

GROWING OUR FUTURE

An Action Plan for Native
Nursery Capability

May 2020

New Zealand Plant Producers Incorporated

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FOREWORD

May 2020

The native nursery industry is undergoing radical change. The demand for native plants is increasing year on year and plant producers are responding by increasing their capacity and productivity.

This report builds on the Insights report from the native nursery sector survey, completed in 2019 and includes an Action Plan to drive plant production in the future, while addressing the things that will get in the way. It underscores the need to change how we do things in order to meet the future demand.

The survey found that the native nursery sector will need to double the current production of native seedlings in order to meet planting targets over the next decade.

While the industry is well positioned to achieve these targets, it will require planning and co-operation across the whole sector and the wider community.

Our sector will have to use all available capacity, open-up new production areas and convert other plant production into growing native plants. This presents a massive opportunity, but also challenges.

New Zealand needs a thriving plant production sector that is able to meet the demand for plants while creating high skilled, meaningful jobs in the regions.

New Zealand Plant Producers is keen to take a leadership role in this challenge and we have developed an Action Plan for the sector to meet this opportunity head on.

This is an ambitious plan that takes a long-term view. The intention is to use it as a road-map to prioritise and pursue targeted projects over time. This report was commissioned by Te Uru Rākau through its Partnership Fund. The research included input from all types of native plant nurseries (commercial, government, not-for-profit, community and iwi owned).

Matthew Dolan
Chief Executive,
New Zealand Plant Producers Inc.

PART 1: ACKNOWLEDGEMENTS

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- Marie Taylor (Chair) – Plant Hawke’s Bay
- Diane Coleman – Treeline Nursery
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- Mark Ross – Tuaropaki Nursery

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PART 2: INTRODUCTION



“
A thriving,
growing nursery
industry is vital to
the future success
of New Zealand.
”

With strong demand for plants across the sector and signals this demand is expected to continue for years into the foreseeable future, there are good opportunities for existing producers to invest in their business and create value in their market.

NZ Plant Producers Inc. was commissioned by Te Uru Rākau to survey the native plant industry and report on whether capacity and capability is sufficient to meet government native tree planting targets under the One Billion Trees programme, and other programmes administered by local government and industry.

In addition to quantitative information from the survey, a series of interviews with plant producers was completed by NZPPI. This culminated in a workshop event with the Native Nursery Special Interest Group in late October 2019. The group identified the key strategic outcomes that will need to be achieved to meet future growth targets.

This report builds on the Insights report from the survey and considers the factors that will drive increased plant production in the future, and what will get in the way. It is structured to answer how the industry is performing, why the industry must change to meet future demands, and what must be done to achieve the extraordinary growth required.

- Part 4 sets out the detailed findings of the survey
- Part 5 discusses the opportunities and challenges required to meet the future demand for plants
- Part 6 summarises the recommendations into an Action Plan consisting of three main themes
- Part 7 showcases three nurseries and how they are meeting the challenges
- The survey methodology and questionnaire are included in Part 8.

PART 3: SUMMARY

The native nursery sector will need to double the current production of native plants in order to easily meet government and community planting targets over the next decade. There is enough capacity in the wider plant production industry to increase production of natives to meet these targets.

During the last financial year, plant nurseries had estimated spare production capacity for up to 107.5 million additional plants – 50 million in the North Island and 56 million in the South Island.

Growing more native plants means working together to reinforce the strengths of the different parts of the industry. Our sector will have to use all available capacity, open-up new production areas and convert effort from other plant production into growing natives. Continued specialisation and collaboration will increase the supply of seedlings. Actions that reduce capacity need to be minimised, such as government subsidisation of nurseries, which creates unstable pricing and risk for private businesses, leading to a reluctance to invest in nursery expansion and tree production.

From the survey and subsequent research, it is clear that three things are needed:

- A step change is needed to grow the sector fast enough to meet increasing demand. Many of the current practices and industry dynamics that have been part of the sector over the past decades are not going to get us there.
- The industry needs to come together around these actions. Individual effort is important, but delivering the actions around science, workforce development, biosecurity and industry standards will require the industry to come together and collaborate.
- Most of all, in many areas, it will take a change in perspective and attitude. Not just from plant producers, but Government, plant buyers and the wider industry.

This action is not for everyone, and there are likely to be those that don't wish or need to participate. For those that do, this action plan includes things that can be done at an industry level and in individual businesses.

The growth will require investment in three major initiatives and will require sustained innovation in the supply chain:

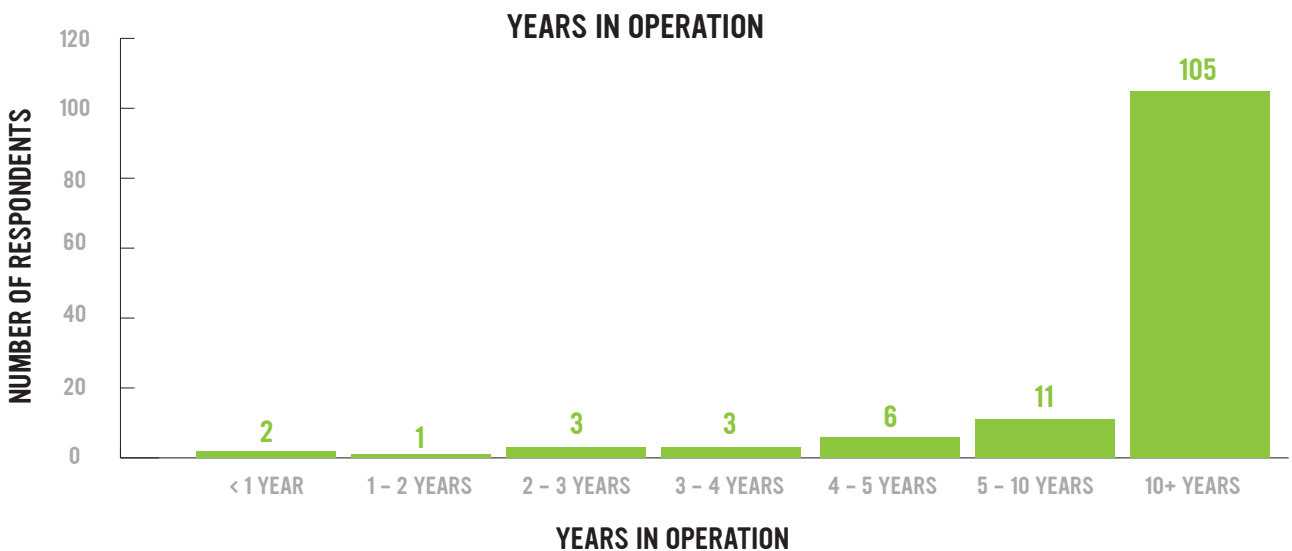
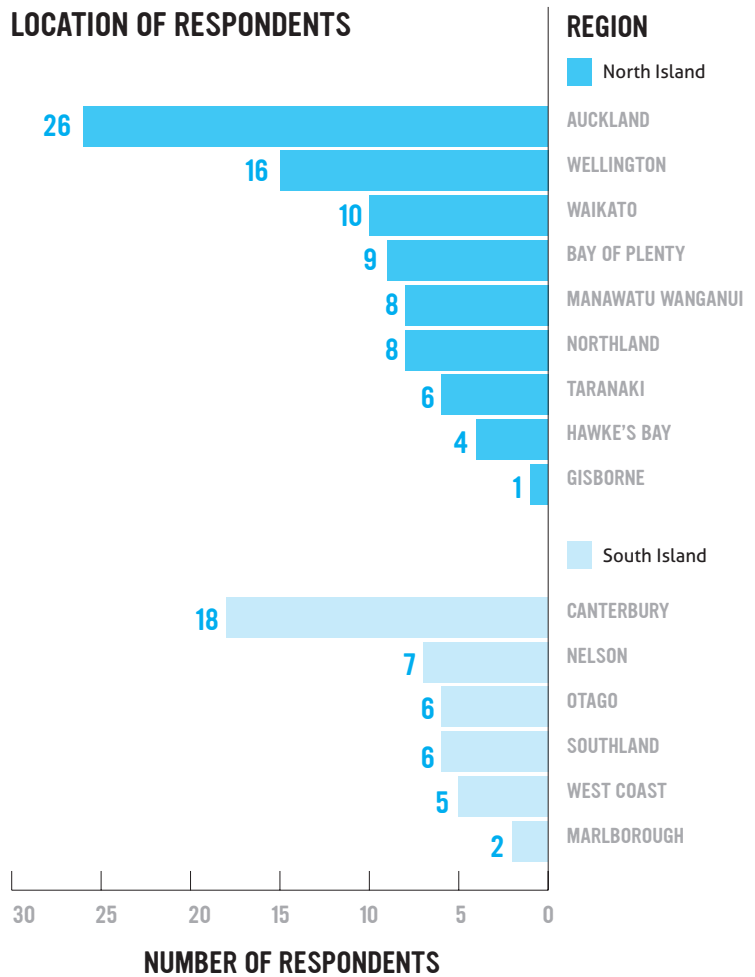
- 1. Setting the standard for sustainably produced plants**
- 2. Capable people**
- 3. A stronger industry**

PART 4: SURVEY FINDINGS

The survey was completed by 156 individuals and businesses, with a final response rate of 43%. Of those completing the survey, twice the number were located in the North Island compared to the South Island (87 to 44).

New nurseries have established in the past decade to meet the increasing demand for plants. Surveyed nurseries reported 15 new nurseries establishing in the last five years, 11 between five and ten years ago. The majority having been in business for ten years and more.

Approximately 6% of nurseries completing the survey identified as a Māori organisation, with half of these establishing themselves in the past five years.



Production

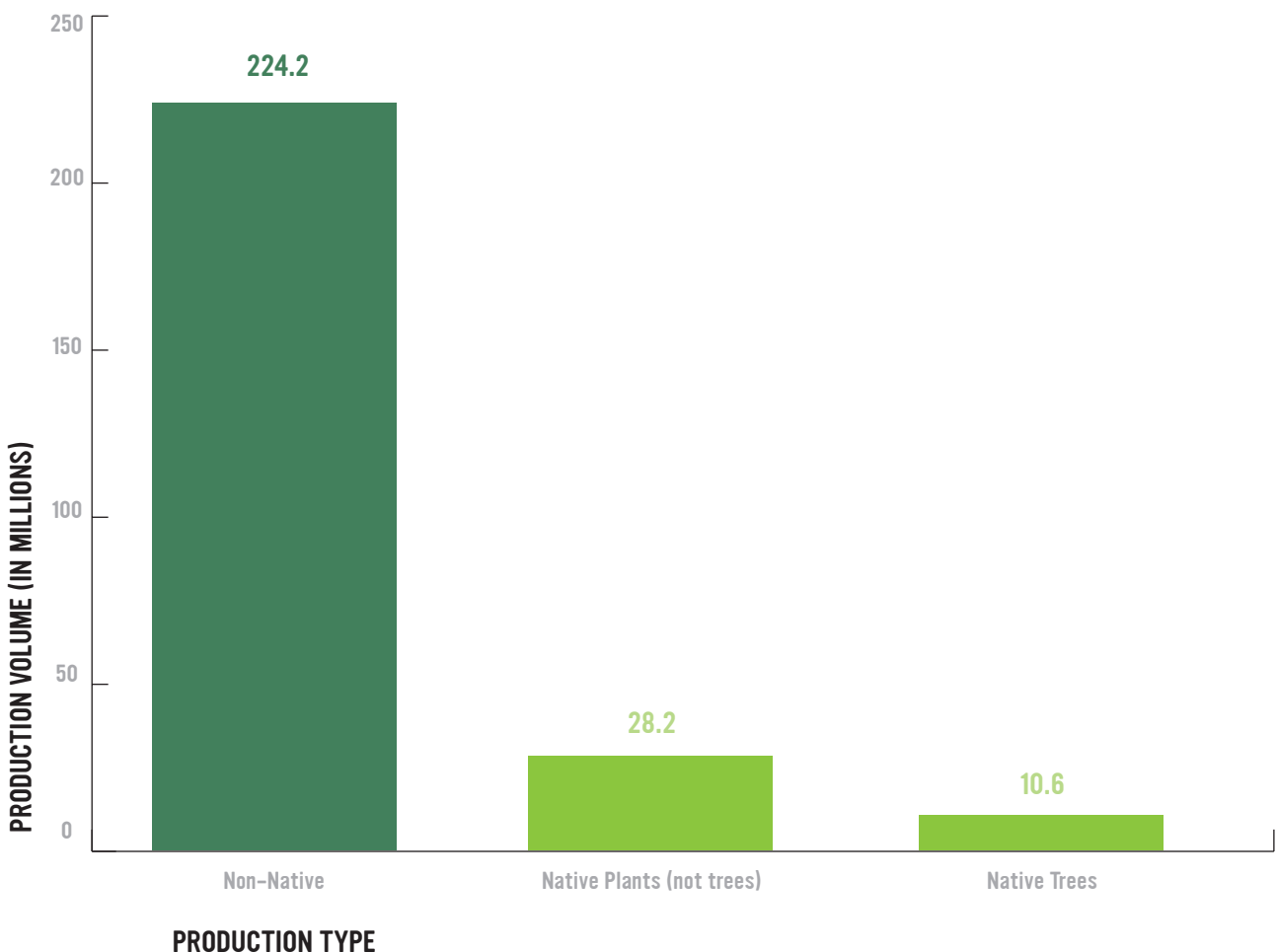
Survey data was stratified and adjusted to estimate results across all 359 nurseries who were sent the survey, imputing data for respondents who only completed some of the questions, and providing a non-response adjustment (calculating and adding data) for nurseries who did not answer the survey at all.

Total native and non-native plant production volume was estimated at 263 million plants in the last financial year. Almost 40 million of this production was native plants, predominantly grasses, flaxes and shrubs. Native trees made up 27% of production, or 10.6 million trees.

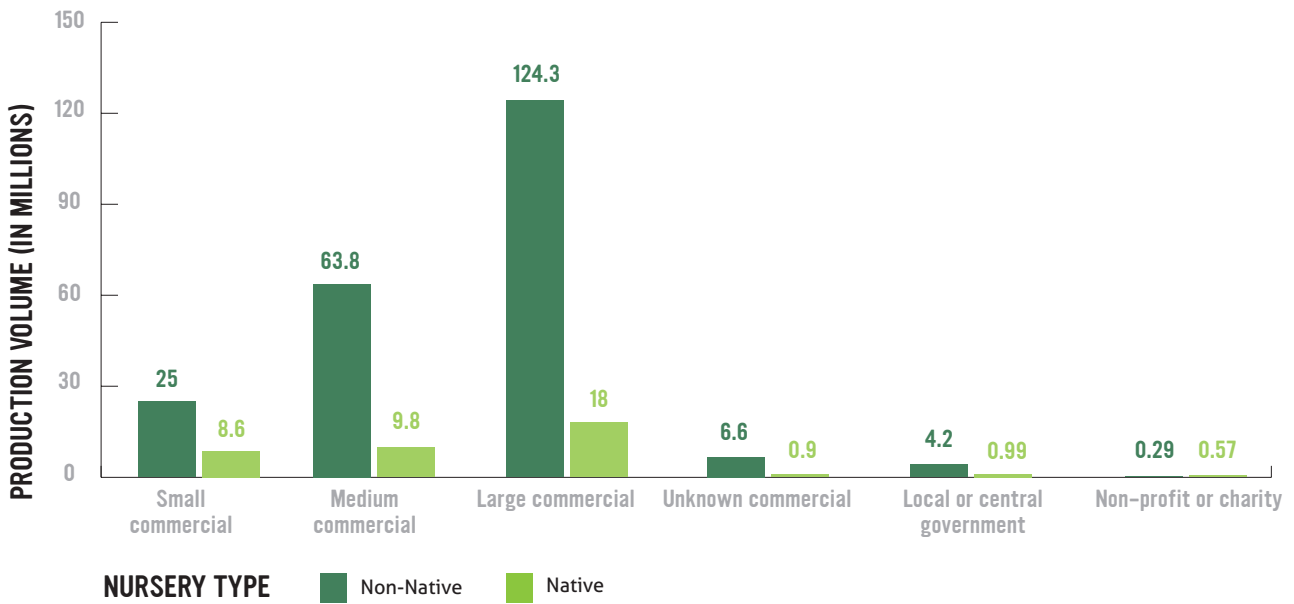
Land area was used as a proxy for categorising nurseries into small, medium and large nurseries (< 2 ha; 2 ha < between > 10 ha; > 10 ha, respectively). Between them, large commercial nurseries (private businesses) grew approximately half the volume of native and non-native plants produced in the last financial year.

Private businesses produced nearly 95% of the production, with central and local government nurseries (including prison and council nurseries), and not-for-profit nurseries supplying the remainder.

ESTIMATED PRODUCTION VOLUME (IN MILLIONS) FOR LAST FINANCIAL YEAR



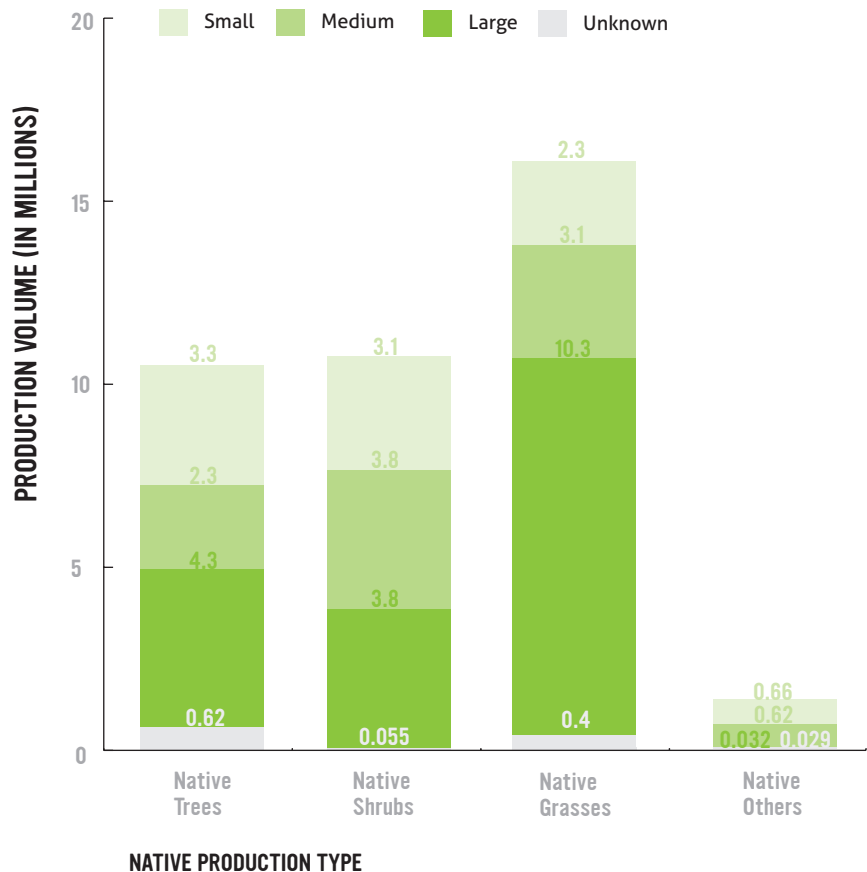
ESTIMATED PRODUCTION VOLUME (IN MILLIONS) FOR LAST FINANCIAL YEAR



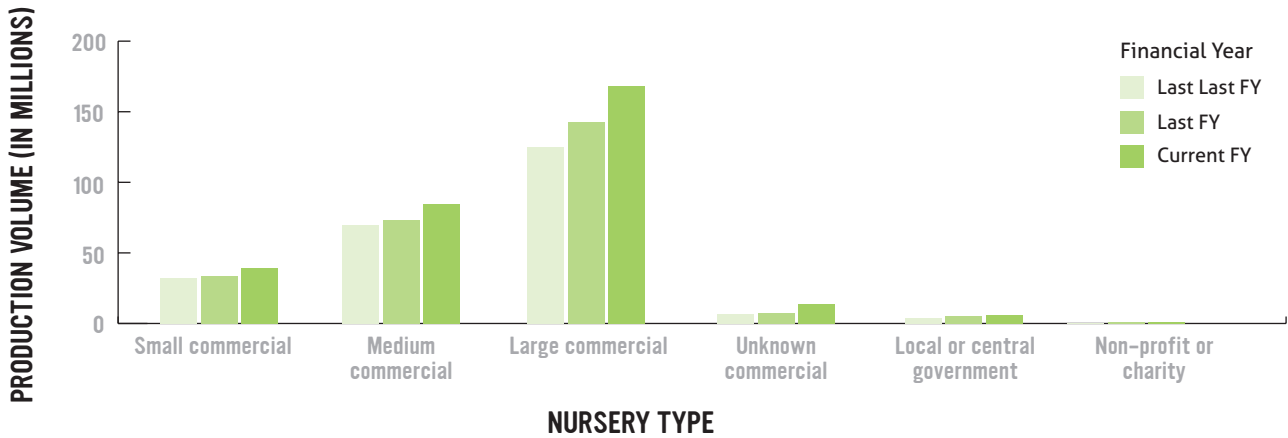
Larger nurseries grow significantly more grasses and flaxes as a proportion of their native plant production compared to small and medium sized nurseries. This probably reflects the greater use of automation by larger nurseries but may also reflect different specialisation and expertise of smaller and medium nurseries.

Industry data, supported by interview responses, indicate the sector has grown at 12%-15% per year over the past three years.

ESTIMATED NATIVE PRODUCTION VOLUME (IN MILLIONS) FOR LAST FINANCIAL YEAR



ESTIMATED PRODUCTION VOLUME GROWTH (IN MILLIONS)



Nurseries participating in the survey collectively spent \$45 million in capital expenditure in the last financial year. Half of this spend was investment in land and buildings, with the remainder on machinery, other infrastructure, including irrigation and water storage, and technology.

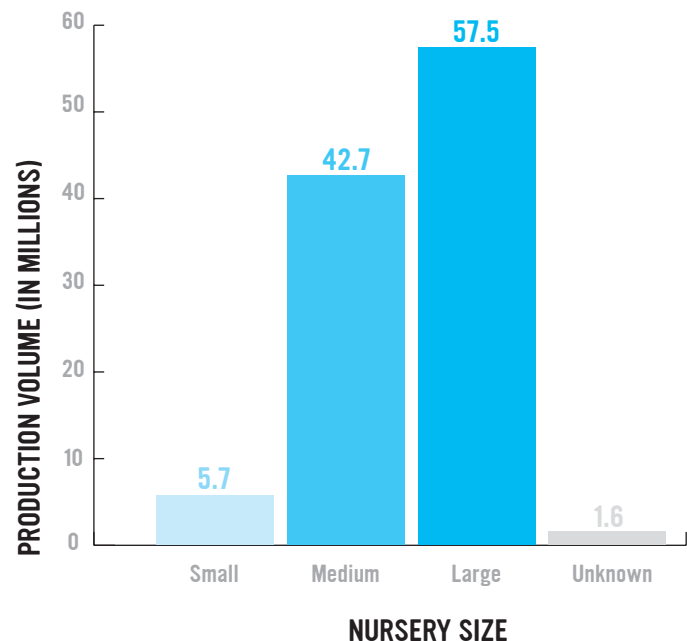
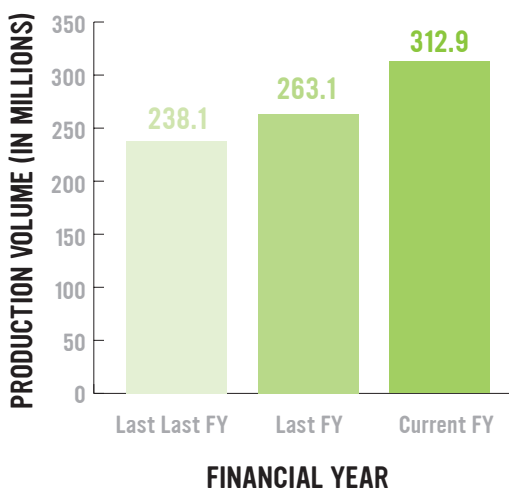
Plant nurseries had an estimated spare production capacity for up to 107.5 million additional plants - 50 million in the North Island and 56 million in the South Island.

Results showed the sector grew by 25 million plants in 2019 compared to the preceding financial year, and further growth of 50 million plants is forecast, increasing to 312.9 million plants by 2020.

This growth is expected to use up to half of the estimated spare capacity of 107 million plants per year in the sector and can be done using existing nursery infrastructure and additional investment in staff and skilled workers.

ESTIMATED SPARE CAPACITY (IN MILLIONS OF PLANTS) FOR LAST FINANCIAL YEAR

ESTIMATED HISTORICAL AND FUTURE PRODUCTION VOLUME (IN MILLIONS)



PART 5: GROWTH – OPPORTUNITIES AND CHALLENGES FOR THE NURSERY SECTOR



The increased demand for plants is being felt right across the plant production sector. Nurseries say they are receiving larger orders and contracts to grow, and demand has outstripped supply for the past few years. Survey results showed plant production volumes have increased in each of the two previous years and further growth is forecast for the coming financial year. To achieve this growth the native nursery sector needs to do things differently.

These projections require forward orders and planning. Without some certainty of demand, plant producers will not invest in nursery expansion and development.

WHAT IS DRIVING GROWTH?

Native plants are enjoying a renaissance as New Zealanders seek to restore biodiversity and improve the aesthetics and health of the natural environment. The sector has been ramping up steadily over the past ten years to meet the growing demand for native plants and trees.

Demand is being driven across multiple different sectors. Central government initiatives include significant roading infrastructure plantings by the NZ Transport Agency, and riparian planting schemes by the Ministry for the Environment (MfE) Freshwater Improvement Fund. Just under 8% of survey respondents said they had supplied plants to the Sustainable Business Network's Million Metres Streams Project in the past year.

Regional and local council planting programmes targeting erosion and water quality on private land, as well as non-government organisations are also driving native planting. Approximately 80% of the nurseries participating in the survey supplied plants into local restoration or revegetation projects in the last financial year.

The Department of Conservation is leading multi-agency restoration projects around the country to improve freshwater habitats and native biodiversity. Some significant planting projects have ramped up with funding from the Provincial Growth Fund. The 1 Billion Trees programme administered by Te Uru Rākau aims to deliver two-thirds of its grant funding to native tree planting.

Future environmental regulations are expected to drive continued planting for riparian, erosion control and carbon-offset in decades to come.

CHALLENGES



A strong industry is characterised by innovation, scale and greater profitability. All of this is underpinned by industry systems which collect and share data, insights and benchmarking, to enable rapid adoption of best practice and innovation.

The survey showed that many nurseries have expanded their businesses in the past few years and there is spare capacity to scale further. However, there are challenges and risks faced in growing a business.

The native nursery industry has grown at 12%-15% per year over the past three years, however this rate of growth is not sustainable indefinitely without affecting debt, profitability, and skilled labour supply. Previous growth phases in specialised horticulture sectors suggest the nursery industry can realistically achieve sustainable year-on-year growth at about 7.5%pa. Greater growth is possible but less sustainable.

The overall challenge faced by the industry in scaling appropriately requires supply chain coordination, increases in productivity through industry standards and investment in science to support sustainable production, and improvements in workforce training and capability.

Specific challenges to growth noted by survey respondents included tendering practices for plants which create price competition in the marketplace, often at the expense of local nurseries and sometimes also plant quality and survivability. Local small and medium sized businesses may be unable to individually supply all of the plants in tendered contracts, necessitating that buyers deal with multiple nurseries.

SUPPLY CHAIN CO-ORDINATION

Achieving the target of doubling the production of native plants by 2028 will challenge the industry's practice on every level.

Increased production needs to be driven by demand so that the right plants can be supplied at the right time. This will require a joined-up approach with landowners, industry organisations, nursery sector and government.

Nurseries must grow the right plants for the market and it's not always possible to predict what will be required for the next planting season, or what will be needed in two to three years' time for slower growing species in the nursery. Nurseries that grow plants on contract are much better able to manage this risk than those who grow to sell to the general public. Some planting programmes specify eco-sourced plants, and these must be grown on contract well in advance of the planting programme, so that the nursery can manage seed collection and propagation to supply. Long lead-in times require good forwards planning and contracts need to be in place (e.g. pre-orders with deposits) to reduce risks to the nursery.

Wherever possible, local planting programmes should encourage a strong nursery sector in their region through buying quality locally grown plants and limiting the numbers of discounted or subsidised plants. This procurement model creates certainty for local businesses which leads to greater local investment. These practices will also discourage market dumping practices, where nurseries seek to offload large numbers of discounted plants, ultimately reducing price.

Finally, predictability of demand over the longer term is essential for nurseries to consider the financial investment required for infrastructure expansion.

To address the need for co-ordinated supply the industry must:

- Understand the drivers and motivations of landowners & land managers to undertake revegetation projects
- Identify traceability tools and nursery production systems (e.g. HortBase) for better supply chain management
- Develop guidance for landowners about planning and lead-in times for plant production
- Undertake greater engagement with government and councils on regional plans for the One Billion Trees programme, and other planting programmes
- Develop and use standard Contract/Terms of Trade for advance ordering of large numbers of tree seedlings
- Encourage best practice tendering and procurement practices
- Consider a marketplace platform on the NZPPI website, encouraging communication on issues of demand/supply

RESOURCE LIMITATIONS

Resource availability can constrain productivity and limit the product that can be produced and the quality of the product.

The greatest resource limitations are:

- Seed availability and quality, the right volume, year on year
- Access to water

Seed availability

Seed availability and quality can fluctuate from season to season. Some native trees are mast-seeders and may only produce good volumes of seed every three to five years. Generally, seed does not store well and fresh seed needs to be collected each year. More research is needed to optimise seed collection and storage, to better manage seasonal variation in quality and quantity.

Access to water

Containerised plant production requires access to a reliable supply of water, sourced from local rivers, water storage ponds and dams, bore water and/or municipal town water supply. Each local authority has different rules in place for allocating and consenting water use. Summer droughts and “low-flow” water restrictions can be a significant risk to the business. Expanding and modernising water infrastructure used in the nursery, obtaining new water consents, and water consumption charges are a significant cost and a barrier to expanding plant production businesses. Industry needs to work with councils to gain greater recognition of the significance of water supply for plant production and maintain allowance for “survival” water during low flow events.



Work needs to be done to understand the patterns and efficiency of water use in nurseries; developing water use metrics, mapping the water footprint and investigating infrastructure and tools to improve water use efficiency, improve storage capability, recycle water, and reduce leaching.

To address pressures from limited resources, industry must:

- Optimise seed collection and storage practices
- Gain recognition from local government for survival water supply
- Map its water footprint and improve water sustainability practices

A SKILLED WORKFORCE

People are a critical asset in plant production and represent one of the highest operating costs for producers. It can take years for a business to gear up and take on more staff. It requires access to the right number of high-quality staff that are work ready and skilled. The nursery sector has experienced a shortage of skilled workers for many years and offers opportunities to retrain and employ workers displaced from other parts of the economy.

Nursery workers are predominantly New Zealanders, NZ permanent residents or Australian citizens, which differentiates this sector from other horticulture sectors.

The survey showed all local and central government nurseries have training programmes in place, compared to 50% of private businesses and non-for-profit nurseries. Many staff start with no horticultural background at all and are trained on site. Advanced studies are available but some businesses feel that they aren't very well tailored and don't have the right mix of practical and theoretical knowledge.

Having a clear training and career pathway into our sector will attract workers and ensure that they quickly develop skills and contribute the productive capacity of the sector.

Some nurseries commented that it is hard to expect qualified staff with generally low nursery wages. However higher wages are not enough to attract the right people.

The competition for skilled people within the industry and between industry sectors is high due to their highly transferable skills. As an industry, we need to promote best practice workplaces in order to attract and retain staff.

Nursery workers require both commercial and practical skills. With the increasing role of automation and technology, jobs are changing, and more highly skilled workers and managers are required. Having the right staff capable of operating in multi-functional teams will be critical to the future of our industry. The ongoing development of people in the industry will be crucial to the industry's ability to retain skilled workers.

The industry must raise the perception of plant production in the public arena through highlighting its importance to New Zealand and the opportunities for people to establish a career within the industry. We need to talk our industry up, bringing our leaders to the fore, highlighting the positives and the enormous contribution we make and the opportunity ahead of us, if we are willing to take it. The industry must celebrate its successes, its industry leaders, its high achievers and communicate this story to New Zealand and the world.

To address the need for skilled workers, industry must:

- Improve the retention of skilled people
- Identify, develop and nurture future leaders and key people
- Improve the status of the Young Achiever competition
- Celebrate its successes, its industry leaders, its high achievers and communicate this story
- Support plant producers to be great employers with best practice guidelines
- Develop an industry workforce strategy, including a pipeline project focused on identifying unemployed people and assisting them into part-time, or permanent work in the industry
- Provide access to high quality vocational and on the job training programmes
- Support an apprenticeship programme and in-work training education
- Establish a Centre of Vocational Excellence (CoVE) for the nursery industry
- Develop training programmes, providing online resources and practical workshops specific to native plant production, seed-collection and storage, germination and propagation

SUSTAINABILITY

Plant producers have an opportunity to support New Zealand’s clean and green image and play a critical role in reversing ecological damage. Nurseries need to be aware of their market and understand what their customers want. They need to be able to tell their story, the values of their business and why their customers should continue to purchase their plants.

Many of New Zealand’s primary industries have developed sustainability credentials that have given them a leading edge in world markets. To support this, the businesses that supply plants into these sectors should at least match these efforts. We cannot present our industry as the solution for sustainability in other sectors if we cannot prove our own credentials. We must develop high standards for sustainability, integrity and traceability of our plants and set an intention to meet them.

We need to map our water footprint and understand water consumption and fertiliser impacts on leachates.

There has been a major shift towards alternatives to plastics in the environment and the nursery sector needs to do more to improve sustainability in this area. The industry needs better recycling programmes and the development of alternative materials for containers in the future (e.g. biodegradable pots).

Grade & Quality standards

Price is most often the key determinant on whether nurseries win tenders or contracts to supply planting programmes. But simply going on price may result in plants with poor survivability. The industry needs to set benchmarks and develop standards for plant grade (pot sizing and planting grades) and plant quality.

Eco-sourced plants are important to some customers for restoration and revegetation programmes. Biodiversity metrics and science underpinning eco-sourcing is needed to develop robust standards to support this activity. Good traceability tools and practices are needed to demonstrate the standards are being met.

Biosecurity and traceability

The impacts of a biosecurity incident can cause a major disruption to part of the sector, and even extend to other sectors if the cause of the incident cannot be traced quickly and accurately. The industry needs to prioritise the roll-out of the Plant Production Biosecurity Scheme and encourage participation, to both maintain and enhance the confidence of consumers and government of its commitment to biosecurity. Third party assurance processes to audit participation in the scheme, and tools that support traceability, must be developed.

Research & Development

A lack of strategic investment in research and development in the nursery sector over the past 20 years is a significant constraint to the success of the sector. Nurseries must be encouraged to engage in R&D activity and share their knowledge about plant health management and growing media systems to improve plant quality and survival. Research aimed at reducing resource inputs into production (e.g. reducing chemical use, water consumption etc) can also help improve a nursery's bottom line.

Up to a third (30%) of nurseries surveyed in 2019 invested in Research and Development (R&D) activities in their previous financial year. Research activity ranged from trialling soil products for control of damping-off fungi, to diagnostic testing for identifying pathogens, and the use of technology to measure performance of soil media.

To address sustainability and quality issues the industry must:

- Develop and adopt industry standards for sustainability
- Map its water footprint and improve water sustainability practices
- Develop metrics for nutrient leaching in nurseries, adopting best practice to minimise the impacts
- Research plastic and other waste from the industry and develop alternatives and recycling programmes.
- Research energy use and the net emission and removal of greenhouse gasses in nursery production.
- Develop methods and tools to measure environmental change
- Set benchmarks for survivability of plants
- Develop standardisation for pot sizes, plant quality and planting grades
- Develop metrics for biodiversity change and support robust eco-sourcing standards underpinned by good science
- Roll-out the Plant Production Biosecurity Scheme and encourage participation
- Develop third party assurance processes (e.g. Plant Production Biosecurity Scheme)
- Identify traceability tools and practices that support supply chain integrity and eco-sourcing confidence

PRODUCTIVITY

Automation is a major trend in plant production around the world. The rising costs of labour and need for increased productivity is one of the main factors for automation in seed-drilling and transplanting. Businesses that grow seedlings at scale can keep production costs down and are important specialists in the supply chain, supplying plug-grown seedlings to other nurseries to grow on. In the survey, 4% of nurseries identified themselves as Growing on-line (GOL) nurseries, supplying other nurseries with plugs for growing on.

Industry needs to invest in high-performance growing systems, such as automation that increases the efficiency of production. Nurseries need to be sufficiently scaled to justify investment in specialised equipment. Specialised equipment may require further investment in purpose-built production houses and other facilities that maximise space utilisation, for example rolling benches.

Field production of native seedlings using a system known as 'plug plus', similar to pine seedling production, is easily scaled to produce a wide range of species, from flaxes to podocarps, at low cost and with almost infinite production capacity.

Upgrading and making use of technology (e.g. HortBase) can improve production scheduling and inventory management in the nursery, as well business process improvements with information flow, including improved business intelligence regarding customer needs and speeding delivery of orders to retailers and distributors/operators.

To improve productivity, the industry must:

- Invest in high-performance growing systems, using automation to increase efficiency
- Upgrade and make use of technology to enable production scheduling, inventory management and traceability (e.g. Hortbase)
- Trial alternatives to containerised plant production, such as field-grown seedlings using forestry-sector know-how and practice



PART 6: ACTION PLAN

Project 1: Setting the Standard for Sustainably Produced Plants

Set industry standards for sustainably produced seedlings

- Develop and adopt industry standards for sustainability
- Map the water footprint and improve water sustainability practices
- Develop metrics for nutrient leaching in nurseries, adopting best practice to minimise the impacts
- Research plastic and other waste from the industry and develop alternatives and recycling programmes
- Research energy use and the net emission and removal of greenhouse gasses in nursery production
- Develop methods and tools to measure environmental change

Set industry standards for plant quality

- Develop metrics for biodiversity change and robust eco-sourcing standards underpinned by good science
- Develop standardisation for pot sizes, plant quality and planting grades
- Set benchmarks for survivability of plants

Encourage the implementation of robust biosecurity standards

- Roll-out the Plant Production Biosecurity Scheme and encourage participation

Prove our credentials

- Develop third party assurance processes, e.g. Plant production biosecurity scheme
- Identify traceability tools and practices that support supply chain integrity and eco-sourcing confidence

Optimise plant production

- Optimise seed collection and storage practices
- Invest in R&D activity to improve plant health management and growing media systems
- Invest in high-performance growing systems, such as automation and equipment to increase efficiency
- Upgrade and make use of technology to enable production scheduling, inventory management and traceability (e.g. Hortbase)

Project 2: Capable People

Improve the overall desirability of the industry

- Improve the retention of skilled people
- Identify, develop and nurture future leaders and key people
- Improve status of Young Achiever competition
- Celebrate its successes, its industry leaders, its high achievers and communicate this story
- Support plant producers to be great employers with best practice guidelines

Demonstrate a clear career pathway for young people

- Develop an industry workforce strategy, including a pipeline project focussed on identifying unemployed people and assisting them into part time, or permanent work in the industry
- Provide access to high quality vocational and on the job training programmes

Industry training

- Support an apprenticeship programme and in-work training education
- Establish a Centre of Vocational Excellence (CoVE) for the nursery industry
- Develop training programmes, providing online resources and practical workshops specific to native plant production, seed-collection and storage, germination and propagation

Project 3: A Stronger Industry

Understanding markets

- Understanding the drivers and motivations of landowners & land managers to undertake revegetation projects

Supply chain coordination

- Identify traceability tools and nursery production systems (e.g. HortBase) for better supply chain management
- Develop guidance for landowners about planning and lead-in times for plant production
- Recognition scheme for competent plant producers as project advisors
- Undertake greater engagement with government and councils on regional plans for the One Billion Trees programme, and other planting programmes

Contracts and agreements

- Develop and use standard Contract/Terms of Trade for advance ordering of large numbers of tree seedlings
- Encourage best practice tendering and procurement practices

Industry trading platform

- NZPPI could consider facilitating a marketplace platform on the NZPPI website, encouraging communication on issues of demand/supply

License to operate

- Gain recognition from local government for survival water supply

Business support

- Industry Development Officers available (South Island, North Island), providing technical extension and support
- Support is available for business growth & to manage risk
- Biosecurity (readiness and response) is better coordinated

PART 7: CASE STUDIES



Pukerau Nursery Gore

James and Maree Holloway

Pukerau is a specialist retail nursery growing natives and trees for farms and shelterbelts. Plants are grown mostly for the spot market. This means there are limited numbers of some species and eco-types. Some customers order eco-sourced plants in advance, and these need to be specifically collected and grown. Seeds are eco-sourced from central-Otago as far up as Clutha, and more recently further north around Dunedin and Mosgiel to satisfy customer requests.

Demand is strong with an estimated eight new customers a week. Environment Southland surveyed farms and riparian areas several years ago and the resultant farm plans are generating a lot of plant sales/enquiries. There are large volumes of plants going to Central Otago. Otago's subdivision consent rules mean that plants must be planted before they're able to get the title.

Orders are received from all over the country but people don't always understand the need for lead in times. We received an enquiry for the supply of 38,000 *Juncus* rushes to Taumaranui – they wanted them the following week because their consent came through. It would take two years to grow this volume of plants.

There is a saying – 'grow south, plant north'. North Island grown plants are not hardy enough for the South and don't always survive their first winter. Plants grown in the South Island are hardier, but they also grow more slowly.

There is a phenomenal, unmet demand for beech saplings. Pukerau supplied beech for a 5 ha planting in 2018 (2500 stems /ha) but are now receiving enquiries for 30 - 60 ha lots, which is about 1.4 million trees. The largest planting enquiry is at Mount Dewer.

The expansion of ski-fields has created demand for alpine natives like *Chionochloa*, *Celmisia* and *Aciphylla*. These take 2 – 2 ½ years to produce, and ski-fields were taking as much stock as Pukerau could produce. Post-covid this may be uncertain.



Southern Woods Christchurch

Gareth Mitchell – former GM

Southern Woods has doubled in size over the past three years because the orders were in place and the ability of the team. Ramping up production to grow another 500k plants would be too risky at the moment.

The risk in the 1BT programme is for small & medium nurseries (SMN) that can't easily access capital to ramp up production by say 500k plants. Big nurseries could relatively easily grow an extra 500k plants, so you get a situation where the big guys win the business.

Enquiries for offset projects on farms are already coming through from farmers. Local farm projects are less risk for SMN's than 1BT, because the size of the projects are achievable, there is a deposit available and a long term plan. These planting projects are in the tens of hectares and landowners are looking for advice as well as the plants. This gives cashflow and funds to begin growing the plants (progress payments are vital).

There is a commitment from the landowner, which doesn't seem to exist with the 1BT programme. Having a group of landowners, e.g. in a catchment, working together on a plan is the ideal scenario. The risk of government policy changing half way through the 1BT programme is a risk.

The whole industry is short of native plants. Buyers can't find the species they are after in the quantities they need, nor can SW buy in the plants needed to fill the orders. They are all sold out. This is an issue Canterbury wide. The nurseries that SW deal with locally are all in the same boat.

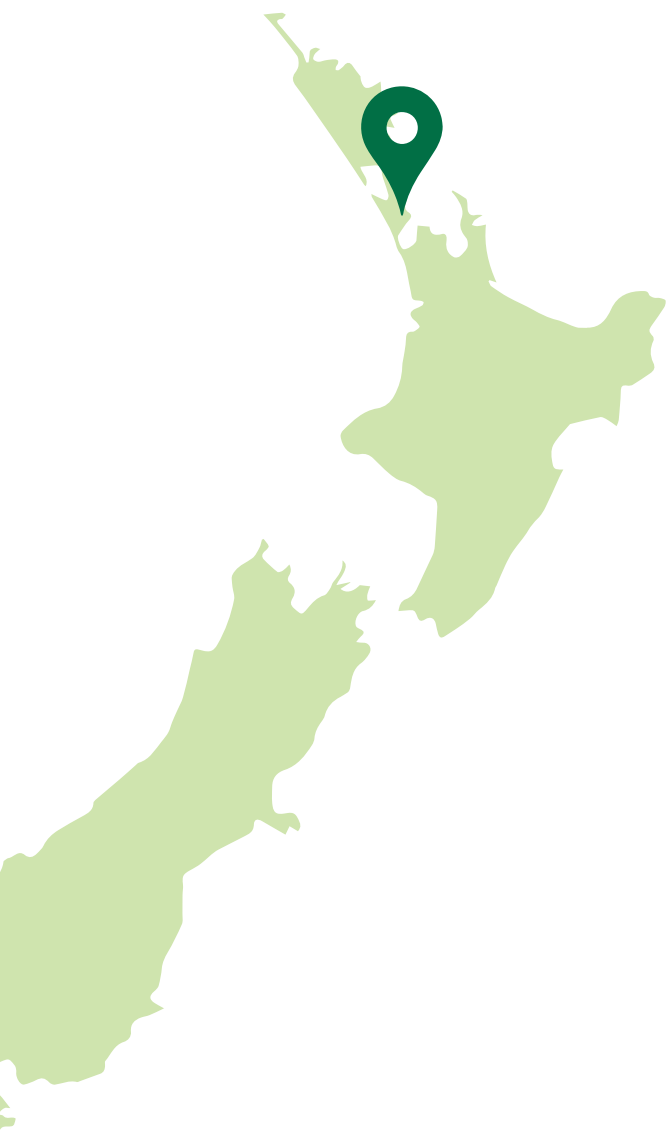
The timing is not great for investment in general, although the banks recognise that the outlook for horticulture is good. Banks believe the 1BT is both an opportunity and a risk, but the world is moving in a direction which will encourage the plant production sector to grow.

The dairy accord may begin to kick in, which means that farmers will need to begin to take action to offset their footprints. They need an environment plan.

Most industries in NZ have not invested in automation because labour has been relatively cheap. But it is creeping up, so automation will come rapidly as the cost of people increase. Thinking is that as the business grows, you need more people. Although revenue increases, the bottom line doesn't shift, because so much cost was added. The cost of labour remains in the business, so if the bottom line changes, it creates risk.

It's a good industry, but it's also a tough one. Small margins & lots of risk.

Prisons are selling plants - A number of SW's customers are going across to the prison to get plants for Rolleston. It's not a threat, but it is a frustration as margins are so low in the sector. The examples are anecdotal. The long term issue is that if a plant producer doesn't have a plant they don't sell it – so they look at sales figures and simply grow less the next year. Corrections did sell it, so they grow more of them.



Nga Rakau

Massey West, Auckland

Mark Struthers & Greg Palmer

Nga Rakau is a specialist plug or cell-tray nursery with a diverse product range covering vegetables, flowering annuals, perennials, cut flower lines, herbs, native and revegetation species, and some forestry lines. The nursery supplies plants to commercial vegetable and flower growers and councils and growing on lines for other nurseries.

The nursery is a state-of-the-art development, including a 70 x 60 m Harford greenhouse with rolling benches and considerable automation. Mark and Greg have noticed that the number of native nurseries has increased dramatically over the past decade. "You could count native nurseries on one hand a decade ago, now there are hundreds". The new nurseries are a combination of commercial and not for profit operations.

The seasonal nature of native tree seedling production is a challenge for plant producers. "You get one turn of native seedlings per year, which take around 8 months. It requires flexibility to produce other types of seedlings to utilise the space and provide cashflow for the rest of the year".

It is far easier to expand an existing native seedling nursery than starting from scratch. There is a lot of skill and automation involved and getting the costings right requires a lot of experience and management. There is now a lot more specialisation. Many small nurseries are now buying in small seedlings then potting and growing them on, without having to focus on propagation. This means that they only pay for the plants they need, there is less handling and waste and the quality of the plant at the end of the process is better.

Automation is making a big difference. Modern seedling equipment is enabling automated nurseries to seed out hundreds of thousands of seedlings per day. This is compared with a few thousand using traditional techniques. This enables nurseries to find scale and keep up with the increasing size and frequency of orders.

The industry is adapting and working differently, improving their workforce and their systems alongside new technology and innovation.

PART 8: SURVEY METHODOLOGY

The Native Nursery Capability Survey was designed and executed by Harmonic Analytics Ltd., who also performed the data analysis.

SURVEY DESIGN

Email was chosen as the method of survey delivery over the alternatives of direct-interview, phone-interview, or postal survey. Reminder emails were sent to nurseries who didn't respond within the first two weeks of the collection period, as well as follow up phone calls to improve the response rate.

Survey questions were designed to gather information on the size, capacity, and operations of New Zealand's native plant nurseries. Cumulatively, 29 survey questions were selected for the survey. Some survey questions replicated questions from [StatsNZ's Business Operations Survey](#) to allow a direct comparison with other businesses.

SELECTING THE NURSERIES

To meet the aims of the survey, a target population of all New Zealand native plant nurseries was chosen, including commercial, council, prison, community and other non-for-profit, conservation and iwi nurseries. An initial list of nurseries was added to by web scraping the Yellow Pages and Neighbourly websites for additional nurseries, adding another 120 organisations to the sample.

Nurseries without an email address were excluded from the survey, even if a contact phone number was available. It was assumed that nurseries without email addresses were too small to survey or were likely out of business. This assumption was confirmed by calling ten random nurseries that fit this profile, all of whom were out of business.

In total, surveys were sent to 359 nurseries by email (in some cases there were multiple email addresses for nurseries). This sample was judged as representative of the target population, potentially even matching the entire target population.

IMPLEMENTING THE SURVEY

A survey questionnaire was sent by email and follow-up phone calls were made to increase the level of participation. The survey had a final response rate of 43%, with 156 respondents completing the survey.

The survey ran from Friday 27th September to Sunday 20th October 2019. Non-response follow-up began on Monday 7th October 2019 and continued for two weeks. All non-respondents were called at least once in an effort to reduce follow-up bias. The survey non-respondents were ordered by their approximate size in hectares (when that data was available), and a member of the team phoned to request they complete the survey.

CLEANING THE DATA

Multiple emails existed for several organisations and double-counted nurseries were removed. Unexplained respondents that did not match the records were also removed, rather than being included in the final dataset.

ADJUSTING THE DATA

See Table 1 for the list of assumptions and calculations made on the data to obtain final results.

Adjusting the volume of produced plants

The survey gathered data on the approximate number of plants finished (produced for final sale) for the previous, current, and coming financial years. It also gathered data on the percentage of native plant production supplied to other nurseries, as it is common for nurseries to on-sell a selection of their produced plants to other nurseries for finishing. The results were used to adjust the production volume for each nursery and these production volumes were then used to approximate the sector's total production.

Stratifying the data

Two different forms of adjustment were performed before data analysis; partial-response adjustment (imputing data for respondents who only completed some of the questions), and non-response adjustment (imputing data for nurseries who did not answer the survey at all).

Post-stratification was used for both partial-response and non-response adjustments. Post-stratification accounts for underrepresented groups of respondents and aimed to decrease non-response bias. This method stratifies data by one variable (commonly the size or location of a respondent) and makes imputation adjustments unique to each strata. An assumption of the method is that the variable used to stratify the data has a causal relationship with that strata's response rate. Survey data was stratified by the nursery's size in hectares, therefore assuming that response rates were linked with nursery size.

Nursery size was obtained from either NZPPI's database or from question 10 of the survey; "how large are each of the following types of areas used by your organisation for producing plants?"

The respondents were split into four strata: small nurseries with less than two hectares of land; medium nurseries with between two and ten hectares of land; large nurseries with ten or more hectares of land; and nurseries of unknown size who did not complete this section.

Adjusting for partial-response

As 99 respondents partially completed the survey, post-stratification was used to adjust for partial-response. For questions that involved continuous data, missing data for partial respondents was imputed with the strata's median. For categorical data, missing data for partial respondents was imputed with either the strata's median or mode.

Adjusting for non-response

As 203 potential respondents did not complete the survey, post stratification was used to adjust for non-response. While the ratios of nursery size differed between respondents and non-respondents, the distributions were not altered as part of adjustment.

The respondent sample contained 87 small, 29 medium, 8 large, 7 nurseries of unknown size, and 27 disqualified nurseries that did not produce native plants. The non-respondent sample contained 52 small, 24 medium, 11 large, and 116 nurseries of unknown size. The total sample of 359 nurseries contained 139 small, 53 medium, 19 large, and 123 nurseries of unknown size.

As for partial-response adjustment, missing data for non-respondents was imputed with the strata's median for continuous data. While either the strata's median or mode was imputed for categorical data. For example, the strata's median was used for imputing questions 4 - 11.

Table 1: Survey Methodology: list of assumptions and calculation methods

Area of analysis	Action / assumption
Survey response	Respondent status was labelled as "completed" for respondents who answered all survey questions and were not disqualified.
Survey response	Respondent status was labelled as "partial" for respondents who answered some but not all of the survey questions and were not disqualified.
Survey response	Respondent status was labelled as "disqualified" for respondents who answered "no" to question two - those that did not produce any native plants in the last financial year.
Production volume	Adjusted native production volume was calculated by multiplying the production volume (Q4-6) with the percentage of native plants (Q8) with the inverse percentage of plants supplied to others (Q11). Subtracting the percentage of native plants supplied to others was intended to ensure these plants were not double counted.
Production volume	Adjusted non-native production volume was calculated by multiplying the production volume (Q4-6) with the inverse percentage of plants supplied to others (Q11).
Production volume	For the percentages of native and non-native plants, the respondent was asked about the production percentages of native and non-native plants for the previous financial year. These production percentages were assumed to be consistent across the current financial year and next financial year too.
Production volume	The sub-categories of native trees, native shrubs, native grasses, and native others were calculated by multiplying the adjusted native production volume with the percentage of each sub-category supplied by the respondent (Q9).
Production volume	For questions 4-6, several respondents responded with statements such as "up to X number of plants", or "over X number of plants". Production volumes were entered as these X values.
Production volume	Maximum production volume for the previous financial year was calculated by dividing the total production volume of the previous financial year by the percentage of full production capacity that the nursery was operating at for the previous financial year (Q7).
Production volume	Spare capacity (unrealised production volume) for the previous financial year was calculated by subtracting the total production volume for the previous financial year from the maximum production volume for the previous financial year.
Production efficiency	Production efficiency in units of area was calculated by dividing the total production volume by the total land area.

Area of analysis	Action / assumption
Production efficiency	Production efficiency in staff members was calculated by dividing the total production volume by the total staff number.
Land area	The total land area of survey respondents was calculated by summing the green-house area, shade house area, open ground area, and standing area (Q10).
Land area	The total land area of non-respondents was calculated by either taking data from NZPPI's databases when available, or imputing using the strata median.
Land area	The inside area was calculated by summing green-house area and shade house area, both at the nursery and total levels.
Land area	The outside area was calculated by summing the open ground area and standing out area, both at the nursery and total levels.
Land area	The percentage of inside area was calculated by dividing the inside area by the total land area.
Nursery size	The stratas for nursery size were decided through discussion with the NZPPI team. Four stratas were used; small nurseries with less than two hectares of land; medium nurseries with between two and ten hectares of land; large nurseries with ten or more hectares of land; and nurseries of unknown size.
Capital	The change in production volume from the previous to the coming financial year per one dollar investment in total capital expenditure was calculated by subtracting the previous years volume from the coming financial years predicted volume. This value was then divided by the total capital expenditure in the previous financial year.
Capital	The dollar value per increase in volume from the previous to the coming financial year was calculated by subtracting the previous financial years volume from the coming financial years volume. The total capital expenditure in the previous financial year was then divided by this value.
Workforce	The number of staff was adjusted by taking the midpoint of a given response. For example, 3 was taken for the response of "0 to 5", and 14.5 was taken for the response of "10 to 19".
Workforce	The estimated percentage of staff with a given level of qualification was calculated by dividing the number of "total" staff (Q20) for a given qualification level by the total number of "total" staff (Q20).

SURVEY QUESTIONNAIRE



Te Uru Rākau
Forestry New Zealand

NZPPI Native Trees Capacity Pilot Survey V3

INTRODUCTION AND INSTRUCTIONS

NZPPI is conducting a survey of native plant producers in collaboration with Te Uru Rākau |Forestry NZ. The results from this survey will be used to build a picture of how many native trees are grown each year and understand what's needed to help the sector to meet the increasing demand for trees.

This survey should be completed by the general manager. Some answers may need to be confirmed with support people in specific areas. Your organisation should only answer this survey once, if you have more than one nursery provide aggregated answers across all of your sites. Completing this survey should take you somewhere between 10 - 20 minutes.

- Where actual figures are not available, please give your closest estimate.
- Where there is no response, leave blank unless otherwise instructed.

We have high standards for keeping your information private, secure and confidential. The information we collect will be used by trusted researchers to produce statistics and research for the benefit of the sector. We will not identify or make it possible to identify any individual organisations in any published statistics or research.

1. **Please provide information relating to the most recent financial year for which this organisation has results available.** *Note: If your balance date is between 1 Jan - 31 Aug, report for the year ending 2019. If your balance date is between 1 Sep - 31 Dec, report for the year ending 2018.*

What is the balance date of the financial year you will use for this questionnaire?

Balance Date

2. **Over the last financial year, did your organisation produce any native plants?** *In this survey, native plants refers to trees, shrubs, flaxes or grasses that occur (or have occurred) naturally in New Zealand without having been introduced by humans. We exclude moss, fungi and fruit trees. For a list of native plants please consult the University of Auckland's [New Zealand Plants Website](#).*

Yes

No

OPERATIONS

This section includes questions on what type of organisation you are, how long you have been operating and your production capacity.

3. How long has your organisation been operating for? Only include time that your organisation has been producing plants.

< 1 year 1 - 2 years 2 - 3 years 3 - 4 years 4 - 5 years 5 - 10 years 10+ years

4. Over the last financial year, approximately how many plants did your organisation finish producing? Finishing production of a plant indicates that it is ready to be dispatched to another party by your organisation. Include all plants, native and non-native.

5. Over the financial year before last (e.g. if you are reporting for FY 18/19 this question considers FY 17/18), approximately how many plants did your organisation finish producing?

6. In the next financial year (e.g. if you are reporting for FY 18/19 this question considers FY 19/20), approximately how many plants do you expect your organisation to finish producing?

- 7. Over the last financial year, what percentage of your full production capacity did you operate at?**
Your full production capacity is the maximum output of plants that you could have produced with the resources available to you.

Percentage of production capacity used	%
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- 8. Over the last financial year, approximately what percentage of the plants your organisation finished producing were native plants?**

Percentage of plants produced that were native	%
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- 9. Over the last financial year, approximately what percentage of the native plants your organisation finished producing were of each the following types? Note: percentages must add to 100%**

Trees (which can grow to at least 5m in height)	%
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Shrubs (which can grow to less than 5m in height)	%
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Grasses and flaxes	%
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All others (ground covers, ferns and vines)	%
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- 10. How large are each of the following types of areas used by your organisation for producing plants?**
Include all sections or buildings which are mainly used for producing plants.

Green house - commonly used for germination / seedling production (m ²)	m ²
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Shade house - commonly used for growing on seedlings (m ²)	m ²
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Open ground area (m ²)	m ²
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Standing out area (m ²)	m ²
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- 11. Over the last financial year, approximately what percentage of your native plant production was supplied to other nurseries?**

Percentage of your native plant production supplied to other nurseries	%
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12. Which of the following best describes your organisation?

Private Business	Non-profit or charity	Local or central government organisation
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13. Do you consider this organisation to be a Māori organisation?

Factors that could influence your decision to consider your organisation to be a Māori organisation may include:

- *ownership*
- *philosophy / principles / goals / tikanga*
- *management practices*
- *branding / marketing*
- *tangible assets / taonga a iwi, e.g. land rights*
- *intangible assets / kaupapa Māori, e.g. cultural property*
- *employees*

Yes	No
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14. Thinking about the last 2 financial years, to what extent has each of the following influenced whether changes are made to how this organisation is run? If your organisation is less than 2 years old, think about the entire time period since you started operating.

	not at all	a small amount	a moderate amount	a great deal	don't know
recruitment difficulties					
productivity					
profitability					
availability of new technology					
complying with regulations					
health and safety considerations					
ease of access to capital					
changing demographics of NZ labour force					
the state of the NZ economy					

15. In the last financial year, which of the following schemes or services has your organisation participated in, supplied plants to, or used? Select all that apply.

- Regional or Local Council Land Management Programmes
- Regional or Local Council Tree Planting Programmes (eg. Wellington’s Two Million Trees Project)
- Million Metres Streams Project - MfE
- Local restoration / revegetation projects
- MPI - Afforestation Grant Scheme (now Te Uru Rākau 1BT Grants Fund)
- Hill Country Erosion Scheme
- Plant Production Biosecurity Scheme (NZPPI)
- NIASA / Eco Hort Accreditation Scheme
- Trees That Count Marketplace
- Emissions Trading Scheme (ETS)
- Other (please specify):

WORKFORCE

This section includes questions on your staff, the skills within your organisation and the labour market.

16. Over the last financial year, how many staff (working proprietors and employees) worked for your organisation on the following basis? Staff includes everyone engaged under a permanent employment agreement.

- Include:
- those temporarily absent from work (e.g. sick, on leave, strike, or temporary lay-off)
 - casual staff
 - all managerial and executive staff (e.g. Chief Executive)
- Don't include:
- Contractors (e.g. temporary staff paid by employment agencies)
 - Working proprietors not actively engaged in the operation of your business

full-time (working 30 hours or more per week)

0	1 - 5	6 - 9	10 - 19	20 - 49	50 - 99	100+

17. part-time (working less than 30 hours per week)

0	1 - 5	6 - 9	10 - 19	20 - 49	50 - 99	100+

18. Over the last financial year, how many contractors or fixed term (working proprietors and employees, seasonal employees) worked for this organisation? Include all contractors/fixed-term employees regardless of how many hours they worked or the duration of their contract.

0	1 - 5	6 - 9	10 - 19	20 - 49	50 - 99	100+

19. Over the last financial year, how many people volunteered for your organisation? Volunteers are people who work with no expectation of payment and who are not covered by an employment agreement.

0	1 - 5	6 - 9	10 - 19	20 - 49	50 - 99	100+

20. Over the last financial year, how many people in total worked for this organisation? This includes everyone who worked for your organisation on any basis i.e. everyone from all of the previous questions in this section.

0	1 - 5	6 - 9	10 - 19	20 - 49	50 - 99	100+

21. Over the last financial year, what percentage of your staff were NZ or Australian citizens or NZ permanent residents? This is the percentage of your staff who had the right to live and work in NZ without restriction. Include everyone who worked for your organisation on a non-voluntary basis.

Percentage of staff	%
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22. Over the last financial year, did your organisation have any training practices in place?
Note: Training must be work related, and could be on-the-job training provided by your organisation or training provided by a third party, such as an educational institution or specialist training organisation.

Yes	No
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23. Over the last financial year, which of the following types of training did any your staff undertake as part of their role? Select all that apply.

On-the-job training delivered by your organisation

New Zealand Certificate in Primary Industry Skills (any level)

New Zealand Certificate in Horticulture (any level)

New Zealand Certificate in Horticulture Production (any level)

New Zealand Certificate / Apprenticeship in Nursery Production

New Zealand Certificate in Business (any level)

New Zealand Diploma in Agribusiness Management

University courses (e.g. Diploma in Horticultural Management)

Other (please specify):

24. For the staff working for your organisation whose main tasks and responsibilities are horticultural in nature (e.g. seeding plants), what percentage of them have qualifications of the following levels in horticulture or related subjects (e.g. agriculture, botany, biosecurity)? Note: Only count the highest level of qualification achieved for each employee. Include overseas qualifications of equivalent levels.

No qualification

NZQA levels 1 - 3 (High School)

NZQA level 4 (Certificate)

NZQA levels 5 - 6 (Diploma)

NZQA level 7 qualification or higher (Bachelors degree or higher)

25. Over the last financial year, to what extent did your organisation experience difficulty in recruiting new staff for each of the following occupational groups?

	No difficulty	Moderate difficulty	Severe difficulty	Don't know	Not applicable
Managers and professionals					
<ul style="list-style-type: none"> - Managers lead organisations, departments or divisions and determine the policy of the organisation or department (e.g. General Manager, Finance Manager) - Professionals perform analytical, conceptual or creative tasks with skills equivalent to a bachelor degree or higher (e.g. accountant, engineer, journalist, computer programmer) 					
Technicians and trades workers					
<ul style="list-style-type: none"> - Technicians and trades workers perform a variety of skilled tasks, applying broad or in-depth technical, trade or industry specific knowledge, often in support of scientific, engineering, building and manufacturing activities. Include all apprentices and trade supervisors. - e.g. Nurserypersons who propagate and cultivate plants 					

	No difficulty	Moderate difficulty	Severe difficulty	Don't know	Not applicable
Labourers, machinery operators and drivers					
<ul style="list-style-type: none"> - Machinery operators and drivers operate machines, plant, vehicles and other equipment to perform a range of agricultural, manufacturing and construction functions, move materials, and transport passengers and freight. (e.g. setting up, controlling and monitoring the operation of machines, plant and equipment) - Labourers perform a variety of routine and repetitive physical tasks using hand and power tools, and machines either as an individual or as part of a team assisting more skilled workers such as Trades Workers, and Machinery Operators and Drivers. (e.g. assisting with cultivating and harvesting crops) 					
All other occupations.					
<ul style="list-style-type: none"> - e.g. Clerical, sales and service workers who perform administrative, organisational, liaison, sales, and clerical tasks. 					

TECHNOLOGY AND INNOVATION

This section asks questions about the technology and practices your organisation uses.

26. Do you use any of the following types of equipment for the purpose of plant production?

Select all that apply.

Temperature monitoring and management (e.g. heating, cooling)

Irrigation systems

Automated seed sowing or potting machines

Weather protection (e.g. frost protection, wind protection)

Booms / flood floor

Hail mesh or shade cloth

27. Over the last financial year, did this organisation undertake or fund any research and development (R&D) activities?

Yes

No

28. Over the last financial year, how much capital expenditure did you have in each of the following categories? Include GST in your answers.

Land	\$	(inc GST)
Buildings	\$	(inc GST)
Machinery	\$	(inc GST)
Other infrastructure (e.g. irrigation)	\$	(inc GST)
Other technology (e.g. computer systems)	\$	(inc GST)

END OF THE SURVEY

29. Thank you for completing this survey.

You can provide any other relevant feedback or comments in the box below.

