Notes of Zoom meeting with Zan Hanley (GM Science, New Cultivar Innovation), Plant & Food
9 September 2020

NZPC: Geoff Lewis, Jo Smith

GL – intros

ZH – breeding programme – I'm the GM for new cultivar innovation. Primarily pipfruit (mostly apples) and kiwifruit. These offer the most opportunities for the scientists – to provide things the industry wants, and things we think they need.

Increasingly trying to arrange ourselves according to the Zespri way of working – which is a highly successful way of working. Both in terms of revenue generation and how it is applied (just over [redacted] earmarked for research [CHECK WHICH REVENUE STREAM THIS REFERS TO]). This virtuous cycle is really quite appealing and places us immediately in a very good place in terms of that ecosystem – industry can articulate its needs and we're well equipped to anticipate them (so can serve them either ahead of their own ideas or in response to them).

Zespri model has evolved over time – currently very close strategic relationship – set of structured operational meetings as well as cycle of strategic interactions. Have an annual contractual moment.

We're trying to extrapolate that model out to other crops– identify the successful elements of the relationship and map them out eg, with T&G on blueberries. Shift the focus from "can you solve our immediate problem right now" – to more of a strategic relationship about what's useful to do and looking 5 years ahead. That's difficult with some sectors, because immediate needs are pressing eg, immediate labour or disease problem. Can't turn their attention towards – what will the consumer be like or what pests might be a problem in 10 years' time?

JS – Zespri sophistication comes through their strong customer focus?

ZH – it does – though some things we think of first! What they can bring is supply chain and consumer insights. We're trying to prioritise consumer needs cf grower needs. Grower needs are something you solve on the way but it's no point having it good for growers if it's no good for consumers. "Putting consumers first has become a little bit of a mantra".

It can take 10 years to breed something – so need to think about what consumers will want in 10 years or what are the enduring gaps in the market. Turn these into science targets.

JS – work on extending picking season?

ZH – 2 ways we think about this. [redacted] Though it's always a high-level aim in our breeding programme – to target 12 months' supply of fruit.

Second is using other ways [redacted]

[redacted]

Looking at CRISPR – gene editing technology, in containment facilities. Zespri doesn't fund this this kind of stuff. Funded entirely by Plant & Food. We've produced a fast-flowering kiwifruit shrub – flowers and

fruits continuously. Takes 2-3 years to establish itself and produce fruit. Growing it in a contained environment. Though we can't taste them because they're genetically modified.

JS – regulatory settings/constraints?

ZH – definitely in terms of NZ vs rest of the world. Understand the need for compliance, though it creates a certain burden and occupies time. But this is irrelevant – more important aspect is competitive aspect – re non-traditional technologies, all our strategic partners are clear we want to see consumer acceptance in-market before we take anything forward. Bit of chicken and egg in terms of how create this acceptance – as consumers would need to see something happen but we have to wait for someone else to go first.

In terms of where we see it playing out, eg, in terms of gene editing, there has been some attempt to start a public discussion by the Royal Society. As traditional genetic modification, it is regulated differently in different jurisdictions. We're watching to see how that goes. But the day consumer acceptance appears, you need to move quite fast, and most other countries have a regulatory regime that enables them to move further and faster than New Zealand.

We would need a more agile system to be able to respond. "Our starting block is a little behind the line, but the race hasn't started".

GL – so a potential loss of competitive advantage?

ZH – At the moment, there is no actual loss of competitive advantage. We're doing the work here but we would need the ability to scale up if things change. The ability to scale isn't here.

GL – read P&F's policy on GM on your website – read between the lines: you're in favour of some liberalisation.

ZH – in these conversations, we always stand alongside our strategic partners, who are more cautious than us.

GL – you're doing the work in containment

ZH – yes but it's contained and constrained – in terms of available space and funding.

It's a global discussion but it very quickly becomes a local one. Because if you want a more assured basis to be ready to grab opportunities, might want more ability to do field trials – becomes a question of where (in my backyard?), who's it next to, how do they feel about it? A complicated dialogue – not just about coming up with an outcomes-based regulatory regime cf a methods-based one. Many moving pieces, and soft and fuzzy views in the mix.

GL – we might be able to raise it as an issue. Other countries with more permissive, safe gene editing reg regimes?

ZH – they're all looking to find a safe one, by their own definition. Australians are struggling with it, and they're usually a good one to watch. Australia, Netherlands, Canada are all useful to look at.

Other regulatory constraints:

- Pests and diseases – it's impossible to do some work on future pests if we can't work on the pests. There are limited facilities for that kind of work – an infrastructural gap. A small facility in Mt Albert and not much else. So not putting as much into our "insurance policy" as we could be.

- Similarly quarantine for bringing in new plant material, getting stuff over the border. Pretty constrained space for certified facilities to do the testing, and it can take a long time (eg, 12-18 months to grow and check for diseases and viruses and the like) – so long queues. MPI oversee the regime. We used to have a facility on-site, but it was decommissioned. So, there's a big

responsibility on us to protect what we've got – if you can't top up your collection, it only ever gets smaller (stuff dies).

JS – skills?

ZH – often recruit foreigners. Sometimes this is because of expertise, but in some cases talent should be available locally but isn't - a small local pool. What the unis provide fits a lot of things but some gaps eg, programmers with broad skills including plant science. Need a particular mix of skills to a professional level – quite tricky to recruit. We want deep skills – which means always looking in an international talent pool. Plant breeders have deep expertise and we often have to recruit them offshore.

There is some professional development – Massey was running a course for plant breeders.

But we are looking for people who are cutting edge, with time served.

GL – what sort of degrees?

ZH – biochemistry, molecular biology – we need degrees that feed into plant science. Uni courses tend to leave out detailed content on plants (focus on human and animal biology).

The old disciplines and their silos persist in the unis. Need a new mix of disciplines to be a scientist now – need to be a data scientist as well, and need commercial and business skills. Need to be agile as industry continually rewrites itself.

GL – uni system supplying enough science grads?

ZH – it doesn't quite match it, can be a struggle to find people. We're usually looking for experienced people, but we also do summer internships and support PhDs – so we're building capability and invest a lot in this, and we're interested in doing more. But this won't solve the problem I've identified.

Cultural competency is another issue – missing from a lot of people; immigrants with no te reo or understanding of how NZ works, missing in some locals too.

GL – anything else?

ZH – post-docs are a missing piece, because Kiwis leave after they finish their degree to go overseas and maybe come back when they're older – so there's a gap in the career system for research scientists. Get post-docs emerging from the system and not seeing a lot of opportunity here, so they head overseas. It would be good to cultivate homegrown talent all the way through. It's a "thin part of the pipe".

My pet peeves with the ecosystem… it's hard to get Endeavour Funding. Takes a lot of effort for a low success rate. "It takes a lot in order to get a no". "Navigating vastly complicated application process" – takes scientists away from the bench, not a good use of their time.

There's some mission-led funding mostly works well, co-funded with industry – makes sure results get out to benefit all of NZ.

We're not entitled to the R&D tax credit. The system is not necessarily easy – puts the partner in the driving seat (tricky contractual palaver) but it has had a positive effect on some of our partners' innovation.

Skills pipeline - lack of coordination across unis and CRIs post-education. Quite hard to be an indiv in the system.

Tech transfer – Zespri is really good at it. They use us to interact directly with growers – they look at different channels and formats (videos, orchard visits…). Other industries struggle with that – they should try to copy the Zespri model.

GL – influence of single desk?

ZH – Zespri's single desk model gives them security which enables them to think on a 20-year timeframe – there are clear benefits to this. Other industries and firms ([redacted]) recognize this kind of privilege isn't going to be available to them, but are trying to emulate the approach of consumer-led, invest early, differentiate on premium and NZ image, as opposed to trying to just capture a slice of the market.