Branching Out

Hops: Scale up opportunities



A GUIDANCE DOCUMENT FOR SMALL AND INDEPENDENT HOP GROWERS



About the Branching Out project

Branching Out is a long-term strategic project for Taranaki, developed from <u>Tapuae Roa</u> and aligning with the <u>Taranaki 2050 Roadmap</u>, the region's strategic vision for a low-emissions future.

Since 2020, the Branching Out project has identified, investigated, and validated diversification opportunities and high-value food and fibre ventures for the region to ensure the long-term sustainability and resilience of the food and fibre sector and the communities it supports. The investigations, collaborations, and potential commercial pilot opportunities for the region have been presented as Venture Blueprints. These blueprints aim to build investor confidence and serve as an informative and inspirational roadmap to kick-start complementary land-based activities and associated value chain enterprises in Taranaki

Phase Two of the project will specifically test each venture's viability by conducting growing trials across the region, developing industry strategies to guide development in the region, and exploring processing and value addition and investment models to support. The project will run until 2025 as Te Puna Umanga Venture

Taranaki, the regional development agency, looks to prove that diversification is possible, and that landowners and enterprises can benefit economically, environmentally, and socially. The project has a clear goal to broaden sustainable land use to increase resilience and diversify farming businesses, develop new related enterprises, create new jobs, and attract new revenue and investment to our region.

Branching Out is funded through the Ministry for Primary Industries (MPI) Sustainable Food and Fibre Futures Fund, alongside contributions from Toi Foundation, LA Alexander Trust, and AGMARDT, as well as extensive inkind contributions from industry partners, growers, and research institutes.

Additionally, Branching Out has been funded and enabled by the region's four local councils – New Plymouth District Council (NPDC), South Taranaki District Council, Stratford District Council, and the Taranaki Regional Council.

DISCLAIMER

This Industry Paper does not constitute investment advice. Professional advice should be sought if you wish to explore this opportunity further. The document is correct to our knowledge and based on the best information Venture Taranaki could access as of November 2023. However, this work is ongoing, and we welcome new or emerging information about this opportunity. For more information or for input, please contact branchingout@venture.org.nz.

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Introduction

This Guidance Document provides advice to small and independent hop growers looking to scale up from pilot scale plots to financially viable hop gardens.

It includes an update on the state of the hop sector, snapshot data, and information on scaling up steps, paths-to-market, hop varieties, and growing in new regions. Venture Taranaki's Branching Out project published a <code>Hops Blueprint</code> in 2022, which should be read in conjunction with this guidance. Two Taranaki growers have planted hops and will be scaling up their pilot plantings in the coming year. Despite the challenges the hop sector is facing at the time of writing, Venture Taranaki is taking a longer-term view, and is keen to support the exploration of hops as a potential future land use for the region.

OUR APPROACH

Desktop research was combined with a programme of industry engagement with a range of industry participants, including: NZ Hops, Freestyle Hops, Hop Revolution, Pikimai Hops, Garston Hops, Nelson Lakes Hops, Kono, MPI, NZTE, Plant and Food Research, Lincoln University, and brewers. Many industry respondents sought anonymity, so not all insights and perspectives have been referenced.

Sector update

The hops sector in New Zealand enjoyed a period of high growth from circa 2010 to 2020, especially in the last five years of the decade. This was fuelled by a steep rise in the number of craft breweries and micro-breweries globally. For example, the total number of breweries in the US increased by 91% between 2015 and 2020. The total number of UK breweries increased by 61% from 2016 to 2020.¹ In New Zealand, the number of craft breweries increased by 90% between 2010 and 2022.² Globally, the growth in the craft beer industry drove demand for new hop aromas and flavours, and demand for aroma varieties of hops increased.

INCREASED DEMAND HAS LED TO GLOBAL OVERSUPPLY

Increased demand for aroma varieties of hops meant the supply/demand balance was in favour of hop growers. Growers and marketers were able to secure five-year contracts from hop buyers (called "forward contracts"), which in New Zealand (and elsewhere) were used to underpin financial models and justify substantial investment in new plantings. The supply of hops to market increased globally. Then a global pandemic arrived, followed by higher inflation and a generally weak economic environment, all of which has affected beer consumption. The 2023 and 2024 seasons in both hemispheres will continue to be affected by a global surplus of hops in the supply chain.

CONTRACT ARRANGEMENTS

Hops are typically sold via forward contracts (multi-year contracts) or on the spot market (using a small number of global hop exchanges). Forward contracts are either direct contracts (selling direct to breweries), or with an intermediary (e.g. a broker). When breweries slowed production during Covid, they were left with unused hop inventory. Those who honoured their commitments to forward contracts for hops, despite having stockpiled inventory, created even larger stockpiles of inventory, which has caused the slump in prices the sector is facing today. Other buyers have broken their forward contracts.

Some buyers are tendering new contracts rather than renewing supply contracts with growers with whom they have an existing relationship. Some brokers – also sitting on surplus stocks – are undercutting tender prices when breweries tender new supply contracts. The market is extremely competitive.

Meanwhile, there has been an aggressive expansion of contracting via direct relationship with breweries by New Zealand's US, Australian and German hop growing competitors, as they seek to secure a slice of the market This makes it harder for New Zealand hop marketers to maintain their market share.

Many brewers globally are now reluctant to commit to new forward contracts, as they can get the hops they need on the spot market. Many brewers globally are also reluctant to commit to forward contracts because:

- · of prior contracting errors they have experienced
- they're seeking the flavour/aroma of individual lots and want the flexibility to select what they want as they want it
- they're less willing to accept hops that aren't of high quality.

Note that under forward contracts, brewers are never entirely sure what type of hops they're getting (flavour, aroma, quality), until they open the bags. There is no uniformity with hops. For example, a brewer might contract forward for the Nelson Sauvin variety of hops. But Nelson Sauvin plants will provide hops with different qualities depending on where they are grown, when they are picked in the harvesting window, and how they are processed. The same plant will also produce different profiles year on year, regardless of external factors such as weather. One brewer referred to the forward contract model as a "lucky dip" in which the brewer takes all the risk.

US Brewers Association and the Brewers Journal UK.

² See this <u>Hoppiness</u> article for a useful commentary

Snapshot data

sources³

The 2023 harvest was circa 2300 tonnes, which is the result of some growers reducing production due to the global surplus. Without the reduction in production, the harvest would have been circa 2500 tonnes.

As a comparison, New Zealand hop production in 2017 was just under 1000 tonnes, meaning production in New Zealand has increased by approximately 130% over the past five years.

GLOBAL PRODUCTION (MT): Increased by 49% between 2015 and its peak (130,811 mt) in 2021.

From 2021 – 2022 global hop production (mt) declined for the first time since 2014. The decline of 19% is the largest in the post WW2 period.

The value of all New Zealand hop exports grew 49% from 2018 - 2022.

The quantity of all New Zealand hop exports grew 47% from 2018 to 2022.

Approximately 85% of our hop production is exported.

95% of hops imported to New Zealand come from the US.

2022 GLOBAL HARVEST:

- 59.5% aroma varieties
- 40.5% bitter varieties

New Zealand produces less than 3% of the global market. New Zealand's top 5 export markets in 2022+:

USA 85.7% France 5.3% UK 5.1% Japan 2.8% Australia 1.1%

*hop cones: fresh, dried, ground, powdered or pelleted. Global beer production in the decade 2013 – 2022 was comparatively steady (an overall decline of -3%).⁵ China's beer production experienced the sharpest decline (-28%).

^{3 &}lt;u>barthhaas.com/resources/barthhaas-report;</u> ITC calculations based on Stats NZ data; NZ Hops Ltd.; NZTE.

⁴ We know that some product is exported to the US for processing, and imported back into New Zealand for final sale.

This statistic supports comments made by some industry respondents on overall beer consumption. Fashion and taste drive changes in the types of beer we drink – e.g. 'the haze craze' – but at a macro scale, there are limits to the number of beer consumers and the amount of beer they can consume. Increased consumption of one type of beer typically displaces (reduces) the consumption of an alternative type of beer. Strategies to grow New Zealand hop exports shouldn't hinge on assumptions that overall beer consumption will rise sharply. We need to provide the types of hops brewers want, so they can make the types of beer that consumers want to drink.

INFLATION AND THE CONTRACTION OF THE CRAFT BEER EXPLOSION

Inflation and a generally weak economic environment have resulted in lower growth and high levels of uncertainty in the craft brewing industry (both domestic and overseas). The 'cost of living crisis' has made a can of craft beer a luxury for many consumers. Increasing excise taxes in New Zealand have applied additional pressure to the domestic craft beer market.

Research undertaken by NZTE in 2023⁶ has confirmed that the rapid growth of new craft and micro-brewery establishments has peaked globally, although regional trends differ. Brazil, Latin America, India and South East Asia are displaying different characteristics to our more mature export markets.

Craft beer consumption in Brazil, Latin America, India and South East Asia present, at face value, an opportunity to grow exports in emerging markets, but this is countered in some countries by other challenges, such as higher tariffs, and immature cold store and supply chain ecosystems. Australia and Singapore were also noted by NZTE as markets that have untapped potential.

An interesting article on the craft beer industry in the US, and its vulnerability to generational change and fashion, can be found here (it finishes with the valid point that beer has survived 10,000 years of historical trends).

ATTEMPTS TO REDUCE PRODUCTION HAVE NOT HAD AN IMPACT

It's estimated there is between 35 to 40 million pounds of excess inventory in the American hop industry alone (15.8 – 18 million kgs²). In January 2023, at the American Hop Convention, the CEO of John I. Haas⁸ estimated that hop growers in the American Northwest needed to reduce their production by 10,000 acres (17%). Haas committed to cutting acreage of the popular Citra and Mosaic varieties by 30 percent. Indie Hops in the US had growers 'idle'9 25-30 percent of acreage in 2023. Data on the extent to which proposed cuts were implemented isn't available, although the BarthHaas Report (2023) references a reduction in planted area in the US of 3,600ha.

THE INDUSTRY HAS TO DELIVER MORE CONSISTENT QUALITY

Brewers are becoming more suspicious of new producers because of the highly variable quality they have seen over the last few years (both from New Zealand and other growing regions). In the case of New Zealand product, many industry respondents felt that 'Brand New Zealand' has suffered from poor quality product going to market. To maintain the reputation of New Zealand hops, better quality control needs to be a key focus across all sector participants.

WHEN WILL WE HIT THE INFLECTION POINT?

Like all primary producing sectors that sell on global commodity markets, the hop sector is cyclical. Hops follow the same formula that influences all New Zealand food and fibre exporting sectors. When demand exceeds supply, prices go up and production increases as existing growers expand and/or new entrants are attracted to the sector. When increased production levels exceed demand, there is an oversupply and prices go down. Everyone understands this cycle – most New Zealand farmers and growers operate through multiple such cycles in their lifetimes. The million-dollar question is always, when will we hit the inflection point, i.e. when will competition and attrition within the industry correct the oversupply, and price trends start curving upwards again? Industry respondents' opinion on this varied, predicting from eighteen months to four years before this 'correction' would occur. There was a consistent view that the 2024 harvest is going to be especially tough, and that attrition within the New Zealand sector is expected.

WHEN THE MARKET TURNS...

Some industry respondents felt the market might right itself faster than expected. Multi-year contracts allow growers and buyers to gauge supply and demand. It was expressed that as most buyers are operating without multi-year contracts, they may find it harder to gauge demand and manage their supply chains once their current surplus inventories are corrected. Note that each hop variety also has its own supply and demand cycles. Varieties that are over-supplied today may become undersupplied in the future, which will immediately drive their price up.

Despite the challenges in the global market, there is still a good underlying demand for the right New Zealand varietals and product of the right quality (hops/pellets/packaging).

There is growing global awareness of the varietals New Zealand grows and of the quality that some New Zealand producers can deliver. Our varietals, and the flavour/aroma profiles we can achieve, continue to be highly sought after by brewers and highly liked by consumers. We still see strong underlying demand for our varietals, when they are hitting the flavour/aroma profiles that breweries want.

The hop breeding programmes underway in New Zealand have potential to attract increased global interest (NZ Hops Ltd, Freestyle Hops and Clayton Hops have breeding programmes). Some industry respondents felt there is still a lack of awareness in the US of our great New Zealand varietals. Consistent quality and a steady supply chain of each varietal is needed. There is still scope to grow US interest in our varietals.

⁶ Not publicly released. See Appendix 1 for summary information.

^{7 &}lt;u>brewingindustryguide.com/rightsizing-the-hop-market/</u>

⁸ John I. Haas is the leading hop supplier in the US. This company is a part of the global BarthHaas Group – the world's largest supplier of hops, hop products and services.

⁹ Not harvest.

The New Zealand industry remains very small. On a global scale, some respondents felt the industry is not remotely approaching its potential global market share. For example, the total New Zealand production of the Nelson Sauvin variety is still less than 10% of the US production of the Citra variety. New Zealand production of the Motueka variety is less than 5% of US production of the Mosaic.

One respondent, who did not want to be identified, felt we need to be more ambitious with some longer-term goals. New Zealand should aim to capture 10% of the global market. Our current global share sites at circa 3%, having grown from 1% in recent years. Exact data is difficult to access.

The hops sector has suffered from being production led. The way most companies transact their sales means the New Zealand industry is a commodity price taker, as it is too small to influence global prices. More growers are trying to move towards a market-led position, by offering buyers increased selection opportunities, with improved traceability to single-garden batches, with distinguishable provenance and flavour and aroma profiles.

Buyers will continue to favour growers who can offer consistent high-quality products (including packaging). As more product of inconsistent quality circulates, quality will remain a critical point of differentiation.

Note that packaging is an important component of our market offering. Anecdotal comments suggest that the packaging offered by US producers is superior. Anecdotal comments also suggest that it takes new entrants to the sector time to refine and perfect their packaging capabilities. The risk of this is that buyers' experiences of prime New Zealand hop products is detrimentally impacted by poor packaging, and they may not give the product a second chance.

Domestically, brewers noted that although beer consumption in New Zealand is low (and with low growth in the past 12 months), there are new opportunities to expand new product offerings in the gluten-free, non-alcoholic and low carb segments.

Brewers also noted that it is an exciting and emerging time with new independent growers entering the market. The 'paddock to glass' and 'born and brewed in New Zealand' brand stories are strong, and they also align with the craft beer story's small and independent producer heritage.

WHAT DOES ALL THIS THIS MEAN FOR GROWERS LOOKING TO SCALE UP?

Some industry respondents were forthright in saying they would not encourage anyone to invest in the hops sector at this time.

NZ Hops Ltd is actively encouraging less supply from its existing growers. This is important because NZ Hops Ltd is the marketer for the significant majority of New Zealand's hop producers (there are over 20 growers supplying NZ Hops Ltd).

Other respondents felt that new investors who start the scale up phase now might time a market correction well – assuming they are not over-ambitious with planting areas.

Some respondents accepted that the 'boom-bust' cycle is a given characteristic of most horticulture and agriculture sectors. The industry needs to retain a focus on the medium to long term opportunities as it rides out its current challenges.

Growers with a higher exposure to debt are always more vulnerable to commodity price cycles. New or small growers looking to scale up will of course be constrained by their debt appetite and thresholds. They must also consider their ability to carry and repay debt in their financial models longer term, across all stages of a fluctuating commodity cycle and fluctuating interest rate cycles.

The underpinning message from existing industry players is 'if you can't sell it, don't grow it.' A crucial component of a scale-up business plan is exploring path-to-market options and understanding the cost of selling what you grow (see page 10), before you grow it.

PAN-SECTOR DATA IS POOR

All industry respondents, including the Ministry for Primary Industries, acknowledged that data on the New Zealand hops sector remains poor. Individual companies are reluctant to share information. Export statistics are misleading due to the range of product types exported (pellets, whole bales, oils), and because product is frequently exported to third party processors or logistics providers. Some hops products are exported to be processed offshore and imported back into New Zealand. There is no pan-sector 'industry body' investing in data collection and learning.

Scaling up

What could a scale up from an initial trial plot look like? Are there some logical steps changes, for example, from a few hundred plants up to one hectare of planting? From one hectare up to five hectares, or ten hectares? In researching these questions, it quickly became clear that scale-up in the hops sector requires significant 'gear changes.'

Advice provided by The Agribusiness Group for the Branching Out <u>2022 Hops Blueprint</u> suggested a minimum viable land area for a hop garden of 40ha, and an optimal size of 150ha.¹⁰

Given the cost of harvesting and processing infrastructure (required as soon as you move beyond pilot scale plots) several industry respondents advised that growers should take the leap direct to plantings of 30-40ha so growers can generate enough revenue to make the necessary investment in harvesting and processing infrastructure viable. Plantings of one hectare are the accepted threshold for the need to invest in some type of harvesting and processing machinery and equipment – a manual / 'number 8 wire' approach is regarded as challenging once trial plots get to this size.

Investment in good picking and kilning equipment is essential, as it will be very challenging to deliver consistently excellent flavour/aroma without these.

The key scale-up constraint is access to sufficient capital, to cover the cost of:

- · establishing new plantings
- · harvesting and processing what you grow
- · selling what you grow.

ESTABLISHMENT COSTS

Financial models have been undertaken by the Hāpi Hops Research Centre and MyFarm. It's recommended that readers access them via the hyperlinks provided and familiarise themselves with the detail. CAPEX costs in both need updating (it has been suggested by a minimum increase of 25%). In summary, estimate costs (updated) are likely to be:

- Garden development costs: \$230k per hectare
- Labour, garden and overhead costs: \$18.6k per hectare.

Additional financial model information is outlined in the 2022 Hops Blueprint, page 14.

THE COST OF HARVESTING AND PROCESSING

Hops need to be processed within hours of picking. When growers scale-up from their small pilot plots they will need to invest in harvesting and on-site processing infrastructure. An estimate cost of the harvesting and processing infrastructure required to service a 40ha garden is between \$5-6M¹¹, comprising:

- · Hop picker
- Flat bed drying kiln/s
- Picker shed
- Kiln shed
- Baler
- · Conveyors and mechanicals
- Electrical and control systems
- Tractors
- Harvest trailers
- · Boiler and plumbing
- · Top cutter

The most significant scale constraint will be the size of picker a grower is able to invest in, followed by the size of the drying kiln/s. Yield per hectare varies across hop varieties. The average final yield per hectare for hops is approximately 1700kg of T-90 pellets (see page 13 for more information on pellets).

There is a small market in second hand equipment within New Zealand. Growers should expect to have to import specialist equipment. Due to the time-critical nature of both harvesting and processing, and our distance from global suppliers of specialist equipment, growers are advised to also invest in an inventory of critical spare parts, which is excluded from the estimate costs above.

Also excluded are pelleting and cold storage costs. Growers will need to secure contract pelleting services with established hop producers who offer toll processing services¹². If marketing independently, growers will also need cold storage for their packaged pellets. The Tasman region remains the centre of the New Zealand hops industry: all the pelleting plants in New Zealand are based there. Growers piloting hops in other regions of New Zealand will need to factor in the transport costs associated with getting their dried/baled hops to Tasman for pelleting.

¹⁰ Refers to canopy hectares, i.e. the amount of planted land, excluding additional land needed for access tracks, shelter, buildings etc.

¹¹ This figure has been derived from the Hāpi financial model (with inflationary increase added), and feedback from industry respondents.

¹² For example, Freestyle Hops and Clayton Hops.

THE COST OF SELLING WHAT YOU GROW

Production growth occurs quickly. Growers will get a harvest from new plantings in Year One, and a 100% yield by Year Three. **Sales growth occurs slowly.** Just as growers need quality machinery and processing to ensure they produce high-quality hops, they need quality brand development, sales, marketing and distribution to ensure they can secure and maintain customers.

A 40ha hop garden will produce upwards of 70,000kg of dried hops per season. **Growers scaling up from pilot plots will need to find export markets.**

The cost of selling what you grow will include:

- market access / regulatory costs
- · transport and logistics costs
- · brand development
- sales and marketing
- staff costs

'Rule of thumb' guidance on how much businesses should spend on sales and marketing is between 7 and 10% of gross revenue. Start-ups typically spend more - upwards of 15%.

SOME REALITY CHECKS

"I'll grow a few hops and sell them to a local craft brewer."

One hectare of hop plants will produce (on average) approximately 1,800kg of dried hops / 1,700kg of T-90 pellets, which is considerably more hops than most small New Zealand breweries use in a year. Local breweries normally have excellent domestic suppliers already: New Zealand already produces a superb range of high-quality hops and brewers are not short of choices.

One craft brewer told us, "We're always keen to develop new relationships with hop growers and do pilot brews trialling new hops. But our 700-litre pilot kit only requires 5-10kg of each hop variety per brew. If a new grower comes to us, that will be the size of our first order: 5-10kg. We'd expect to spend two years in the R&D phase before we progress a trial brew to a new product launch. We're able to sell our 700-litre pilot brews on tap, on-site. On average we'd only launch one new product in the six-can format (for retail distribution) per year. The path to scaling up production of a new product takes time. It's challenging for new growers to disrupt the purchasing preferences/supply arrangements we already have."

Another craft brewer told us that he likes to experiment with new hops but prefers to 'watch' all new players in the sector for 1-2 years, until he is sure they can deliver consistent product, of consistent quality. He prefers to let other brewers take the risk of being the first to experiment.

ADVICE ON EXPORTING

Introductory level advice from MBIE

Guidance from MPI

NZTE advice on complying with regulations

NZTE Export Strategy advice

<u>Customs advice for exporters</u>

New growers need to be realistic about how long it could take for a new relationship with a New Zealand craft brewer to evolve into a scaled and secure order for their hops. Brewer respondents recommended that new, small growers should focus initially on building personal relationships with small breweries who will need smaller volumes of hops.

Also, as referenced earlier in this document, craft and micro-breweries are closing in markets around the world, and New Zealand breweries are not exempt from this trend. A useful opinion piece outlining the challenges faced by the New Zealand craft beer industry (August 2023) can be found here. Brewers interviewed indicated that more attrition within the New Zealand craft brewing industry is expected.

Craft breweries that have been established with crowd funding and other investor backing will be under pressure to meet the returns that investors are expecting. When under financial pressure, the question 'what does it cost to make a beer?' can cause tension between brewers and FCOs/investors. Broadly speaking, brewers want to brew beer they want to brew, using the hops they want to use. When the brewing function is cost driven rather than craft driven, it can restrict the ability of the brewer to experiment with multiple hop types.

"Surely local brewers will prefer locally grown hops?"

New Zealand brewers vary enormously in their use of imported hops. Our research found one craft brewer who uses 75% New Zealand hops, and another who imports 70% of their hops from the US (US hops offer brewers distinct flavours, and are especially suited to making hazy beers, for example).

As well as developing their commercial hero product lines using New Zealand hops, domestic brewers will also experiment with New Zealand hops and produce limited run novel brews, (including brews that are marketed on a local 'provenance play'). But it is unrealistic to expect locally grown hops to disrupt and displace the importation of hops into New Zealand. Brewing is an exercise in alchemy: access to a selection of hops from here and abroad gives brewers the variety of ingredients they need to perform their magic.



ESSENTIAL JARGON:

Some hop growers are producers of hops. Some are producers **and** marketers of hops. Most of the members of NZ Hops Ltd (known as 'the Co-op') rely on NZ Hops Ltd to collectively market their hops under the NZ Hops Ltd brand (although some members are also marketers - selling their products direct).

The newer entrants to the New Zealand hops sector, who operate outside of the NZ Hops Ltd framework, are known as 'independents.' Most are hop producers **and** hop marketers. Some independent producers have B2B arrangements with each other, with one company marketing the products produced by another.

MINISTRY APPROVED ORGANISATION (MAO) REGISTER

The MAO Register is part of MPI's plant export assurance system. Becoming certified as an MAO allows an organisation to perform certain phytosanitary activities on behalf of MPI. Different export markets have different phytosanitary certification requirements. For example, to export pellets to the European Union, hop marketers must be MAO registered to provide a Certificate of Equivalence (assurance that pellet products are equivalent to the loose coned hops used in their production). A Certificate of Equivalence is also required for the UK until February 2025.

Independent hop marketers who are not on the MAO register can have their pellets made and exported by a company which is on the MAO register. Only three companies are currently on the MAO register:

- Freestyle Hops
- Clayton Hops
- NZ Hops Ltd.

Information regarding the requirements and obligations of an MAO can be found in the MPI Certification Standard: Organisation Requirements. See here.

Section 1.4 of the certification standard outlines the process for MPI approval of organisations. An organisation must engage the services of an Independent Verification Agency (IVA) to facilitate an effective approval process. IVA contact details are linked here.

Independent Verification Agencies cost recover using an hourly rate. The time and associated cost of the approval process is impacted by the extent and quality of the applicant organisation's existing documents and processes, and the amount of capability and capacity the applicant organisation has in-house to prepare for the registration process. Once approved, organisations are classified for one year as an 'entry-level' organisation. They are subject to a systems audit and six unannounced surveillance audits during the first year. Once they move beyond 'entry-level', they are subject to systems audit and three unannounced surveillance audits per year. All audits are cost-recovered. At the time of writing, approximate costs are in the region of \$1200 per system audit and \$800 per surveillance audit.

MPI require a high level of audit, as the MAO framework amounts to a delegation of MPI's plant assurance functions down to individual organisations. However, MPI remains the accountable agency and must ensure market access isn't put at risk.

Note that the physical requirements of having processing premises meet necessary 'transitional facility' standards have been mentioned as the most significant cost barrier to MAO registration.

AsureQuality is one of MPI's approved Independent Verification Agencies. For information on how they can help hop growers with the MAO process, contact: <a href="https://linear.ncbi.nlm.ncbi.n

THIOL TESTING

Free thiol testing is not mandatory for selling hops and most New Zealand breweries don't expect to see the data. Internationally, expectations are more mixed. Freestyle Hops provide data on thiols as it is a signal of quality for many buyers. Product needs to be sent to France for testing. The testing is done by the hop seller on fully finished product (usually on packaged T-90 pellets). Companies also undertake thiol testing on different material for R&D or process analysis purposes, for internal use.

Path-to-market

Be a Hop Producer

Contract grow / sell your products as an ingredient to an existing New Zealand hop marketer. They will probably aggregate same variety products from multiple hop gardens and sell in market under their own brand.

OR

Establish your own brand. Use contract processing services. Develop a relationship with an independent marketer to provide your sales and marketing functions.

Both options are challenging at the time of writing due to the surplus of hops in the market. For example, NZ Hops Ltd are currently actively encouraging less supply from their existing growers, though their position will change as market conditions improve.

An increased emphasis on quality is also making independent marketers extremely hesitant to commit to marketing/selling anything that they don't know to be high quality, as their reputation for quality is their main driver for business success in today's hyper competitive market.

Be a Hop Producer *and* a Hop Marketer

Establish your own brand. Use contract processing services. Undertake your own sales and marketing functions. Options to sell to:

- Global brokers and distributors
- Global brewers (direct contracts)
- New Zealand brewers.

Companies need to invest significantly in branding and marketing as well as developing and maintaining in-market relationships. Several industry respondents commented that the level of investment required to ensure the ongoing excellent execution of sales and marketing activities is easily underestimated. Historical investment in this area across the sector has been low, but this is changing. Small or new growers looking to scale up will need to allocate realistic levels of resources (time and money) into sales and marketing excellence

The start-up/scale up period is always challenging. If revenue streams are not yet sufficient to allow dedicated staff to be recruited, sales and marketing can become a task that the owner/founder squeezes in amongst the other multiple tasks they juggle. Advice from existing hop growers is to factor in the true cost of an efficient sales and marketing resource in scale-up business plans.

Brewers in our export markets have established relationships with growers / distributors / brokers. For example, although there are over 900 breweries in the US, there are established channels to market based on long-established brokerage and distribution systems. 'Breaking into the market' requires a considerable human resources investment. Building new relationships direct with breweries may not generate a size of order commensurate to the time spent securing it. Many 'direct-to-brewery' orders are less than 100kgs in size.



Case Study: Garston Hops

Garston Hops was established in 2016 by the McNamee family on the family sheep farm in Northern Southland – an hour's drive south of Queenstown.

- In the spring 2016 they planted 50 trial plants (Cascade, Green Bullet, Fuggle and Colegate).
- The 2017 harvest took four days to pick by hand, and reaped 30kg (wet hops).
- From 2017 2020 they invested in a Feasibility Stage.
 They scaled up to 800 plants over this period and developed a relationship with Freestyle Hops (producer and marketer), whose support and input was critical.
- 2021 installed new trellis system and a 5ha hop garden.
- 2022 harvested 5ha, yield was 3.8T of pelletised hops (processed in Tasman).
- In 2023 harvested 10ha and expanded plantings to 15ha, the yield was 8.5T of pelletised hops (processed in Tasman).
- In 2024 production will expand to 23ha of hop garden

- They have plans to scale up to 40ha over five years.
- They're commercially producing six varieties: Nelson Sauvin[™], Motueka[™], Rakau[™], NZ Cascade[™], Riwaka[™], Green Bullet[™], and are now exporting to Australia and the US.

SOME LEARNINGS AND CONSIDERATIONS:

- The hop venture is a diversification activity within an existing multi-generational (4th generation) sheep farm in shared family ownership. James works full-time off farm. Hops are not the family's sole revenue stream. Subdividing some farmland and selling eight residential sections will fund hop expansion beyond 2023.
- They had to install a bore to provide the hops with the 25mm of water they need each week during the growing and dry months of December/January to March.
- In 2023 James employed an experienced hop manager from Slovenia, who is from a 5th generation hop growing family, and provides a vital depth of technical and institutional knowledge.

- The 2022 harvest needed 20 workers for the three week harvest period. The support of extended family and neighbours has been critical.
- They converted a haybarn into a temporary processing shed (with a two-year lifespan). The existing wool-bale serves as a hop baler. Other existing farm machinery was modified where possible. Other equipment and machinery had to be purchased. In 2023 they were awarded the proposal of a \$2.5 million loan from the government's Regional Strategic Partnership Fund, for a purpose-built processing shed and machinery to harvest, dry and press the hops. The processing shed will be built for a capacity of 200ha, hopefully to support other new entrant growers in Southland.
- As well as selling hops domestically and for export,
 Garston Hops have a vision to develop a food and
 beverage tourism path-to-market. They plan to
 establish a cellar door in a historic church the family
 owns on the farm. Using sheep they've grazed in the
 hop garden, they will develop a 'Hoppy Burger.' They
 hope to leverage the visitor market on their doorstep
 (four Great NZ Walks are within a one hour radius.
 Queenstown is one hour away).
- They have invested in technical analysis, so they
 have data showing the difference in oils and other
 compounds in Southland hops, compared to hops
 grown in the Tasman region. This is important validation
 of the regional / terroir story.
- Breaking into the core beer market is hard. Brewers are mainly interested in buying smaller quantities of hops for novel brews. They hope to secure supply contracts for a core commercial brew (longer-term contracts).
- Brewers want to be able to select hops. You need
 the logistics and systems in place to be able to offer
 brewers not just a choice of varieties, but access to
 the same varieties over the course of the harvest (early
 pick versus mid pick versus late pick). Note that flavour
 profiles change daily during the harvest period.
- When you're scaling up in a new region outside of
 Tasman you face extra challenges due to a lack of
 support services, e.g. mechanics with knowledge of hor
 harvest and processing equipment; farm supply shops
 don't carry the supplies you need locally, so it takes
 time and sometimes money to have them transported
 to you (if you're time pressured, you must make a 10
 hour journey to the nearest branch of the farm shop
 that does stock what you need).
- You must be able to wear 20 different hats during the scale-up period as you're a 'Jack-of-All-Trades.' Do not underestimate how hard this is, especially during the period before you can afford to hire staff



- The operation now requires a full-time sales and marketing staff member.
- Scaling up is challenging and capital intensive. You need a good relationship with a good bank, who understands your long-term vision.
- For James and his family, diversification into hops supports their long-term vision for the future of their intergenerational sheep farm.
- Hops and sheep are a perfect pairing for a two-tier farming system. There are excellent synergies between the two land uses
- You must have a passion and a belief in what you're doing.

Processing in the future: Cryogenic lupulin pellets

Cryogenic pellets are also referred to as "enriched" pellets or T-45 Pellets.

T-90 = pellets in which 100kg of whole hops results in 90kg of pelletised hops

T-45 = pellets in which 100kg of whole hops results in 45kg of pelletised hops

Lupulin is a compound in hops which contains hops' sought-after resins (used for bittering) and oils (used for flavour and aromas). Cryogenic pelleting technology separates hop cones into lupulin and plant material (bract) at an extremely low temperature, in a nitrogen-rich and low oxygen environment, which limits oxidisation.

Because of its concentrated resin and oils content, a cryogenic lupulin pellet is up to twice as intense as a standard T-90 pellet. The concentrated product has a reduced footprint compared to T-90 pellets, meaning reduced packaging, shipping and storage costs.

Yakima Chief Hops in the US led the global industry in cryogenic technology and holds registered patents in this area. Other hop growers are now investing in similar technology. In New Zealand, Clayton Hops have invested in the first cryogenic concentrated lupulin pellet processing facility in the Southern Hemisphere, using a

patent pending process, and are offering toll processing services to other growers. Freestyle Hops are actively exploring potential advancements in their processes, including the potential implementation of cryogenic pelleting in New Zealand. At present, Freestyle Hops produces a distinct cryogenic hop extract named 'SubZero Hop Kief,' using an offshore processing partner. NZ Hops Ltd and Hop Revolution produce T-45 pellets using offshore processing partners with cryogenic capabilities.

Onshore investment in pellet technology is an important step change for the New Zealand industry. New technologies will not replace T-90 pellets. Cryogenic technology has existed in the US for many years and demand has levelled out at approximately 20% of total pellet demand¹³. Industry respondents felt it would take many years for New Zealand production of T-45 pellets to reach this anticipated ceiling in demand.

One of the New Zealand craft brewers interviewed confirmed that 30% of the US hops they import are enriched pellets (i.e. T-45s). Although they are approximately double the price of T-90 pellets, they allow for reduced freight costs. Enriched pellets allow brewers to get more flavour /more yield so also offer cost efficiencies during the brewing process.

Varieties

The 2022 Hops Blueprint includes information on the hop plant and hop varietals. Currently, the two most important New Zealand-bred varietals are Nelson Sauvin™ and Motueka™ – which make up almost 50% of New Zealand's production.

NZ Hops Ltd have launched two new varieties (Nectaron® and Superdelic®). The MPI-supported Hāpi breeding programme is due to launch three new varieties over the coming five years. All varieties are competing to remain or become the leaders in the pack, i.e. the hops most preferred by brewers. Note that there is a lag in trends. Hop growers incur significant costs to pull out varieties and replace them, and they must also navigate plant variety rights.

The choice of hops planted during scale-up will be influenced by:

- Plant Variety Rights some hops are non-PVR (free for all to use), while others remain protected and can only be grown under licence.
- Harvest window. The timing of hop harvesting is critical to hop quality. Growers need to include a mix of varieties with early/mid/late harvesting windows, so they can manage available machinery and staff and pick each variety at the optimum time.

- Flavour and aroma mix. What do your target customers want?
- Suitability for growing in your region / hop garden, and yield. Note also that the specific harvest windows of each variety will vary depending on the specific site.

We asked industry respondents for advice for newcomers. They noted that NZ Cascade[™], Motueka[™], Nelson Sauvin[™] and Rakau[™] are a good set of varieties for trial plots, to assess the right harvest windows and character of the key non-PVR varietals. Riwaka[™] is another popular variety that is off-PVR.

Plant and Food Research are undertaking plant breeding programmes for NZ Hops Ltd and Clayton Hops. The future of hop breeding in New Zealand will be industryled. Plant and Food Research are open to working with new hop growers interested in investing in new varieties. There is a minimal viable amount of investment required for an effective breeding programme: science providers can discuss costs directly with interested parties. Breeding is in essence a numbers game; programmes start with



multiple options which are removed one-by-one as the programme evolves, leaving the strongest and best performing. Sensory feedback from brewers means that the market dictates which varieties are commercialised.

Lincoln University runs a Hops Research Programme. Small and new growers can approach Lincoln University and seek their input into agronomics, site selection, varieties, testing, and a range of other matters. Developing hops that are better suited for new growing regions is an area of interest, as the existing commercial varieties have all been bred for the Tasman region. Matching available genetics to the right site will offer new opportunities, e.g. developing varieties with different harvest windows, to suit new regions. Harvest windows are linked to the break of dormancy and flowering times, which are dictated by regional and site-specific weather.

New Zealand has excellent science capabilities in our CRI and university systems. Science and R&D work developed in other horticultural sectors can be deployed to the hops sector when individual companies are ready to partner with science providers.

CULTIVARS

A PVR check on hops cultivars can be made on the New Zealand International Property Office <u>website</u>. In the dropdown menu, select all *Humulus lupulus L*. to get a list of what currently has active PVR protection. PVR rights can expire or can be surrendered. Any of the post 2004 varieties could still be under PVR.

Cultivar name	Year released
Green Bullet™	1972
Sticklebract™	1972
Dr Rudi™	1976
Rakau™	1983
Pacific Gem™	1987
Wakatu™	1988
Pacifica™	1994
NZ Southern Cross™	1994
Motueka TM	1997
Riwaka™	1997
Nelson Sauvin™	2000
Pacific Sunrise™	2000
NZ Pacific Jade™	2004
Wai-iti TM	2011
Kohatu™	2011
Waimea [™]	2012
Moutere TM	2015
Nectaron®	2021
Superdelic [®]	2023

When a hop is protected by Plant Variety Rights, growers pay an annual licence per hectare to grow the variety. The amount varies on the market value of the variety but is typically in the vicinity of \$2-5 thousand per planted hectare per year. Companies who have invested in a plant breeding programme typically enjoy a period of exclusivity – during which only they can access the new variety – before they licence it to other growers.

The new Nectaron® variety is showing promise. In 2021, US brewers ranked Nectaron fifth in a Brewers Association member survey of hops they want more of.¹⁴ Nectaron is a NZ Hops Ltd variety. NZ Hops Ltd's Bract. Brewing Programme is seeking feedback from brewers, which will inform their decisions around new varieties to commercially launch. The Bract Brewing Programme takes trial hops grown by Master Growers in the Tasman region and sends them to sixty different breweries around the world. The experimental hops known as NZH-101, NZH-102, NZH-104, and NZH-105 will be exclusively delivered to these breweries for them to use in single-hopped beers as a trial-by-fire.

WHICH NEW ZEALAND VARIETIES ARE BREWERS IN OUR SMALLER AND EMERGING MARKETS USING?

NZTE undertook a global analysis in 2023. They scanned products from a **sample of 253 breweries across 22 countries**, *excluding* the US, France and UK.¹⁵

They noted the specific hop varieties mentioned in product labelling and marketing. New Zealand hops were mentioned 41 times by brewers in 11 countries. 16% of brewers in the overall sample cohort referenced New Zealand hops.

The most mentions came from Canada and Japan (7), Mexico (6), Argentina (5), Australia and Spain (4), Brazil and Germany (3), and Czech Republic, China and Denmark (1).

Between them, Nelson Sauvin™ and Motueka™ accounted for 82% of all mentions of New Zealand varieties. Riwaka™, Wakatu™, Rakau™ and Waimea™ were the other New Zealand varieties mentioned.

¹⁴ Untapped - industry <u>blog</u>

¹⁵ The research scanned 12 European countries, Ukraine, Russia, Canada, Mexica, Brazil, Argentia, South Africa, China, Japan, and Australia. The data has not been publicly released.



Growing in new regions

Trial plantings have been undertaken in several regions, including Northland, Hawkes Bay, Taranaki, Central Otago and Southland. Taking a longer-term view – beyond the current global surplus – establishing hops as a viable industry in new regions is attractive. It gives the sector increased resilience to climate change and biosecurity events, and it gives buyers an increased range of flavour profiles and aromas to select from.

There appears to be mixed opinions on the concept of *terrior* in hops. James McNamee at Garston Hops is reporting a noticeable flavour difference in hops grown in Southland, compared to the same varieties grown in Tasman. Growers trialling hops in Taranaki are excited to see how the flavours and aromas in their hops perform.

Trials undertaken by Plant and Food Research showed differences in Alpha Acids and harvest windows across trial locations (Clyde, Motueka and Kerikeri). A Plant and Food Research presentation on this research was made to the NZ Agronomy Symposion in 2022, and can be accessed here. Note that Plant and Food Research's work to date should be viewed as indicative data only, and should not be used as a conclusive driver of commercial decisions – more research is required.

Whilst new growing regions create an obvious point of difference, scientists have cautioned against placing too much importance on *terrior* - compared to other factors. There are many influences on the flavour, aroma, and quality of hops. Geography is a comparatively minor influence. The time of harvest is a major influence. If you harvest too early, flavour is weak. If you harvest too late, flavours become undesirable. Post-harvest techniques and processes also impact, e.g. the kilning temperature used. Growers need experienced staff who understand the implications of harvesting and processing techniques on the quality of the final hop product.

Growers scaling up in new regions will take time to build a body of knowledge on how varieties perform in their region. All the 'institutional knowledge' in the hops sector, developed via decades of experience, is based on trends and insights and performance relating to the Tasman region. For example, average yields per hectare for each variety may vary in new growing regions, compared to the yields experienced in the Tasman region.

Growers scaling up in new regions should adequately capture new learnings and knowledge. Don't, by default or unintentionally, allow one skilled member of staff to be the sole repository of learnings as they experiment and evolve the practices and techniques best suited for the new growing region. If they should leave, they will take the knowledge with them.

Climate change considerations

During the 2022 harvest, unfavourable weather conditions hit the world's two largest hop producers (US and Germany) equally hard.

The Pacific Northwest states were the focus of disruption in the US: the coldest and wettest spring in recorded history delayed plant development. Following this, extremely high late sumer temperatures suspended cone ripening. Yields per hectare in the Pacific Northwest were down 12% on 2021. Commentary on this referenced climate change concerns ("Average yield was 1.87mt/ha in the US and only 1.67mt/ha in Germany. The effects of climate change are becoming apparent. The fluctuations in the US are historically unprecedented" 16).

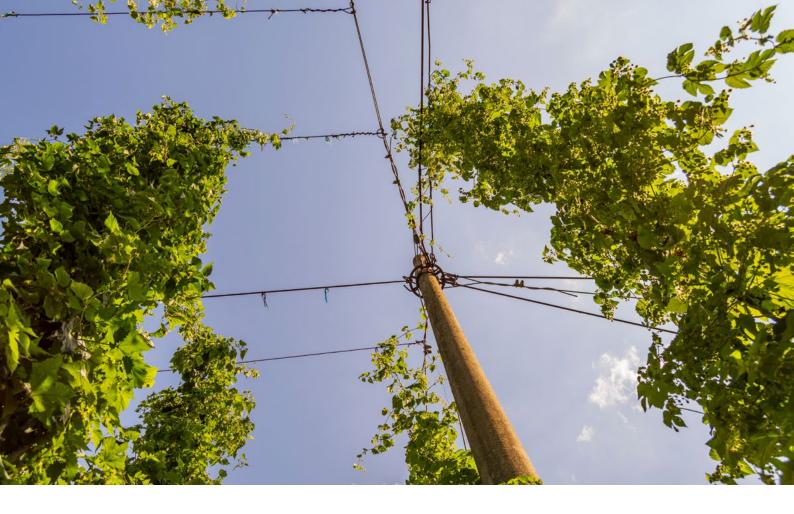
Industry respondents were asked if they're actively planning or implementing actions aimed at increasing their resilience to climate change. Due to the more pressing challenges the industry is facing at the time of writing, the common response could be summed up as, 'not especially.'

General advice for growers looking to scale up includes:

- Don't plant on the flood plain of a river.
- Don't plant in a location where you can't access a sufficient water supply to support irrigation.
- Generally speaking, hops don't mind cold weather, but they don't like extra hot summers.
- Hail and wind remain the biggest unmitigated risk

 there isn't a cost-effective crop insurance option
 for hops.

Our science providers see plant breeding as a key mitigation against climate change. Science capability developed in other sectors can be deployed to the hops sector, but industry will need to partner in the investment required to accelerate this work. Ideally, longer-term strategies to build resilience to climate change would be advanced with pan-sector investment, but this is unlikely given the fragmented nature of the sector.



What are hop buyers looking for?

Hop buyers are influenced by a range of factors:

- Flavour and aroma determined by the variety.
- Flavour and aroma differentiation determined by the specific growing location, and harvesting and processing practices.
- Quality of the hop product, including packaging, including *consistent quality*.
- Ability to select buyers are attracted to opportunities
 to select, with improved traceability to single-garden
 batches with distinguishable provenance and flavour
 and aroma profiles. Put more simply, buyers want to
 work with suppliers who can provide them with what
 they want and need.

- Brewers are always looking for new abilities to create a competitive advantage.
- Opportunities to create novel brews with novel marketing angles and narratives.
- Working with a trusted supplier / knowledge that the supply chain will be secure / working with a supplier with robust systems and processes.
- Value including opportunities to reduce costs along the supply chain.

Sector collaboration

The hops sector does not have a pan-sector industry body. After the former New Zealand Hops Marketing Board was deregulated in the early 2000s, NZ Hops Ltd was formed as a grower owned cooperative.

For over a decade, NZ Hops Ltd represented all hop growers. Now that new companies ('independents') have entered the sector outside of the NZ Hops Ltd framework, this is no longer the case. NZ Hops Ltd operates as a business which is focussed on the interests of its owners. There is some strong collaboration between some of the independent growers in the sector, including contract processing, but overall, collaboration at a pan-sector level is weak.

The industry has expanded quickly over a short period of time. Improved pan-sector collaboration would help to address the following issues:

- Quality control 'brand New Zealand' is impacted by any poor-quality product sent to market.
- Training, and the development of a skills pipeline to support the sector.
- · Pan-sector data capture and sharing.
- Development of a 'one-stop shop' for resources and information.
- Encouraging more pan-sector discussion and debate on those issues that could be addressed more effectively, collectively, e.g. a mid to long-term plan to respond to climate change.



Brewers doing crafty things

There are hundreds of brewers across New Zealand making superb novel brews. Hop growers looking to scale up will already be building relationships with them. Here are just two examples.

THE FLAVOURTORIUM NANO BREWERY

The Flavourtorium is the work of Eelco Boswijk from The Free House, a renowned pub in Nelson.

Made in Slovenia, the nano-brewery is the first of its kind in New Zealand. The fermenters are 500L capacity and are unitanks – so the team can ferment and condition the beer in the same tank. There are six of them in the nano-brewery, which is housed in a shipping container adjacent to the pub.

The first brew was put down in 2021. Since then, experimental brews are produced at an average rate of one a week and are sold on-tap in The Free House. This model allows local hop growers in Tasman to provide uberfresh hops and get prompt sensory feedback from Eelco's discerning customers. The nano-brewery also allows local hop growers to put a very local beer in the hands of visiting overseas brewers, providing growers and buyers with an opportunity to see how specifically selected hops have behaved.

Eelco describes the outputs of his nano-brewery as a mixture of styles, oddities and dreams. One in four of the beers he sells in The Free House are now made on site, and he hopes to move to one in three. He's keen to work with hops produced in other regions of New Zealand and invites growers to get in touch.

MCLEODS BREWERY

Situated in Waipu, Northland, McLeods Brewery was established in 2014 and are on a ten-year journey to become "an overnight success." They release seasonal innovative beers (in can and keg format), as well as a monthly 'unfiltered and unapologetic' IPA release. Each brew uses the same base beer and showcases different hops. With over 55 releases in the series, it has secured something of a cult following, allowing beer fans to compare the sensory experience of each unique featured hop mix.

McLeods Brewery

CONNECTING WITH BREWERS

Hop growers can expand their networks at the annual **BREWNZ event**, organised by the New Zealand brewers' guild.

Information on BREWNZ as well as their beer tourism initiative, the **NZ Ale Trail**, can be found on their website.

Appendix: Summary of NZTE 2023 research¹⁷

Country ranked by number of breweries	# of Breweries	Market size -hops by volume (2022) (Tonnes)	Number of new products launched containing hops 2020 - 2022	Top beer style	Tariff for Hop Cones (Fresh or Dried) Exported from NZ	Tariff for Hop Cones (Ground, Powdered or in the Form of Pellets; Lupulin) Exported from NZ
United States	8,833	10729	165	IPA	1.2%	1.0%
Germany	2,486	5316.5	322	Helles / Dortmunder Export	5.8%	5.8%
United Kingdom	1,826	2159.9	496	Blonde Ale / Golden Ale	4.0%	4.0%
Italy	1,745	898.4	344	IPA	5.8%	5.8%
France	1,643	1381.5	1150	IPA	5.8%	5.8%
Canada	1,511	898.1	196	IPA	0.0%	0.0%
Spain	1,193	1419.2	249	IPA	5.8%	5.8%
Netherlands	974	540.9	314	Stout - Imperial	5.8%	5.8%
Belgium	924	227.3	104	Belgian Ale - Pale / Golden / Single	5.8%	5.8%
Brazil	871	2221.1	846	IPA	8.0%	8.0%
Australia	843	390.1	84	IPA	0.0%	0.0%
Czech Republic	698	540.1	127	Pilsener - Bohemian / Czech	5.8%	5.8%
Mexico	684	699	130	IPA	0.0%	0.0%
Switzerland	658	184.2	150	IPA	0.0%	0.0%
Russia	616	#N/A	#N/A	Pale Lager - American	#N/A	#N/A
Poland	600	1252.3	299	IPA	5.8%	5.8%
Sweden	547	313	178	IPA	5.8%	5.8%
Japan	530	1892.8	366	IPA	0.0%	0.0%
Austria	377	328.6	79	Zwickelbier / Kellerbier / Landbier	5.8%	5.8%
Denmark	356	128.6	206	IPA	5.8%	5.8%
Argentina	345	702.7	268	IPA	8.0%	8.0%
Ukraine	289	447.6	29	Pale Lager - American	20.0%	20.0%
China	257	21794.9	325	Pale Lager - American	0.0%	0.0%
Norway	241	70.7	163	Pale Ale - American (APA)	0.0%	4.5%
South Africa	232	1173.8	71	IPA	0.0%	0.0%

ABOUT TE PUNA UMANGA VENTURE TARANAKI

Te Puna Umanga Venture Taranaki is a catalyst for future prosperity in Taranaki with strategic focus areas in energy transition, food and fibre, destination development and visitor futures, and hi tech innovation. Venture Taranaki (VT) seeks to inspire and nurture growth, connect communities, empower individuals, and ignite innovation to sustain and stabilise through lasting development, investment, and opportunity for our region. VT is a Council Controlled Organisation of the New Plymouth District Council, is governed by an independent Board of Trustees, and guided by Te Tiriti o Waitangi.

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