years later if required.

Deciding which plant species are best for each situation requires consideration of the following:

- site conditions such as climate, slope, aspect, drainage, soil type and closeness to kiwifruit vines
- host preferences (where known) of current and potential kiwifruit pests such as scale, chorus cicada, leafrollers, greenhouse thrips, fruit flies, brown marmorated stink bug, phytophthoras and verticillium wilt (see more on this in sections 2.3.1 and 2.3.2 below)
- availability of water and/or potential for the use of mulch to help new plants establish
- other activities that will continue in or adjacent to the site such as beekeeping, drain clearing, swimming, picnicking, agrichemical spraying, duck shooting, fishing and vehicle access.

Section 3 of this document provides a plant selection guide to assist growers in making their plant choices. The guide provides information about growth habit, tolerances and (where known) pest risks relating to species that may be chosen for native plantings in kiwifruit orchards. It also identifies and provides basic information on a range of native plants that growers might consider for other situations.

There are several other regionally specific plant selection guides and tools available that can assist growers in making their selections (see references below).

2.3.1 Host plants of kiwifruit pests and disease

Some plant species are known hosts to kiwifruit pests.

The most significant kiwifruit pest is passion vine hopper *Scolypopa australis* (PVH)[101, 102], which can travel from neighbouring plants to your orchard and cause staining of kiwifruit. Native plant species such as mahoe *Melicytus ramiflorus* and tree ferns harbour it. Exotic weeds such as blackberry *Rubus fruiticosus*, woolly nightshade and moth plant *Araujia sericifera* are also common hosts for PVH. Woolly nightshade and moth plant are two of the most common weeds in orchard shelter belts.

The brown-headed and black-lyre leafrollers are native moths whose larvae can cause significant damage to kiwifruit[103]. They have a wide host range including many native plants, e.g. the native herb peperomia (*Peperomia urvilleana*)[104]. However in contrast to PVH, leafrollers are well managed within crops by sprays with insect growth regulators and *Bacillus thuringiensis* as active ingredients. There may also be significant biological control in areas of native forest by parasitoids[105] based on observations of declines in leafroller abundance in apple orchards[106].

[68] https://www.nrc.govt.nz/environment/land/how-we-can-help-landowners/
[69] https://www.boprc.govt.nz/environment/land/land-management-officers
[70] https://www.boprc.govt.nz/environment/land/biodiversity
[71] https://www.hbrc.govt.nz/environment/farmers-hub/how-we-can-help-you/
[72] https://www.coastalrestorationtrust.org.nz/resources/planting-calculator/
[73] https://www.doc.govt.nz/nature/biodiversity/biodiversity-new-zealand-resources/
[74] https://www.nzffa.org.nz
[75] https://www.tanestrees.org.nz
[762] https://www.landcare.org.nz
[77] https://qeiinationaltrust.org.nz
[78] https://www.nzpcn.org.nz
[79] https://fishandgame.org.nz/environment/protecting-nz-fish-and-waterways/riverbank-management/
[80] https://www.nrc.govt.nz/your-council/work-with-us/funding-and-awards/for-landowners/environment-fund/
[81] https://www.nrc.govt.nz/your-council/work-with-us/funding-and-awards/for-landowners/grants-for-planting-on-erosion-prone-land/
[82] https://www.boprc.govt.nz/environment/land/biodiversity
[83] https://www.gdc.govt.nz/natural-heritage-fund/
[84] https://www.hbrc.govt.nz/hawkes-bay/community/
[85] http://www.nelson.govt.nz/environment/funding-for-environmental-programmes/environmental-grants-scheme/
[86] http://www.nelson.govt.nz/environment/nelson-nature/resources/
[87] https://www.doc.govt.nz/get-involved/funding/nature-heritage-fund/
[88] https://www.mpi.govt.nz/forestry/funding-tree-planting-research/one-billion-trees-programme/direct-landowner-grants-from-the-one-billion-trees-fund/
[89] https://www.mpi.govt.nz/forestry/funding-tree-planting-research/hill-country-erosion-programme/
[90] https://www.landcare.org.nz/file/bay-of-plenty-funding-updated-november-2020/open
[91] https://www.landcare.org.nz/file/waikato-funding-page-updated-oct-2020-1-1/open
[92] https://www.wai-kokopu.org.nz
[93] https://www.uem.org.nz/projectparore
[94] https://www.treesthatcount.co.nz
[95] https://www.treesthatcount.co.nz/media/17711/ttc_rs_forlandowners_v4.pdf
[96] https://www.doc.govt.nz/get-involved/funding/other-funding-organisations/
[97] https://www.doc.govt.nz/get-involved/funding/nga-whenua-rahui/nga-whenua-rahui-fund/
[98] https://www.doc.govt.nz/get-involved/funding/nga-whenua-rahui/matauranga-kura-taiao-fund/
[99] https://www.mpi.govt.nz/funding-rural-support/maori-agribusiness-funding-support/introduction-to-maori-agribusiness/
[100] https://www.tpk.govt.nz/en/whakamahia/land-and-environment/whenua-maori-fund
[101] Logan, D.P., P.A. Allison, and K. Stannard. "Selection of Wild Hosts for Feeding by Passion Vine Hopper Scolypopa australis; (Walker) (Hemiptera Ricaniidae) in the Bay of Plenty". *New Zealand Plant Protection 55* (August 1, 2002): 368–373. Accessed March 22, 2021. https://journal.nzpps.org/index.php/nzpp/article/view/3934.
[102] Martin NA. 2017, revised 2018. Passion vine hopper - *Scolypopa australis*. Interesting Insects and other Invertebrates. New Zealand Arthropod Factsheet Series Number 111. http://nzacfactsheets.landcareresearch.co.nz/Index.html. Accessed March 2021. ISSN 1179-643X.
[103] McKenna CE and Stevens PS. 2007. A comparison of lepidopteran damage to 'Hort16A' and 'Hayward' kiwifruit. New Zealand Plant Protection 60, 254-258 Steven D. 1990. Entomology and Kiwifruit. Pp 362-412 In: Warrington IJ, Weston GC ed. Kiwifruit Science and Management. Ray Richards Publisher in association with the NZ Society for Horticultural Science, Auckland, New Zealand
[104] Landcare Research – Plant-SyNZ https://plant-synz.landcareresearch.co.nz/index.asp
[105] Walker JTS, Suckling DM, Wearing CH 2017. Past, present, and future of integrated control of apple pests: The New Zealand experience. Annuall Review of Entomology 62: 231-248.
[106] Pers comm Dr David Logan

Greenhouse thrips may also breed on many native plants[107]. However the most important source of greenhouse thrips for kiwifruit may be shelter species such as *Cryptomeria* and weeds growing in the shelter row. This is assumed to be the case because of the limited ability of greenhouse thrips to disperse and the closeness of shelter rows to the crop[108].

Some pests such as scale insects and cicadas already exist in orchards, and populations build up from within over many years, so what is planted outside the orchard is less important.

Armoured scales[109] (greedy scale (*Hemiberlesia rapax*), latania scale (*Hemiberlesia lataniae*) and oleander scale (*Asipidiotus nerii*)) are a key risk to kiwifruit growers because they are quarantine pests of kiwifruit in some importing countries and their presence in a consignment can result in the fruit being rejected. Shelter species such as willows, poplars, Leyland cypress and *Pittosporum* can be hosts to large numbers of scale, while pine, *Cryptomeria*, and *Casuarina* do not harbour large numbers.

The presence of chorus cicada (*Amphipsalta zelandica*)[110] can result in the rejection of kiwifruit as a result of sooty mould growing on the excreta produced by cicada adults. Cicadas can also damage replacement canes and damage kiwifruit. Native trees such as mahoe are hosts to chorus cicadas, however densities tend to be much lower in native forest than in kiwifruit orchards.

Armillaria is a root disease of kiwifruit vines. Some native plants are known to be susceptible to *Armillaria* and can therefore act as carriers. They include kauri, black beech, red beech and rimu, while exotic willows can also be a source. Similarly some native and exotic trees are known to be susceptible to *Phytophthora* species and could act as carriers of this root disease into kiwifruit orchards also.

The plant selection guides in section 3 and 4 note the pest host risks discussed above for some of the key native species, where they are known.

2.3.2 Biosecurity threats

In addition to existing pests, there are a number of potential pests such as fruit flies, brown marmorated stink bug, verticillium wilt and *Phytophthoras* that, if they were to become established, could result in significant issues for kiwifruit production. The management of these biosecurity risks is detailed in the *Kiwifruit Growers On-Orchard Biosecurity Plan*[111] prepared by Kiwifruit Vine Health Inc (KVH).

There are existing diseases such as *Armillaria* that can be transferred from native plants to kiwifruit, so ensure that any plants you source are free from *Armillaria* when planted. Good biosecurity practice should be followed when moving between planting areas and production orchards; see guideines for this on the KVH website at www.kvh.org.nz/hygiene.

Other potential biosecurity risks include those resulting from the introduction of weeds and weed seeds. These can be managed through the use of weed-free plants sourced from reputable nurseries and also ensuring that contractors and machinery don't introduce weeds through transfer from other sites.

Plants are a high risk pathway for introducing new biosecurity threats onto your property. Organisms such as *Phytophthora* have the potential to spread from shelter plants into your kiwifruit orchard. It's important to minimise this risk by taking care to check that all plant material is sourced from the cleanest possible source, and traceability records are maintained so that pest sources can be found quickly. KVH has been working on a National Pathway Plan for the kiwifruit industry, which will include requirements for all plants entering kiwifruit orchards (kiwifruit vines and shelter plants), to reduce the risk of unintentionally spreading biosecurity threats. Please check the KVH website for the latest details of these requirements and a list of nurseries who have demonstrated that they meet the necessary standards.

2.3.3 Market access considerations

There are some plants that produce seeds at kiwifruit harvest time that can cause market access issues if they are found on the kiwifruit. The vast majority of problem seeds found on kiwifruit are from pampas grass (*Cortaderia selloana*), which can produce more than 100,000 light, windborne seeds per flower head in autumn at harvest time[112]. Mexican daisy (*Erigeron karvinskianus*) seeds are also problematic, but produce much fewer seeds.

The native plant toetoe (*Austroderia spp*) looks similar to pampas grass, but produces far fewer seeds and flowers in spring. Toetoe is not a known contamination risk for kiwifruit, but planting in close proximity to vines should be avoided to reduce the risk of fine seeds adhering to fruit in late summer/autumn.

2.3.4 Ecosourcing

Ecosourcing is the practice of using native plants that have been sourced locally from the wild for revegetation plantings. Ecosourcing avoids the risk of planting species that are not native to an area. It therefore maintains the distinctness of local flora and makes use of plants that are best adapted to an area's environmental conditions.

Many nurseries offer locally sourced plants or seeds, and sometimes locally specific varieties.

The Land Cover database *Potential Vegetation of New Zealand*[113] provides an insight into the native vegetation that was present before settlement throughout New Zealand and can be a useful resource to identify plants that are local to your area.

As a guide, look at which native species are growing naturally in nearby native habitats that have similar characteristics (e.g. topography, altitude and soil type) to the area you are planning to revegetate. This will give you an idea of what species are likely to be suitable for your site.

2.3.5 Natural revegetation options

Not all native revegetation needs to be planted. As long as there is a seed source within the soil or from nearby vegetation, ecosystems will, in time, restore themselves.

Pasture if left to revert and kept free of fires, persistent weeds and browsing animals, may turn into bracken or manuka, which in turn will probably be overtaken by native trees. Wetlands will usually revert rapidly to native sedges, rushes, shrubs and trees when allowed to remain damp. Even a hillside of gorse or broom may become native forest over time.

Management will likely be required, such as control of invasive weeds, possums, rabbits or hares, the removal of drains, or the exclusion of farm animals. Planting appropriate native species may speed up the process by providing instant vegetation and seed sources, and by attracting birds that bring yet more native seeds[114]. Natural revegetation is generally less suitable for fertile sites where there is vigorous competition from plants such as grasses.

A potentially cheaper alternative to planting trees to achieve native forest revegetation in some sites, could be through direct seeding, however there is comparatively less information available on this method[115].

[107] Martin NA. 2017, revised 2018. Greenhouse thrips - Heliothrips haemorrhoidalis. Interesting Insects and other Invertebrates. New Zealand Arthropod Factsheet Series Number 105. http://nzacfactsheets.landcareresearch.co.nz/Index.html. Date Accessed. ISSN 1179-643X.
[108] pers. comm Dr David Logan
[109] KiwiTech Bulleting No N1– Armoured Scales – revised 2017 www.zespricanopy.co.nz
[110] https://www.landcareresearch.co.nz/tools-and-resources/identification/what-is-this-bug/chorus-cicada/
[111] https://www.kvh.org.nz/vdb/document/104824
[112] https://www.kvh.org.nz/newsroom/id/1689
[113] https://lris.scinfo.org.nz/layer/48289-potential-vegetation-of-new-zealand/
[114] https://www.hbrc.govt.nz/assets/Document-Library/Land-Management/Riparian-Planting-Guide.pdf
[115] Potential of direct seeding for establishing native plants into pastoral land in New Zealand N.Z.J.Ecol., Volume 31(2), 2007 Review Article Grant B Douglas Mike B. Dodd Ian L. Powerhttps://newzealandecology.org/nzje/2831.pdf.

Additional information sources on plant selection for different regions are listed below.

RESOURCES

Regional planting and plant sources

- Trees that Count. *Northland Regional Guide*[116].
- Northland Regional Council. *Trees for the Land – Growing Trees in Northland for Protection, Production and Pleasure*[117].
- Northland Regional Council. *A planter's handbook for Northland natives including special plants for wetlands, coast and bird food*[118]. Resources for detailed plant descriptions[119]
- Bay of Plenty Regional Council. *Native Planting in the Bay of Plenty*[120].
- Trees that Count. *Bay of Plenty Regional Guide*[121].
- Trees that Count. *Gisborne Regional Guide*[122].
- Trees that Count. *Hawkes Bay Regional Guide*[123].

Biosecurity risk management

- *Kiwifruit Growers Biosecurity Guidelines. 5 steps to strengthen on-orchard biosecurity*[124].
- DOC. *Weeds that pose serious threats to New Zealand*[125].
- BOPRC. *Pest plants*[126].

Ecosourcing

- NZ Plant Conservation Network. *Eco-sourcing fact sheet*[127].

Native plants and kiwifruit pests

- A good summary of strategies for controlling PVH is found in *Fighting Sooty Mould with Native Plantings*[128].

Nurseries

There are many local nurseries that specialise in growing native plants appropriate for their supply areas. They can be a good source of information to assist with your native planting project.

- New Zealand Plant Producers Inc (NZPPI). This is the industry organisation representing plant producers. Its member directory[129] can be used to identify native plant nurseries in your area.
- A list of nurseries which are part of the KPCS (Kiwifruit Plant Certification Scheme) can be found on the KVH website[130].

[116] https://www.treesthatcount.co.nz/media/18142/trees-that-count-northland-regional-guide.pdf
[117] https://www.nrc.govt.nz/media/2i3jmurg/treesfortheland2013web.pdf
[118] https://www.nrc.govt.nz/media/opcjflrm/a-planters-handbook-for-northland-natives-2019-rebrand.pdf
[119] https://www.nrc.govt.nz/environment/land/planting/planting-and-establishment/brief-tree-descriptions
[120] https://atlas.boprc.govt.nz/api/v1/edms/document/A3259555/content
[121] https://www.treesthatcount.co.nz/media/18212/trees-that-count-bay-of-plenty-regional-guide.pdf
[122] https://www.treesthatcount.co.nz/media/18156/trees-that-count-gisborne-regional-guide.pdf
[123] https://www.treesthatcount.co.nz/media/18216/trees-that-count-hawkes-bay-regional-guide.pdf
[124] https://www.kvh.org.nz/vdb/document/104824
[125] https://www.doc.govt.nz/nature/pests-and-threats/weeds/
[126] https://www.boprc.govt.nz/environment/pests/pest-plants
[127] *https://www.nzpcn.org.nz/conservation/restoration/eco-sourcing/*
[128] NZ Kiwifruit Journal Oct Nov 2020 (Pg 62-65)
[129] https://nzppi.co.nz/Plant-Producer-Members/19793/
[130] https://www.kvh.org.nz/indnurseries

2.4 PREPARE YOUR SITE FOR PLANTING

Preparation of the site prior to planting and organisation of planting, will help ensure a successful planting project.

Order plants ahead of time.

- It's best to put your order into a nursery well in advance (up to one year), so that you can be assured of receiving the number and types of plants that you need.

Weed control:

It is critical that you prepare your site well before planting, especially by controlling perennial weeds.

Remove weeds (including grass) from the areas to be planted *before* you begin to plant. Depending on the site, spot spray the planting area, rather than blanket spray to avoid creating bare patches that can be reinvaded by weeds. Apply herbicide at least six weeks before planting on clean grassy sites. Sites with more persistent weeds may need a much longer intensive weed control programme (up to 18 months).

For some weeds such as kikuyu, Japanese honeysuckle and blackberry, two sprays of herbicide may be needed to suppress them.

There are some weed and plant species that create specific and significant potential threats to kiwifruit orchards because they impact on local ecosystems or are hosts to kiwifruit pests and diseases. These include:

- Wild kiwifruit plants that could become a reservoir for disease. Wild kiwifruit is a fast-growing, smothering weed and costly to destroy. It degrades the biodiversity value of native bush and the production value of forestry[131].
- Passion vine hopper (PVH) hosts — many weedy species such as blackberry, Japanese honeysuckle and privet, and pioneering native species such as mahoe and kawakawa.
- Leafroller hosts — gorse (*Ulex europaeus*) and broom (*Cytisus scoparius*)[132] are known hosts.
- Greenhouse thrips hosts — wineberry, blackberry, barberry as well as some ornamental plants such as hydrangeas and azaleas are known to host greenhouse thrips.

Fencing:

- If there is a risk that farm animals or vehicles will enter the planting area, you'll need to protect it with stock-proof or other site suitable fencing. Fencing should be erected before any planting starts.

Soil preparation:

- If soils have been badly compacted by machinery or stock, ripping before planting may be needed to encourage deep root growth.

Pest control:

- Pests such as goats, possums, rabbits and hares can quickly destroy new native plantings. So, it's important to control or exclude them and other browsing animals such as pūkeko, before planting. If pūkeko are abundant and culling is not a viable option, then larger plants could be considered, since root trainer and small cell plants will suffer large losses due to pūkeko pulling them out. Bigger plants (such as PB2 grade) are more appropriate and the extra costs can be justified because of the higher survival rates.
- The use of plant guards can be useful for minimising loss from browsers as well as protecting plants from herbicide damage.

RESOURCES

Planting guides

- Northland Regional Council. *Planting and establishment*[133] .

Weed control

- QEII National Trust. *Weedbusting tips*[134]. A compilation of articles from their magazine.
- *Weedbusters*[135]. A weeds awareness and education programme that aims to protect New Zealand's environment from the increasing weed problem. The weedbusters website has diverse resources to help with weed identification and control.

[131] https://cdn.boprc.govt.nz/media/321627/PP18-Wild-kiwifruit.pdf
[132] D. M. Suckling , G. M. Burnip , J. T. S. Walker , P. W. Shaw , G. F. McLaren , C. R. Howard , P. Lo, V. White & J. Fraser (1998) Abundance of leafrollers and their parasitoids on selected host plants in New Zealand, New Zealand Journal of Crop and Horticultural Science, 26:3, 193-203, DOI: 10.1080/01140671.1998.9514055
[133] https://www.nrc.govt.nz/environment/land/planting/planting-and-establishment/
[134] https://qeiinationaltrust.org.nz/wp-content/uploads/2018/02/Weedbusting-tips-a-Compilation-OS-weebusters-articles-FINAL-web.pdf
[135] www.weedbusters.org.nz

2.5 PLANTING

Planting is a critical stage for any successful planting project.

- **When to plant:** Typically the best time to plant is from late May until September; the earlier the better, especially in dry sites. Late winter/early spring is often best for frost prone or inland sites. Planting in the cooler, wetter months ensures adequate development of roots to sustain plant growth over summer. Outside of this period, and without irrigation, many native plants will not survive in dry soil. Planting when there has been enough rain to make the ground easy to dig is also wise.
- **Fertiliser and mycorrhizae:** A soil test can be useful to identify whether you need to add any fertilisers or trace elements. These deficiencies can be addressed through the use of slow release fertilisers such as Grotabs at the time of planting. Make sure the fertiliser does not touch the plant roots. Many plants require the presence of specialist mycorrhizae to thrive[136]. The use of synthetic fertilisers and agrichemicals can slow development or damage the soil biome and delay the establishment of the beneficial fungi necessary for plant growth[137].
- **Contractors:** In most regions there are an increasing number of specialist contractors who can undertake weed control, planting and releasing, (hand pulling of weeds from around new seedlings), as well as overall project management. They have experience and equipment that can help ensure a successful project — however there can be significant variation in their cost and quality of work. In your planning phase, ask advisors and other growers to recommend contractors with a good reputation and consider getting multiple quotes before choosing your service provider(s).
- **Planting**
    - For most sites, plants that are 20–40 cm high and have well-developed roots will be most suitable. If however there is good weed control, significant cost savings can be made from using cheaper forestry grade plants rather than PB2 or similar sized plants.
    - Avoid planting on hot, sunny or windy days if possible as these conditions can quickly dry out new plants.
    - Lay out plants where they are going to be grown and keep them moist prior to planting. Also shelter them from frosts if planting in frost-prone sites in winter.
    - Dig a hole that is twice the width of the root ball in size, and loosen the soil at the bottom of the hole. The hole should be deep enough so the base of the stem where the roots start is slightly below ground level.
    - Firmly pack the soil around the plant with the heel of your boot after the hole is filled. Leave a slight depression around the plant to catch any rain or water run-off. Ensure the plant is positioned straight upwards.
    - Water your plants either early or late in the day if required.
    - Avoid planting in rows. Instead aim for a look that mimics nature.
- **Mulching:** Use of mulch around the plants will suppress weeds and keep the soil moist. Aim for a mulch depth of at least 10 cm. Avoid direct contact between the mulch and the plant to minimise the risk of disease or insect damage via the plant stem. On grass sites, the spot-sprayed dead grass can often form a very good natural mulch. The use of weed matting, or for example old carpet squares, can also be useful to suppress weeds around plantings, especially with grasses.
- **Plant protection:** The use of plant guards to protect plants from rabbits, hares, spray drift and the weather is advisable at sites where these factors are a significant issue. The use of staking and windbreaks may be needed at exposed sites to protect larger plants from wind damage. By weeding only around individual plants and allowing longer grass to establish in between plantings, rabbits and hares will be discouraged from browsing on the seedlings, as they generally don't like long wet grass.

RESOURCES

- Trees that Count website resources page[138] includes best practices for planting native plants.

[136] https://www.nzffa.org.nz/farm-forestry-model/resource-centre/tree-grower-articles/august-2005/perfect-partners-mycorrhizae-and-forestry/
[137] https://www.nzffa.org.nz/farm-forestry-model/resource-centre/tree-grower-articles/august-2017/soils-underpin-the-future-of-our-forests/
[138] https://www.treesthatcount.co.nz/resources/

2.6 ONGOING MAINTENANCE

The success of your planting project is greatly improved by ongoing maintenance. Check your new plants regularly to see how they are going.

- They may need watering, especially in the first couple of years or if there are drought conditions. If available, irrigation on drier sites is very beneficial.
- Hand weeding (also known as 'releasing') around plants will reduce competition and stress. This is very important as competition from surrounding vegetation can soon outcompete and overwhelm young plants, leading to death. This is one of the prime reasons for revegetation projects failing. Weeding can be done by hand, mechanically (e.g. with a weed eater), or by the use of herbicides.
- Weeding should be done twice yearly at a minimum, usually in spring and autumn. It may need to be done more frequently in warmer coastal sites where there is more competition from species such as kikuyu, or if you are not using herbicides.
- Ongoing weeding should continue for at least three years after planting, or longer if there are significant weed issues at the site (e.g. climbing vines are a problem), or if slow growing species such as podocarps are planted. If you use mechanical weed control methods, care must be taken not to damage plants in the process. If herbicides are used, then plants should be protected by plant guards, or knapsack spray guards should be employed.
- Dead or damaged plants should be replaced.
- Maintain pest control. For example, destroy weedy plants such as Japanese honeysuckle which is a host for PVH, and control rabbits, hares and possums.

Further planting of larger or more shelter-dependent plants can be carried out once the early stage pioneer plants are well established.

Monitoring: It is useful to photograph your planting each year and watch how it changes and becomes self-sustaining over time. This can help identify those plants and planting strategies that work well on your property, as well as provide a historical record of your planting project and its impact on the landscape. Further monitoring could include bird counts, and recording the presence of other living things such as insects and animals.

Maintain frost drainage: In kiwifruit orchards, natural or artificial shelter can trap cold air so that it pools in kiwifruit blocks, leading to frost damage and production losses.

Since cold air is more dense than warmer air, it settles at the lowest point that it can easily flow to. In an open environment, the lowest points are often lakes, ponds or riverbeds. This needs to be considered when developing your planting plan. As your plants become established, ensure that frost drainage pathways are maintained.

Maintaining frost drainage pathways in a kiwifruit orchard usually involves modifying downhill shelter or planted areas so that cold air can freely drain out of the orchard. This can include removing the lowest metre of foliage from natural shelters, so that cold air can flow under the shelterbelt, or repositioning artificial shelter to allow for cold air to escape.[139]

RESOURCES

- New Zealand Plant Conservation Network. *Photo points*[140].
- DOC. *Monitor biodiversity projects*[141]. Information and resources to assist with the monitoring of biodiversity projects.
- DOC. *5 minute bird counts* webpage[142].
- DOC. *Biodiversity inventory and monitoring toolbox*[143].
- ARGOS. *Diversity and abundance of birds in New Zealand kiwifruit orchards*[144].
- Land Air Water Aotearoa (LAWA)[145]. A key resource for environmental data and information.
- Trees that Count. *Monitoring*[146] website.
- The Landcare Trust. *Wetmak – Wetlands monitoring and assessment kit*[147]. A resource aimed at community groups working on wetland restoration projects.
- Landcare Research. *Water Monitoring*. Stream Health Monitoring and Assessment Kits (SHMAK)[148].

[139] https://www.nzkgi.org.nz/wp-content/uploads/2019/11/NZKGI_Kiwifruit_Grower_Book_2019_Chapter-2.pdf
[140] https://www.nzpcn.org.nz/conservation/monitoring/photo-points/
[141] https://www.doc.govt.nz/get-involved/run-a-project/restoration-advice/bush-restoration/monitor-biodiversity/
[142] https://www.doc.govt.nz/our-work/five-minute-bird-counts/
[143] https://www.doc.govt.nz/our-work/biodiversity-inventory-and-monitoring/
[144] https://researcharchive.lincoln.ac.nz/bitstream/handle/10182/626/Kiwifruit_Symposium_Birds_Poster.pdf?sequence=1&isAllowed=y
[145] https://www.lawa.org.nz
[146] https://www.treesthatcount.co.nz/resources/monitoring/
[147] https://www.landcare.org.nz/resource-item/wetmak
[148] https://www.landcare.org.nz/resource-item/water-monitoring

3

Plant SELECTION GUIDE

This plant selection table on pages 28-29 has been developed through a review of national and regional planting guides and associated information. The table includes a reference number beside each plant type, to assist with matching the more detailed descriptions provided in section 4 and information in Appendix 1.

KEY[149]

KIWIFRUIT PRODUCTION RISKS

Pest host risk[150]

High	Preferred host for multiple kiwifruit pests
Medium	Recorded host for kiwifruit pests
Low	Minimal or low likelihood of hosting kiwifruit pests

Risk rating relates to pest species noted i.e.:

PVH	Passion vine hopper
A	Armillaria host
AS	Armoured scale host
GHT	Greenhouse thrips host

SITE SUITABILITY

Good	Naturally found and well adapted for this site
Average	Will grow in this site
Poor	Not adapted and will not grow in this site

USE SUITABILITY

Good	High suitability for this use
Average	Some suitability for this use
Poor	Limited or not suitable for this use

Bird food source

Most plants are bird friendly to some extent.

Good	excellent food source for birds
Average	provides some food for birds
Poor	limited food source for birds

Some specific important birds and their feed sources

Fruit and nectar feeders	koromiko/bellbird, tūī/parson bird, pihipihi/ silvereye, kākā
Foliage and fruit	kererū/New Zealand pigeon
Insects	pīwakawaka/fantail, riroriro/grey warbler, pīpīwharauroa/shining cuckoo
Small rodents, birds, lizards	ruru/morepork, kōtare/kingfisher

PLANTING DEVELOPMENT STAGE

Good	Ideal for planting at this stage
Average	Can be planted at this stage
Poor	Not suitable to be planted at this stage

[149](Adapted from the Environment Bay of Plenty – Native Plant Guide Key)
[150] Armillaria rating from https://www.nzffa.org.nz/farm-forestry-model/the-essentials/forest-health-pests-and-diseases/forestry-diseases/Armillaria/ArmillariaPath4/

PLANT TOLERANCE TO SITE CONDITIONS

Cold/Frost

● Good	generally frost hardy in most low to mid-altitude districts; will tolerate frosts of -7°C or lower
● Average	will tolerate frosts of -3°C to -7°C
● Poor	frost intolerant

Wet/damp conditions

● Good	can withstand roots continuously in a wet/waterlogged state, although growth may be slowed
● Average	can withstand frequent but not continuous waterlogging
● Poor	cannot withstand a wet or waterlogged site

Dry conditions

● Good	can withstand long periods of seasonal drought
● Average	will withstand seasonal drought unless soil moisture drops below wilting point for several weeks
● Poor	cannot survive in dry conditions

Salty

● Good	tolerates salt laden winds and to some extent saline soils
● Average	tolerates some salt deposits on leaves but will lose vigour if exposed to heavy or continuous deposits
● Poor	limited or no tolerance to salt conditions

Shade

● Good	tolerates shade
● Average	tolerates partial shading
● Poor	no tolerance to shade

Windy

● Good	will tolerate strong to gale force winds with little or no damage
● Average	will tolerate strong winds and occasional gale force winds, but with minor damage, and will not grow in very exposed positions
● Poor	will not tolerate strong or heavy winds

	REF. NO	PLANT NAME	KIWIFRUIT PRODUCTION RISKS	SITE SUITABILITY					USE SUITABILITY					PLANTING STAGE		TOLERANCES					
			Pest host risk	Forest situations	Lowland open sites	Riparian areas	Coastal	Wetlands	Pollinator support	Bird food source	Carbon sequestration	Shelterbelt	Erosion control	Pioneer species	Secondary planting	Cold/frost	Wet/damp	Dry	Salt	Shade	Wind
NATIVE TREES	1	Lacebark, narrow-leaved lacebark	PVH, AS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	2.a	Kānuka and *Kunzea* species	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	2.b	Mānuka	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	3.a	Tarata, lemonwood, kohuhu	PVH, A, AS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	3.b	Karo	PVH, A, AS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	4	Tī kōuka, cabbage tree	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	5	Karaka	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	6	Kahikatea, white pine	PVH, A, AS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	7	Rimu	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	8	Akeake	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	9	Kāpuka, broadleaf	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	10	Rewarewa	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	11	Pōhutukawa, rata	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	12	Ngaio	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	13	Beech	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	14	Ribbonwood	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	15	Totara	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	16	Miro, matai	PVH & A unknown	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	17	Lancewood, horoeka	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	18	Whauwhaupaku, five finger	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	19	Pūriri	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	20	Kōwhai	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
EXOTIC SHELTER SPECIES	21	Poplar	PVH, A, AS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	22	Willow	PVH, A, AS, GHT	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	23	Sheoak	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	24	Japanese cedar	A, AS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	25	Italian alder	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	26	Radiata pine	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
NATIVE SMALL TREES/SHRUBS	27	Red matipo	PVH, AS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	28	Mingimingi, karamū, taupata	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	29	Mākaka, shore ribbonwood	PVH, AS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	30	Koromiko	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	31	Akepiro, tree daisy	PVH unknown	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	32	Tauhinu, cottonwood	PVH & AS unknown	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	33	Tagasaste, tree lucerne	unknown	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	34.a	Harakeke, flax	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	34.b	Mountain flax	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	35	Tussock sedge, pūkio	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	36	Sea rush	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	37	Kuta, paopao	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	38	Toetoe	PVH, A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	39	Raupō	PVH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

4

Detailed PLANT DESCRIPTIONS

Information collated from a range of sources including Regional Planting Guides, NZ Flora website[151] and New Zealand Plant Conservation Network[152].

4.1 NATIVE TREES

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Common/*botanical* name:
1. Lacebark *Hoheria populnea,* **narrow-leaved lacebark,** *Hoheria angustifolia.*

Uses
- Okay flower feed source for birds. Very good nectar and pollen supply for bees.
- Depending on the site this species could comprise up to 1% of the plants scheduled for an individual site.
- Can be used as part of mixed shelterbelts.

Preferred site conditions
- Riparian and lowland open sites.
- Dry and medium soil moisture, tolerant to wind and frost, low tolerance to shade.

Growth
- *H populnea* — up to 8m, fast growth rate, erect form. Flowers Jan–Mar, white flowers Fruit Apr–Jun
- *H angustifolia* — up to 11m. Flowers Dec–Feb, white flowers. Fruit Feb–Apr.

Risk to kiwifruit production: Medium PVH host risk.

Common/*botanical* name:
2.a. Kānuka *Kunzea species,* **2.b. Mānuka** *Leptospermum scoparium.*

Uses
- Good flower feed source for birds. Manuka also produces honey dew.
- Honey from manuka can be valuable.
- Plantings to mainly comprise the species in this category; matched to the physical site characteristics identified for this species.
- Important revegetation species.
- Susceptible to myrtle rust[153].

Preferred site conditions
- Mānuka — adapted to lowland open, riparian and coastal sites. Average adaptation to coastal and wetlands. Poor adaptation to forest sites.. Thrives on moist sites. Susceptible to myrtle rust[154]
- Good tolerance to frost, tolerates damp, dry and windy conditions. Poor tolerance to shade
- Kānuka — adapted to riparian sites -dry to medium moisture levels. Tolerant of wind, moderate tolerance to frost, coastal salt condition's., Low tolerance to shade.

Growth
- Mānuka — up to 6m, fast growth rate, bushy form. Flowering throughout the year, red/pink or white flowers.
- Kānuka — up to 18m, fast growth rate, erect form. Flowers Oct-Feb, white flowers. Fruit Nov-Mar.

Risk to kiwifruit production: Low PVH host risk

[153] https://myrtlerust.org.nz/identifying-myrt
[154] https://myrtlerust.org.nz/identifying-myrt

Common/*botanical* **name:**
3. Tarata, lemonwood *Pittosporum eugenioides,* **kohuhu** *Pittosporum tenuifolium;* **karo** *Pittosporum crassifolium.*

Uses
- Bird feed, yellow to red flowers.
- *P eugenioides* — Final plantings can include up to 15% of this species in suitable habitats.
- *P tenuifolium* — in most situations, plantings should not comprise more than 5% of these species, can also be used for low shelterbelts/hedges.
- *P crassifolium* — suited to coastal conditions.

Preferred site conditions
- Adapted to forest and lowland open sites. Average adaptation to riparian areas. Poor adaptation to coastal conditions except for P crassifolium.
- *P eugenioides* — Average tolerance to frost, damp, dry, shade and wind. Poor tolerance to salt wind conditions.
- *P tenuifolium* — tolerates dryer sites that P eugenioides.
- *P crassifolium* — well suited for coastal conditions.

Growth
- *P eugenioides* — up to 13m, fast growth rate, bushy form. Flowers Oct-Dec. Fruit/seeds Mar-May.
- *P tenuifolium* — up to 8 m, fast growing, bushy form. Nectar Oct-Dec. Fruit and seed Feb-May.
- *P crassifolium* — up to 5m, fast growing, flowers Aug-Oct.

Risk to kiwifruit production: Medium PVH host risk

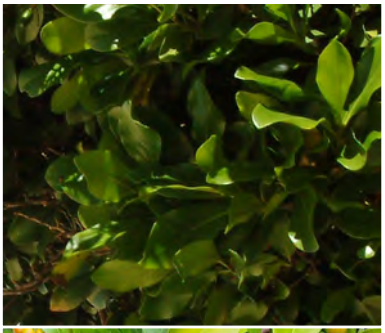
Common/*botanical* **name:**
4. Tī kōuka, cabbage tree *Cordyline australis,* **ti ngahere** *Cordyline banksii.*

Uses
- Great sources of nectar, fruit and seed source for birds and bees. Cream flowers.
- In most situations, plantings should not comprise more than 5% of this species.

Preferred site conditions
- Widespread and common from coastal to montane forest. Most commonly encountered on alluvial terraces within riparian forest.
- Tolerant to dry and wet sites, supressed by shade, frost hardy, moderate tolerance to wind and salt air.

Growth
- *C australis* grows to 20 m tall. Flowering Oct-Dec cream flower. Fruiting Jan-March. Erect form. Fast growth rate.
- *C banksia* grows to 4 m tall. Flowering Nov-Jan. Fruiting Feb-Apr. Fast growth rate.
- Can be a pioneer plant or part of a secondary planting programme.

Risk to kiwifruit production: High PVH host risk



Common/*botanical* name:
5. Karaka *Corynocarpus laevigatus.*

Uses/benefits
- Great fruit and seed food source for birds.
- Nectar from the karaka tree which flowers in the spring is very attractive to bees but toxic to adult bees
- Final plantings can include up to 15% of this species in suitable habitats.

Preferred site conditions
- Common in mainly coastal situations, often a major component of coastal forest, rarely dominant.
- Good tolerance to salt wind conditions, average tolerance to wet/damp, dry and shade. Sensitive to frost.

Growth
- Grows up to 15 m tall. Flowering Aug-Nov. Fruiting Jan-Apr. Medium growth rate, bushy form. Large orange fruit.

Risk to kiwifruit production: Poisonous plant – the seed kernel is poisonous. Also nectar is toxic to bees.High PVH host risk

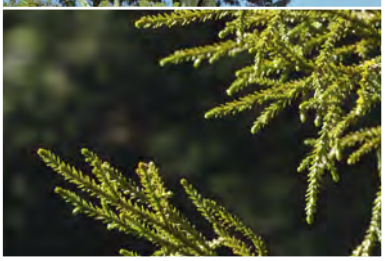
Common/*botanical* name:
6. Kahikatea, white pine *Dacrycarpus dacrydioides.*

Uses
- Prolific fruit which is very attractive to native birds such as wood pigeons.
- Final plantings can include up to 15% of this species in suitable habitats.
- Tallest New Zealand native tree – up to 50 m.

Preferred site conditions
- Grows from sea level to 750m in the North Island. Adapted to forest situations and wetlands, flat fertile land. Most abundant in high rainfall areas and can grow on a wide range of soils.
- Formerly dominant on frequently flooded, and/or poorly drained alluvial soil.
- Tolerant to heavy shade, wind and frost.

Growth
- Easy to establish and grow. Flowering October – January. Fruit Feb – June. Medium growth rate, erect form.

Risk to kiwifruit production: Low PVH host risk



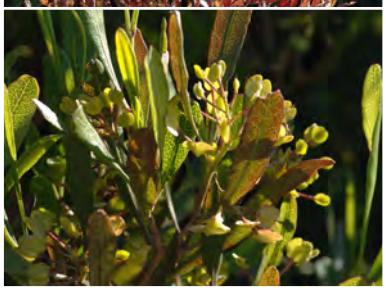
Common/*botanical* name:
7. Rimu, red pine *Dacrydium cupressinum.*

Uses
- Fruit and seeds good feed source for birds.
- Final plantings can include up to 15% of this species in suitable habitats.

Preferred site conditions
- Adapted to forest situations – average moisture.
- Tolerant of medium shade, wind and frost.

Growth
- Grows up to 35 m. Slow growth rate, erect form.
- Fruit and seed Mar-May.

Risk to kiwifruit production: Low PVH host risk, *Armillaria* host



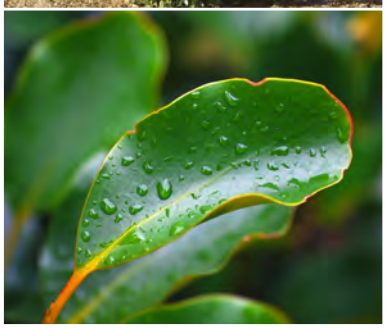
Common/*botanical* name:
8. Akeake *Dodonea viscosa.*

Uses
- Plantings to mainly comprise the species in this category matched to the physical site characteristics identified for this species.
- Can be used for low shelter/hedges and erosion control.

Preferred site conditions
- Adapted to coastal and lowland sites.
- Good tolerance to dry and salt conditions. Average tolerance to wet, partial shade and windy conditions. Sensitive to heavy frosts when young.

Growth
- Grows up to 6 m tall, fast growth rate, bushy form,
- Flowering Sep-Jan, red/pink, yellow flowers. Fruiting Nov-Mar.

Risk to kiwifruit production: Low PVH host risk



Common/*botanical* name:
9. Kāpuka, broadleaf *Griselinia littoralis; Griselinia lucida.*

Uses
- Good fruit food source for birds.
- Plantings to mainly comprise the species in this category matched to the physical site characteristics identified for this species.
- Can be used for shelter/hedging.

Preferred site conditions
- *G lucida* — adapted to coastal conditions. Tolerant to dry and windy conditions.
- *G littoralis* — adapted to coastal and forest conditions. Tolerant to drought, coastal conditions and partial shade.

Growth
- *G lucida* — grows to 8 m tall. Flowering Oct-Dec. Fruiting Dec-Aug. Medium growth rate, bushy form.
- *G littoralis* — grows to 10m tall. Flowering Nov-Jan, purple flower. Fruiting Jan-Aug.

Risk to kiwifruit production: High PVH host risk

Common/*botanical* name:
10. Rewarewa, New Zealand honeysuckle *Knightia excelsa.*

Uses
- Great nectar feed source for birds.
- Final plantings can include up to 15% of this species in suitable habitats.

Preferred site conditions
- Adapted to lowland open sites.
- Tolerant of dry conditions. Tolerant to wind and frosty conditions, low tolerance to shade

Growth
- Grows up to 30m tall. Flowering Oct-Dec, red flower. Fruiting Oct-Dec. Fast growth rate, bushy form.

Risk to kiwifruit production: Low PVH host risk

Common/*botanical* **name:**
11. Rata *Metrosideros,* **northern rata** *Metrosideros robusta;* **pōhutukawa** *Metrosideros excelsa;* **southern rata** - *Metrosideros umbellate.*

Uses
- Great nectar, fruit and seed source for birds.
- Final plantings can include up to 15% of this species in suitable habitats.
- Very palatable to possums, some species susceptible to myrtle rust[155].

Preferred site conditions
- Northern rata — adapted to coastal conditions. Tolerant to both dry and wet conditions, frost and wind. Low tolerance to shade.
- Pōhutukawa — can tolerate drier coastal situations. Tolerant to wind and salt air. Low tolerance to frost and shade.
- Southern rata — prefers cooler regions with high rainfall.

Growth
- *M robusta* — tree up to 25 m. Flowering Nov-Jan. Fruiting Dec-Jan. Erect growth, medium growth rate.
- *M umbellata* — tree up to 15 m tall. Flowering Nov-Jan. Fruiting Dec-Feb.
- *M excelsa* — tree up to 20m, slow growth rate. Flowering Nov-Jan, fruiting Mar-May.

Risk to kiwifruit production: Low PVH host risk

Common/*botanical* **name:**
12. Ngaio *Myoporium laetum.*

Uses
- Berries palatable by bellbirds and tui.
- Plantings to mainly comprise the species matched to the physical site characteristics identified for this species.
- Can be used for hedging/shelter in coastal situations.

Preferred site conditions
- Adapted to coastal sites and a wide range of soils.
- Tolerant to dry conditions, wind including salty sea winds. Tolerant to frost when older, low tolerance to shade.

Growth
- Grows up to 12 m. Flowering Jul – Apr, white flowers. Fruiting Dec-June. Fast growth rate, bushy form.

Risk to kiwifruit production: Poisonous plant - leaves are poisonous to livestock. High PVH host risk.

Common/*botanical* **name:**
13. Hard beech *Fuscospora truncate,* **red beech** *Fuscospora fusca,* **black beech** *Fuscospora solandri.*

Uses
- Black beech produces honey dews that is a feed source for birds and bees.
- In most situations, plantings should not comprise more than 5% of these species.

Preferred site conditions
- Hard and red beech — forest commonly in association in mixed broadleaf-conifer forests and with other beech species on slopes and river sides.
- Low tolerance of shade. Tolerant to wind and frost.
- Black beech — adapted to dryer conditions than hard/red beech. Tolerant of wind and frost.

Growth
- Hard/red beech to 30 m, fast growing, erect form.
- Black beech to 25 m. fast growing erect form.
- Flowers in spring, wind pollinated.

Risk to kiwifruit production: Unknown PVH host risk, some species host to *Armillaria.*

[155] https://myrtlerust.org.nz/identifying-myrtle-rust/

Common/*botanical* name:
14. Lowland ribbonwood, manatu *Plagianthus regius.*

Uses
- Final plantings can include up to 15% of this species in suitable habitats.

Preferred site conditions
- Adapted to lowland open, coastal and riparian sites.
- Tolerant to windy and frosty conditions and average moisture and shade levels. Semi-deciduous.

Growth
- Grows up to 17 m, fast growth rate, erect form.
- One of the few deciduous native trees. Pale yellow flowers.

Risk to kiwifruit production: Medium PVH host risk

Common/*botanical* name:
15. Totara *Podocarpus totara.*

Uses
- Good fruit and seed food source for birds.
- Final plantings can include up to 15% of this species in suitable habitats.
- Can be used as a shelter species

Preferred site conditions
- Hardy pioneer species where it readily establishes on open sites.
- More tolerant of dry soils and seasonal drought than other podocarps but is intolerant of poorly drained soils. Tolerant of wind and frost.

Growth
- *P totara* grows up to 30 m. Fast growing, erect form.
- Fruit/seed Mar-Apr.

Risk to kiwifruit production: Low PVH host risk

Common/*botanical* name:
16. Miro, brown pine *Prumnopitys ferruginea,* **matai, black pine** *Prumnopitys taxifolia.*

Uses
- Fruit and seed food source for birds.
- Final plantings can include up to 15% of this species in suitable habitats.
- Can be used for hedging.

Preferred site conditions
- Adapted to forest conditions, medium soil moisture and shade conditions. Tolerant of frost when older and only light shade.

Growth
- *P ferruginea* — grows up to 15 m, slow growth. Fruit and seeds Mar-Jun, bright red.
- *P taxifolia* — grows up to 25 m; medium growth rate, erect form.

Risk to kiwifruit production: Unknown PVH host risk

Common/*botanical* **name:**
17. Lancewood, horoeka *Pseudopanax crassifolius.*

Uses
- Great nectar, fruit and seed food source for birds. Black fruit.
- Final plantings can include up to 15% of this species in suitable habitats.

Preferred site conditions
- Adapted to lowland open, riparian sites
- Average tolerance to wind, frost, damp and drought conditions.

Growth
- Tree up to 15 m. Fruiting Jan-Apr. Fast growth rate, erect form.

Risk to kiwifruit production: Low PVH host risk

Common/*botanical* **name:**
18. Five finger *Pseudopanax colensoi,* **whauwhaupaku** *Pseudopanax arboreus.*

Uses
- Great food source for bees — pollen and copious nectar. Black fruit.
- Okay fruit and seed food source for birds .
- Use these species sparsely in plantings (this species should comprise 1% or less of the plants scheduled for an individual site).
- Very palatable to possums.

Preferred site conditions
- Coastal to montane, moist broadleaf forest. Frequently epiphytic. A frequent component of secondary forest. Stream sides and forest margins.
- Good tolerance to dry conditions and shade. Tolerant to damp conditions and wind. Intolerant to salt conditions and frost.

Growth
- *P arboreus* — grows up to 8 m tall. Flowers June to August. Fruit and seeds Feb — May.
- *P colensoi* — grows up to 5 m.

Risk to kiwifruit production: High PVH host risk

Common/*botanical* **name:**
19. Pūriri, kauere, New Zealand oak *Vitex lucens.*

Uses
- Nectar, fruit and seed food source for birds. Pink/red flower, red fruit.
- Pioneer plant. Final plantings can include up to 15% of this species in suitable habitats.

Preferred site conditions
- Adapted to drier fertile sites. Tolerant of wind and coastal conditions. Frost tender.

Growth
- Tree up to 20 m tall. Fruiting Feb-Sep. Medium growth rate.
- Flowering May-Oct, red/pink and white flowers. Fruiting Jan-Oct.

Risk to kiwifruit production: High PVH host risk

Common/*botanical* **name:**
20. Small leaved kowhai *Sophora microphylla,* **large leaved/North Island kowhai** *Sophora tetraptera.*

Uses
- Kowhai is a legume and nodules on its roots fix nitrogen. It is New Zealand's only deciduous tree.
- Great nectar, leaf and flower food source for birds. Nectar can however be toxic to adult bees.
- Use this species sparsely in plantings (this species should comprise 1% or less of the plants scheduled for an individual site).
- Can be used for hedging.

Preferred site conditions
- *S tetraptera* — lowland stream sides and forest margins.
- *S microphylla* — up to 800 m. Diverse range of habitats - riparian forest, coastal and associated wetlands, inland grey scrub communities.
- Frost hardy, moderate wind and drought tolerance.
- Prefers fertile sites but not waterlogged.

Growth
- *S microphylla* — up to 25 m tall. Flower Aug-Oct. Fruiting Oct-May.
- *S tetraptera* — up to 12 m tall. Flowering Oct-Dec. Fruiting Oct-May.
- Fast growth rate, busy form.

Risk to kiwifruit production: Poisonous plant – all parts of the plant and especially the seed are poisonous. Medium PVH host risk

4.2 EXOTIC SHELTER SPECIES

Exotic species. Common/*botanical* **name:**
21. Poplar *Populus species.*

Uses
- Erosion control especially for hill country soils.
- Riparian plantings Improves water quality by protecting banks from erosion and reduce runoff.

Preferred site conditions
- There are a large number of cultivars adapted to different sites and tolerances to drought, palatability by possums and timber value.

Growth
- Rapid growth rate, with one dominant leader and erect form.
- Typically planted as spaced poles – 12-15 m apart.

Risk to kiwifruit production:
- Not recommended to be planted near kiwifruit orchards – such as for shelter. They are hosts for armoured scale, and *Armillaria.* Possible host to brown mamorated stink bug (BMSB).
- Have a tendency to drop branches and compete with kiwifruit growth.

Exotic species. Common/*botanical* name:
22. Willow *Salix species.*

Uses
- Erosion control especially for steep hill country. Can be used for riparian buffer zones to manage nutrient runoff and erosion.
- Pollen from willows is an important source of protein for bees in spring.

Preferred site conditions
- Wide range of varieties/cultivars with different attributes and tolerances.
- Some varieties such as crack and grey willows can spread and choke up waterways and should not be planted along waterways. Osier willows are an option however natives are probably more suitable.

Growth
- Fast growth rate.

Risk to kiwifruit production:
- Not recommended to be planted near kiwifruit orchards – such as for shelter. They are hosts for armoured scale, *Armillaria,* leafrollers and chorus cicada. Possible host to brown mamorated stink bug (BMSB) and giant willow aphid.

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Exotic species. Common/*botanical* name:
23. Sheoak, casurina *Casuarina cunninghamiana* (river sheoak), and *Casuarina glauca* (swamp sheoak).

Uses
- Widely planted for shelter on kiwifruit orchards. Of the evergreen species, the sheoaks are the most permeable, although regular trimming is necessary to prevent them from becoming too open.
- Hardy tree also used for erosion control.

Preferred site conditions
- *C. glauca* will withstand heavier soils than *C. cunninghamiana* and is more resistant to infection by *Phytopthora* root rots.
- *C. glauca* may be slightly more resistant to salt-laden winds though neither have high levels of tolerance.
- *C. cunninghamiana* has considerably better form than *C. glauca* and is to be preferred where soil conditions are not limiting. Both species are fairly frost sensitive.

Growth
- Evergreen – though permeable if regularly pruned.

Risk to kiwifruit production: None identified

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Exotic species. Common/*botanical* name:
24. Japanese cedar *Cryptomeria japonica.*

Uses
- Utilised widely for shelter for kiwifruit. Foliage grows from the ground to become an excellent shelter tree.
- Tolerant of strong winds.

Preferred site conditions
- Grows best on moist (rainfall of at least 1000mm per year), fertile relatively sheltered sites in warm lowland areas.
- Does not thrive on water logged land, very dry soils or exposed sites with strong winds. Can withstand exposed coastal conditions and salt wind.
- Can be damaged by late frosts. Is tolerant of light shade but strongly supressed by dense shade.

Growth
- Up to 45 m high, rapid growth.
- Palatable to possums.

Risk to kiwifruit production: None identified

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Exotic species. Common/*botanical* name:
25. Italian alder *Alnus cordata.*

Uses
- Shelter — when trimmed regularly, their wind permeability is about the optimum 50%.
- Sometimes for hill country erosion control.
- Alders fix atmospheric nitrogen. They do not compete to any extent with the crop for this nutrient and in fact can contribute additional nitrogen to the ecosystem, mainly through leaf litter.

Preferred site conditions
- *A. cordata* (Italian alder) retains its leaves longer into the autumn than the other species, but can be susceptible to damage from severe frosts.
- Moderate drought resistance.
- Some alder species provide a good autumn feed source (pollen) for bees[156].

Growth
- Up to 20m, fast growth rate. Deciduous.
- Deep rooted.
- Frost resistant after plants are established.

Risk to kiwifruit production: None identified

Exotic species. Common/*botanical* name:
26. Radiata pine *Pinus radiata.*

Uses
- Timber, carbon, erosion control.
- Rarely used for shelter around kiwifruit orchards.

Preferred site conditions
- High frost and salt spray tolerance.
- Wide site tolerance.

Risk to kiwifruit production: GHT host

[156] https://static1.squarespace.com/static/5c354d3031d4df3e72d75662/t/5f33dee9fb539d2246f0c051/1597234921970/2020.04_Trees+for+Bees+Corner+April+2020+NZ+Beekeeper+Star+Performer_11_Alder.pdf

4.3 SMALL NATIVE TREES, SHRUBS AND GRASSES

Common/*botanical* name:
27. Numerous species including **red matipo** *Myrsine australis,* **weeping matipo** *Myrsine divaricata,* **mapou.**

Uses
- Food for birds, black fruit.
- Can be established as a pioneer plant, use commonly.
- Can be used for low hedging/shelter.

Preferred site conditions
- *M divaricata* — tolerant to damp margins, wetlands.
- *M australis* — tolerant to dry sites, wind, frost and coastal salty conditions.

Growth
- *M divaricata* — 4m, slow growth rate.
- *M australis* — 6m, medium growth rate. Fruit and seed March – Oct.

Risk to kiwifruit production: Medium PVH host risk

Common/*botanical* name:
28. Multiple **coprosma** species that are adapted to different sites, including; **sand coprosma** *Coprosma acerosa,* **taupata** *Coprosma repens;* **karamu** *Coprosma robusta,* **kanono** *Coprosma grandifolia,* **mingimingi** *Coprosma propinqua,* **karamu** *Coprosma lucida.*

Uses
- Good source of fruit for birds. Most are well suited for pioneer planting.
- *C repens, C robusta* — plantings to mainly comprise the species in this category, matched to the physical site characteristics identified for this species.
- *C lucida and C propinqua* — these species can comprise 1-5% of the plants scheduled for an individual site.
- Some varieties can be used as low shelter and hedging.

Preferred site conditions
- *C acerosa* — adapted to coastal conditions. Tolerant to dry, windy and frost.
- *C repens* — adapted to coastal conditions. Tolerant to dry windy sites.
- *C robusta* — adapted to lowland open sites. Tolerant of dry, windy, frost conditions.
- *C grandifolia* — adapted to forest sites. Adapted to medium soil moisture and shade.
- *C propinqua* — adapted to wetland and riparian sites. Wind, frost and partial shade tolerant.
- *C lucida* — adapted to dry/moist conditions and tolerant of partial shade.

Growth
- *C acerosa* — up to 1 m, low form, medium growth rate.
- *C repens* — up to 6 m, bushy form, fast growth rate. Fruit/seed – Jan-Mar.
- *C robusta* — up to 6 m, bushy form, fast growth rate. Fruit and seed – Feb-May.
- *C grandifolia* — up to 7 m, fast growing, bushy form. Fruit and seeds – Feb-May.
- *C propinqua* — up to 5 m, medium growth rate, bushy form.
- *C lucida* — up to 6 m, medium growth rate, bushy form. Fruit and seed Jan-Apr, attractive to birds and bees.
- Generally adapted as a pioneer conditions and fast growing.

Risk to kiwifruit production: Medium PVH host risk

Common/*botanical* name:
29. Mākaka, marsh ribbonwood *Plagianthus divaricatus.*

Uses
- Plantings to mainly comprise the species in this category matched to the physical site characteristics identified for this species.
- Can be used as low shelter.

Preferred site conditions
- Adapted to wetland sites. Tolerant of salt conditions and wind. Not tolerant of frost.

Growth
- Up to 2 m tall. Flowering Sep-Nov. Fruiting Dec – March. Medium growth rate, bushy form.

Risk to kiwifruit production: Medium PVH host risk

Common/*botanical* name:
30. Koromiko *Veronica salicifolia, Veronica stricta.*

Uses
- Okay food source for bees.
- Plantings to mainly comprise the species in this category, matched to the physical site characteristics identified for this species.
- Can be used for low shelter/hedging.

Preferred site conditions
- Adapted to coastal and riparian sites. Tolerant to dry, windy and frosty sites though prefers moist sites. Tolerant to semi shade.

Growth
- Up to 4 m. Flowering – white to pale lilac flowers.
- Fast growth rate, bushy form.

Risk to kiwifruit production: Low PVH host risk


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Common/*botanical* name:
31. Multiple **olearia** species adapted to a wide range of sites, including; **akepiro** *Olearia paniculate,* **coastal tree daisy** *Olearia furfuracea/solandri,* **twiggy tree daisy** *Olearia virgata.*

Uses
- Can be established as a pioneer plant, use commonly.
- Can be used for low shelter.

Preferred site conditions
- *O paniculata* — adapted to coastal sites. Tolerant to dry and windy conditions. Intolerant to wet sites.
- *O solandri* — adapted to coastal and riparian sites. Tolerant to dry and windy conditions.
- *O virgata* — adapted to riparian sites with dry to wet conditions. Tolerant to wind and frost.

Growth
- *O furfuracea/solandri* — grows up to 5 m. Flowering Oct-Jan. Fruiting Dec-Feb. Bushy form, fast growth rate.
- *O paniculate* — grows up to 6 m. Flowering from March-May. Fruiting April-July. Bushy form, fast growth rate.
- *O virgata* — grows up to 3 m. Fast growing and bushy form.

Risk to kiwifruit production: Unknown host risk to PVH


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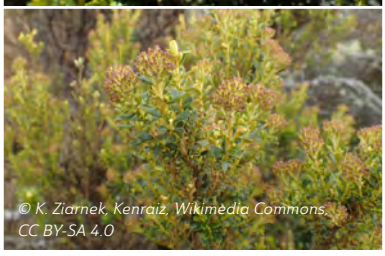
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Common/*botanical* name:
32. Tauhinu, cottonwood *Ozothamnus leptophyllus.*

Uses
- Suitable as a pioneer plant.
- Plantings to mainly comprise the species matched to the physical site characteristics identified for this species.

Preferred site conditions
- Adapted to dry and exposed sites, full sun or partial shade.

Growth
- Shrub – 5 m tall, fast growing.
- Flowers July-Aug, white flowers.

Risk to kiwifruit production: Unknown risk to PVH.

Common/*botanical* name:
33. Tagasaste, tree lucerne *Chamaecytisus palmenis.*

Uses
- Good food source for native birds.
- Very good source of nectar and pollen for bees when food is short.
- Wind and water erosion control.
- Can be used for low shelter.

Preferred site conditions
- Adult plants are moderately frost tolerant (-6°C) but the flowers are damaged by frost.
- Drought hardy with deep roots. Average tolerance to wind.
- Highly palatable to pests, intolerant to shade, intolerant of poor drainage or water logging.

Growth
- Branched evergreen shrub or small tree up to 5 m high.
- Flowering April – October.

Risk to kiwifruit production: None known

Common/*botanical* name:
34. Harakeke, flax *Phormium tenax,* **coastal/mountain flax** *Phormium cookianum.*

Uses
- Bees — very high protein levels and plentiful pollen. Bountiful nectar[157], yellow flower.
- On dryland sites: in most situations, plantings should not comprise more than 5% of these species.
- On wetland sites: plantings to mainly comprise the species in this category matched to the physical site characteristics identified for this species.
- Can be used for low shelter.

Preferred site conditions
- *P tenax* — adapted to lowland open sites. Tolerant of dry and wet conditions, wind and frosty.
- *P cookianum* — adapted to coastal conditions. Tolerant to dry and wet conditions. Tolerant to windy, frosty conditions.

Growth
- *P tenax* — grows up to 5 m tall. Flowering Nov-Dec. Fruiting Jan-Mar. Fast growth rate, grows as a clump.
- *P cookianum* grows to 3 m tall. Flowering Nov-Jan. Fruit Feb-Apr. Grows as a clump, fast growth rate.

Risk to kiwifruit production: High PVH host risk

Common/*botanical* name:
35. *Carex* species including; **tussock sedge, pūkio** *Carex comans,* **purei** *Carex secta.*

Uses
- Plantings to mainly comprise the species in this category matched to the physical site characteristics identified for this species.
- Erosion control on stream banks.

Preferred site conditions
- Adapted to wetland conditions. Tolerant of wind, frost and partial shade.

Growth
- 1-2 m tall, fast growing, forms a clump.

Risk to kiwifruit production: Low PVH host risk

[157] https://keys.lucidcentral.org/keys/v3/trees_for_bees/flower_catalogue/phormium_spp.htm

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Common/*botanical* name:
36. *Juncus* species including; **common rush** *Juncus gregiflorus,* **sea rush** *Juncus kraussii.*

Uses
- Plantings to mainly comprise the species in this category matched to the physical site characteristics identified for this species.

Preferred site conditions
- Adapted to wetlands though some varieties can handle dry conditions. Tolerant to wet conditions, some varieties tolerant of salty conditions. Tolerant of wind and some varieties tolerant of partial shade.

Growth
- Grows up to 2 m, medium growth rate, forms a clump.

Risk to kiwifruit production: Low PVH host risk.

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Common/*botanical* name:
37. Kuta, paopao *Eleocharis sphacelate.*

Uses
- Dense mats of rhizomes and roots in beds of kuta help stabilise bottom sediments and therefore assist in maintaining good water clarity. Increases aeration of sediments and enhances debris decomposition and nutrient turnover.
- Plantings to mainly comprise the species in this category matched to the physical site characteristics identified for this species.

Preferred site conditions
- Open shallow fresh water – water table above the ground surface.
- Found in swamps and on lake edge.

Growth
- Tall grass-like plant. Forms clumps of densely packed, bright-green or yellow-green stems (culms) that rise from woody underground stems (rhizomes). The stems emerge as much as 1.5 m above the water surface, and total stem length may be as much as 3 m.

Risk to kiwifruit production: Low PVH host risk.

Common/*botanical* name:
38. Toetoe *Austroderia fulvida.*

Uses
- Plantings to mainly comprise the species in this category matched to the physical site characteristics identified for this species.
- Suitable for low shelter belts.

Preferred site conditions
- Adapted to coastal, lowland open sites and wetlands. Adapted to both dry and wet conditions.
- Tolerant of windy, frosty conditions and salt spray. Hardy.

Growth
- Grows to 4 m. Grows as a clump, fast growth rate.

Risk to kiwifruit production: Low PVH host risk.

Common/*botanical* **name:**
39. Raupō, bullrush *Typha orientalis.*

Uses
- Plantings to mainly comprise the species in this category matched to the physical site characteristics identified for this species.
- Water purification - Rapid growth of raupō, stimulated by its fertile habitat and continual supply of moisture, results in annual biomass production that is among the highest of any habitat in the world.
- Natural and constructed raupo wetlands provide valuable habitat for wildlife, including eels, water fowl, spawning whitebait (inanga), and other native fish and rare native birds such as fern bird, marsh crakes and bittern.

Preferred site conditions
- Adapted to wetland conditions - on the margins of ponds, lakes, slow flowing streams, and rivers. Wind and frost tolerant.

Growth
- Grows up to 3 m tall, fast growth rate, forms clumps.
- Flowers Dec Feb. Fruiting Mar-May.
- Raupō tends to increase in abundance at the expense of other aquatic herbs in natural wetlands where there is high nutrient runoff from surrounding land. Plantings of raupō have the potential to become a weed problem but can be contained by trenches at least 2 m deep.

Risk to kiwifruit production: Low PVH host risk.

5 Appendices

APPENDIX 1: PLANT FLOWERING AND BEE POLLINATION GUIDE.

REF. NO	BOTANICAL NAME	COMMON NAME	JUNE	JULY	AUGUST	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
18	*Pseudopanax arboreus*	Whauwhaupaku, Five finger.				x	x	x	x					
33	*Chamaecytisus palmenis*	Tagasaste, tree lucerne				x	x	x	x					
27	*Myrsine divaricata*	Weeping matipo				x	x	x	x					
12	*Myoporum laetum*	Ngaio				x	x	x	x					
11	*Metrosideros carminea*	Crimson rata				x	x	x	x					
2.a.	*Kunzea ericoides*	Kānuka				x	x	x	x					
2.b.	*Leptospermum scoparium*	Mānuka				x	x	x	x					
8	*Dodonaea viscosa*	Akeake				x	x	x	x					
14	*Plagianthus regius*	Ribbonwood				x	x	x	x					
29	*Plagianthus divaricatus*	Marsh ribbonwood				x	x	x	x					
4	*Cordyline australis*	Tī kōuka, cabbage tree				x	x	x	x					
10	*Knightia excelsa*	Rewarewa				x	x	x	x					
9	*Griselinia lucida*	Pukatea				x	x	x	x					
31	*Olearia furfuracea*	Tanguru				x	x	x	x					
3.a.	*Pittosporum eugenioides*	Tarata				x	x	x	x					
9	*Griselinia littoralis*	Mahimahi				x	x	x	x					
4	*Cordyline banksii*	Ti ngahere, Bank's cabbage tree				x	x	x	x					
34	*Phormium tenax*	NZ Flax				x	x	x	x					
11	*Metrosideros umbellata*	South rata				x	x	x	x					
11	*Metrosideros robusta*	Northern rata				x	x	x	x					
1	*Hoheria angustifolia*	Narrow-leaved lacebark				x	x	x	x					
11	*Metrosideros excelsa*	Pōhutukawa				x	x	x	x					
30	*Veronica salicifolia*	Koromiko				x	x	x	x					
17	*Pseudopanax crassifolius*	Lancewood, Horoeka				x	x	x	x					
1	*Hoheria populnea*	Lacebark				x	x	x	x					
31	*Olearia paniculata*	Akiraho				x	x	x	x					

KEY: Great for bees | Okay for bees | Kiwifruit pollination period X | Flowering period

Regional variations

Kiwifruit pollination - this varies between varieties and regions. Red 19 can start in October, while Hayward flowering can go well into December. Flowering can start earlier in northern or coastal regions.

Plant flowering periods are indicative - southern regions and higher altitude location flowering times will typically be later than northern regions or coastal situations.

Beekeeping seasonal calendar

- In the spring pollen is especially important for raising young bees.
- In summer, nectar from trees supplements the flow from main sources, eg clover.
- In autumn, nectar is stored to provide a food bank for the winter.
- In winter, nectar and pollen are needed for maintenance.

https://static1.squarespace.com/static/5c354d3031d4df3e72d75662/t/5cb7499115fcc0c0e3d107d7/1555515794090/TfB_2013_Flowering-Times-National-Level.pdf

APPENDIX 2: ADDITIONAL PLANTS TO AVOID

Common Name	Botanical name	Market Access Risk	Pest Host Risk	Status	Information
African feather grass	*Pennisetum macrourum*			Containment	https://cdn.boprc.govt.nz/media/321609/PP07-African-feather-grass.pdf
Alligator weed	*Alternanthera philoxeroides*			Eradication	https://cdn.boprc.govt.nz/media/415022/pp32-alligator-weed-web.pdf
Apple of Sodom	*Solanum linnaeanum*			Pest Plant	https://cdn.boprc.govt.nz/media/321636/PP23-Apple-of-sodom.pdf
Aquatic wetland plants	*various*			Various	https://cdn.boprc.govt.nz/media/321621/PP13-Aquatic-pest-Plants-WEB.pdf
Blackberry	*Rubus fructicosus*		PVH,GHT	Containment	https://cdn.boprc.govt.nz/media/321600/PP04-Blackberry.pdf
Boneseed	*Chrysanthemoides monolifera*			Containment	https://cdn.boprc.govt.nz/media/321612/PP08-Boneseed.pdf
Chilean rhubarb	*Gunnera tinctoria*			Containment	https://cdn.boprc.govt.nz/media/321639/PP24-Chilean-Rhubarb.pdf
Climbing plants	*various plants*			Various	https://cdn.boprc.govt.nz/media/321755/Climbing-plants.pdf
Climbing spindleberry	*Celastrus orbiculatus*			Containment	https://cdn.boprc.govt.nz/media/321642/PP25-Climbing-spindleberry.pdf
Coast tea tree	*Leptospermum laevigatum*			Containment	https://cdn.boprc.govt.nz/media/321645/PP26-Coast-tea-tree.pdf
Darwins barberry	*Berberis darwinii*		PVH,GHT	Containment	https://cdn.boprc.govt.nz/media/321648/PP27-Darwins-barberry.pdf
Gorse	*Ulex europaeus*		PVH,GHT	Containment	https://cdn.boprc.govt.nz/media/321603/PP05-Gorse.pdf
Wild ginger	*Hedychium gardnerianum, H flavescens*		PVH	Containment	https://cdn.boprc.govt.nz/media/321594/PP02-Wild-ginger.pdf
Green goddess lily	*Zantedeschia 'Green Goddess'*			Containment	https://cdn.boprc.govt.nz/media/321651/PP28-Green-goddess.pdf
Horsenettle	*Solanum carolinense*			Eradication	https://cdn.boprc.govt.nz/media/415021/pp31-horsenettle-web.pdf
Italian buckthorn	*Rhamnus alaternus*			Containment	https://cdn.boprc.govt.nz/media/321654/PP29-Italian-buckthorn.pdf
Kiwifruit wild	*Actinidia spp.*		PVH,PSA, GHT,AS,A	Containment	https://cdn.boprc.govt.nz/media/321627/PP18-Wild-kiwifruit.pdf
Lantana	*Lantana camara*		PVH	Containment	https://cdn.boprc.govt.nz/media/321624/PP16-Lantana.pdf
Mistflower	*Ageratina riparia*			Surveillance	https://cdn.boprc.govt.nz/media/321749/Mistflower.pdf
Noogoora bur	*Xanthium strumarium*			Eradication	https://cdn.boprc.govt.nz/media/415023/pp33-noogoora-bur-web.pdf
Old mans beard	*Clematis vitalba*		PVH	Containment	https://cdn.boprc.govt.nz/media/321597/PP03-Old-mans-Beard.pdf
Pampas	*Cortaderia jubata, C selloana*	Yes		Surveillance	https://cdn.boprc.govt.nz/media/395546/pp20-pampas-january-2005-old_smaller.pdf
Pine - lodgepole	*Pinus contorta*		A	Containment	https://cdn.boprc.govt.nz/media/321630/PP21-Lodgepole-pine.pdf
Pines - wilding	*various*		A	Progressive Control	https://cdn.boprc.govt.nz/media/395547/pp21-wilding-pine-february-2005-old_smaller.pdf
Privet	*Ligustrum lucidum, L sinense*		PVH	Surveillance	https://cdn.boprc.govt.nz/media/395544/pp10-privet-january-2005-old_smaller.pdf
Ragwort	*Senecio jacobaea*			Containment	https://cdn.boprc.govt.nz/media/321606/PP06-Ragwort.pdf
Royal fern	*Osmunda regalis*			Containment	https://cdn.boprc.govt.nz/media/321657/PP30-Royal-Fern.pdf
Thistles	*Silybum marianum*			Containment	https://cdn.boprc.govt.nz/media/321615/PP09-Variegated-thistle.pdf
Velvetleaf	*Abutilon theophrasti*			Unwanted	https://www.mpi.govt.nz/biosecurity/long-term-biosecurity-management-programmes/velvetleaf/
Woolly nightshade	*Solanum mauritianum*			Containment	https://cdn.boprc.govt.nz/media/321591/PP01-Woolly-Nightshade.pdf

Common Name	Botanical name	Market Access Risk	Pest Host Risk	Status	Information
Yellow flag iris	*Iris pseudacorus*			Containment	https://cdn.boprc.govt.nz/media/321618/PP12-Yellow-flag-iris.pdf
Aquatic - wetland pests	*various*			Various	https://cdn.boprc.govt.nz/media/321588/LM39-Pests-in-Wetlands-WEB.pdf
Native Plants					
Tutu	*Coriaria sps*			N/A	All parts. Very toxic to humans and animals
Mahoe, whiteywood	*Melicytus ramiflorus*		PVH,A,GHT	N/A	
Makomako, wineberry	*Aristotelia serrata*		PVH,A, GHT	N/A	
Seaside daisy	*Erigeron karvinskianus*	Yes		N/A	https://www.weedbusters.org.nz/what-are-weeds/weed-list/mexican-daisy/

Status definitions are as specified in the Bay of Plenty Regional Pest Management Plan and relate to the outcomes sought for management of that pest plant.

- **Sustained control** - To provide for ongoing control of the subject, or an organism being spread by the subject, to reduce its impact on values and spread onto other properties.
- **Site led** - The subject, or an organism being spread by the subject, that is capable of causing damage to a place is excluded or eradicated from that place, or is contained, reduced, or controlled within the place to an extent that protects the values of that place.
- **Eradication** - To reduce the infestation level of the subject, or an organism being spread by the subject, to zero levels in an area in the short to medium term.
- **Exclusion** - To prevent the establishment of the subject, or an organism being spread by the subject, that is present in New Zealand but not yet established in an area.
- **Progressive containment** - To contain or reduce the geographic distribution of the subject, or an organism, being spread by the subject, to an area over time.

APPENDIX 3: OPERATION POLLINATOR™ TRIAL PLANTING LISTS

Operation Pollinator™ is a global biodiversity programme developed by Syngenta which is active in over 40 countries, to promote the health and wellbeing of pollinators on commercial farms. Syngenta has partnered with Plant & Food Research to investigate ways to improve the range of pollinators in New Zealand's kiwifruit orchards.

Based on previous and ongoing research, Plant & Food Research have developed recommendations for planting native species close to kiwifruit canopies to maximise habitat for a wide range of pollinating insects, while reducing the likelihood of harbouring known kiwifruit pests.

Unmanaged pollinators, such as native bees, bumble bees, and some species of flies have the potential to improve pollination and fruit quality, and be complimentary to honey bees. Honey bees are more active in orchards during the morning despite kiwifruit flowers being receptive throughout the day, and honey bees often exhibit preferences between male and female flowers whereas other insect species may not show this bias. Attracting other pollinators to your orchard can help fill this pollination gap.

The Operation Pollinator™ planting lists contain specific ratios of each species to encourage a wide range of beneficial insects. This is to build resident populations of kiwifruit pollinators by greatly extending on–farm nectar and pollen resources beyond the short period of kiwifruit flowering.

Some important points to remember:

- These lists of native plants are intended for use in areas close to the kiwifruit canopy to improve pollination.
- For maximum benefit, it is important to maintain the stated ratios to ensure sufficient resources are available for insects to establish.
- Do not introduce other plant species as these may allow pests to reproduce.
- Wherever possible, source plants from a specialist native nursery in your area, this will ensure your plants are adapted to the local conditions and will establish more quickly.
- Two lists are currently being trialled, one each for the Bay of Plenty and Northland.
- This research is ongoing, as more information becomes available the planting lists may be updated or amended. Information correct as at 15 July 2021.

DISCLAIMER

BAY OF PLENTY PLANTING LIST

BOTANICAL NAME	PEAK FLOWERING TIME	HEIGHT	% COMPOSITION
Carpodetus serratus	November - March	10 m	3
Cordyline australis	October - November	20 m	1
Hoheria sexstylosa	February - May	18 m	6
Kunzea robusta	August - June	15 m	12
Leptospermum scoparium	August - September	5 m	12
Ozothamnus leptophyllus	January	2 m	6
Pittosporum crassifolium	August - October	9 m	2
Pittosporum eugenioides	October - December	10 m	1
Pittosporum tenuifolium	October - November	10 m	2
Sophora microphylla	August - October	25 m	2
Sophora tetraptera	October - December	25 m	1
Veronica (Hebe) parviflora	December - February	2 m	26
Veronica (Hebe) stricta	August	2 m	26
Total			**100**

NORTHLAND PLANTING LIST

BOTANICAL NAME	PEAK FLOWERING TIME	HEIGHT	% COMPOSITION
Carpodetus serratus	November - March	10 m	2
Cordyline australis	October - November	20 m	1
Corokia buddleioides	August - October	3 m	2
Hoheria populnea	January - March	8 m	10
Kunzea robusta	August - June	15 m	6
Leptospermum scoparium	August - September	5 m	10
Ozothamnus leptophyllus	January	2 m	9
Pittosporum crassifolium	August - October	9 m	2
Pittosporum eugenioides	October - December	10 m	1
Pittosporum tenuifolium	October - November	10 m	1
Sophora microphylla	August - October	25 m	2
Veronica (Hebe) ligustrifolia	January -December	2 m	24
Veronica (Hebe) rivalis	January - June	1 m	3
Veronica (Hebe) stricta	August	2 m	24
Veronica diosmifolia	September - January	2 m	3
Total			**100**

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