

Thriving Southland [00:00:04]:

Catchment Convoos with Thriving Southland. You're linked to Southland catchment groups and their impactful projects. Each episode, we'll dive into grass effort by local farmers and communities that are driving change and sustainability in our regions. Listen in for inspiring stories and insight. Real people, real change, the Southland way.

Rachael Halder [00:00:58]:

Welcome back to another episode. Today, we're diving into the world of precision fermentation, a technology with the potential to reshape how we think about alternative proteins, especially here in New Zealand. The paper we'll be discussing today offers a high level overview of precision fermentation, covering the fundamentals, insights from stakeholders and pointing to further resources. It's designed to spark thought and conversation, helping you form your own perspective on this emerging technology. Global investment in precision fermentation is on the rise and while it presents exciting opportunity it also brings significant challenges particularly for sectors like dairy which could face disruption sooner than others. To explore these key topics we've invited 2 fantastic guests with us on this episode. We're joined by Anna Crosbie from Lodestone New Zealand Limited. Anna brings over 30 years of experience across the UK and New Zealand, specializing in urban regeneration, sector innovation and regional economic development. She's worked on partnership projects that create lasting commercial and community benefits in collaboration with industry, iwi, and government. Anna's knowledge in precision fermentation stems from her research and writing of this resource paper that we'll be unpacking today. Joining Anna today is Sandra King, Thriving Southland's very own project manager. Sandra has played a key role in developing this discussion paper and helping Southland farmers start to navigate the potential impacts of precision fermentation through this initiative funded by MBIE's Southland Just Transition Program.

Rachael Halder [00:02:06]:

Together, they'll help us break down what precision fermentation could mean for our local farming systems, the opportunities it presents, and the potential hurdles we'll need to overcome. Welcome to the show, Sandra and Anna. It's awesome to have you here. Our new, new podcast guests. How are you going?

Sandra King [00:02:23]:

Good. Thanks. Thanks for having us.

Anna Crosbie [00:02:25]:

Yes. Nice to be here, Rachael. Really pleased that you've invited us along. Thanks.

Rachael Halder [00:02:29]:

Oh, it's cool. Big topic today. So lots to cover. So I was thinking, Sandra, could you sort of start us off and give us a little bit of context? And what is the Southland Food and Fibre Project and how and why is Thriving Southland involved?

Sandra King [00:02:44]:

So from the work that we do at Thriving Southland, we get asked to support and help out other projects and Southland Food and Fibre was one of those projects. So you'll probably remember a while ago now, Tiwai or New Zealand Aluminum Smelters, they talked about that they might not be around in Southland. And so to support that, the Ministry of Business Innovation and Employment, and let's just call them MBIE from here on in, They actually fund that the Southland just transition program, which was a way to sort of look at the opportunities that our region could invest in different things to fill that gap with Tiwai leaving. So thriving Southland was tasked with leading the land use work stream within that program. So that was to explore opportunities within the food and fibre sector. You know, could we enhance what we're already doing? Could we look at new products and services? Just finding ways that we could boost resilience both business wise and environmentally. So we started with a sort of brain power session, and we went out and got farmers, iwi, researchers, just different people in the room to sort of think what's going on out there.

Sandra King [00:03:49]:

What sort of things should we look at? And from that session, we got some sort of potential focus areas, and that's when we got Anna to join us. We're really lucky there was someone within that sort of brainpower session who said, I know who you should talk to. And that was Anna, which was amazing. So then Anna started to take those sort of ideas and start progressing this project, Southland Food and Fibre. So we wanted to support land owners with their decision making. So sort of by developing some robust information resources that they could use so they would be shared freely these resources, They would almost sort of cover that early stage of due diligence for any sort of new opportunities to help out that way. So we then took those ideas and started doing a series of engagement. So that was online engagement and workshops just to get feedback and input.

Sandra King [00:04:43]:

And then we further refined that and went to an advisory group, and they came back with 7 key focus areas. And so we wanted to produce these blueprints or guides that would be this useful resource for farmers and landowners and even potential investors. So the precision fermentation document is the first one of these focus areas that we're looking at, under the Food and Fibre Project. So this one is a discussion document more than a blueprint. We just want people to be aware of this. We're not advocating one way or the other. We just want people to actually start thinking about it, start talking about it. So neither thriving Southland or Anna, we're not claiming to be experts in this.

Sandra King [00:05:25]:

We just wanted to bring all the information that's already out there and has spoken to different stakeholders as well and kinda bring all that together into one document so that it's actually there and starts that discussion and thinking about it because it's quite a big topic. But definitely, Anna will cover. She's done a great job

Rachael Halder [00:05:42]:

of putting this document together for us. It was a really big piece of work, and it was a really cool to see how much engagement we did get from the community when we put out that sort of online survey, and we had those groups coming through. So people are asking the questions, and I think yeah. Thanks, Sandra. That summarized it really good, and it's a big piece of work. And, you know, this podcast is only just gonna kinda lightly touch on it. But, hey, so with that, Anna, you got the the honor of delving into this big topic and starting the research. So I guess, shall we shall we start real high level? And for those people who maybe haven't had a chance to read the discussion paper yet, Can you sort of give us a high level idea as to what is precision fermentation?

Anna Crosbie [00:06:24]:

I certainly can and and thank you Sandra for just reiterating that I'm by no means an expert, I'm not a scientist. So it was a really interesting process in terms of I thought I knew what it was and I'd heard about it and knew a little bit about it. And it was interesting just to go through that process of trying to really understand it and hence this this resource, this sort of safe neutral resource as a space where people can come and try and get their heads around what is it and what might it mean. So what is precision fermentation? The \$1,000,000 question. So it's one method of making alternative proteins. So for listeners who again, alternative proteins is another phrase that's hackneyed around, isn't it? So an alternative protein, it's the name given to a product that's brought to market, brought to us consumers, which is an alternative to an animal sourced protein. So that's what an alternative protein are, and there are 3 main ways that we create alternative proteins and precision fermentation is one of them. So the other two ways that listeners might have heard of is plant based protein, which is where we extract protein from a plant or a legume or a grain that we grow and we use that an animal free product.

Anna Crosbie [00:07:35]:

Another example is the cell cultured protein. That's the other method where cells are extracted from actual animals. So actual animals, muscles or fat cells, and they are grown in a lab. So that's also called lab based meat, which listeners have probably heard that phrase. So those are the 2 other methods, and then precision fermentation is the third method of making these alternative proteins. So precision fermentation, as the name suggests, it uses a host microorganism, which is commonly a bacteria or a fungi, and that host microorganism is grown in a controlled environment in a special tank called a bioreactor. And these microorganisms, they use a sugar based feedstock and they grow like wildfire. And that process is called the precision fermentation.

Anna Crosbie [00:08:26]:

So the interesting thing about precision fermentation, I have, I guess, become slightly geeky about the whole topic after doing this work, it just creates a single ingredient. So the precision fermentation process is selected to either produce a protein or an enzyme or a flavor molecule or a vitamin or a pigment or a fat. In the case of the dairy industry, it's being used to create proteins such as whey. So it just produces one single protein. That's an important point. And the other important point about precision fermentation, which is why it's a bit polarizing, I think, for some people, is it does use bioengineering techniques. And different countries have different regulatory settings around that in terms of the phrase genetic modifications. If I just take a quick minute to try and get our heads around the actual process.

Anna Crosbie [00:09:19]:

So scientists, and you do need deep expertise to do this process, they take a DNA sequence, which you can get from DNA sequences online. So the DNA genomes, us clever humans, we've cracked these DNA genomes for cows and all sorts of other living things. And you can just you can just access the DNA code. You don't need an actual cow to get the DNA from. So that's the important point. You can get a cow DNA code from a global database that is free to access. You take that DNA code, and this is where the bioengineering happens, you insert the DNA code into the microorganism. And because microorganisms are clever, there's a naturally, there's a natural process called DNA repair and it can tell that something's been inserted and it repairs itself and adapts and adopts the new DNA sequence.

Anna Crosbie [00:10:15]:

So you've got an engineered host, which is the bacteria or the fungi, and it grows whatever you've told it to grow. And then that single ingredient, whether it's a flavor molecule or a protein or a fat, is extracted from the host and used singularly. So the host has been genetically modified, but the thing you're using the host to grow is the exact same as the DNA from the the cow or whatever it is you've got the DNA from. So the actual protein, if you're, for example, creating whey protein from a piece of cow DNA, that is exactly the same. And the genetically modified host is used to grow it and then it's discarded. Wow. So that's that's the sort of the clever bits and the cleverness of of DNA, which of course is the, you know, the universal language of life.

Rachael Halder [00:11:10]:

Yeah. Hugely complicated stuff and amazing that you've just been out to pick this up, Anna. And, you know, I guess you like you said, you've been out of nerd out a little bit on it. So

Anna Crosbie [00:11:19]:

it took a little time to get my head around it. But I think that's the that's the value of having these resources for farmers in Land owners and others just to understand exactly what it is.

Rachael Halder [00:11:30]:

Just so just to help us sort of maybe ground what you're talking a little bit because, you know, like I think I'm following along. It makes logical sense, and I've already had the pleasure of reading the paper. So, can you maybe just give us a couple of examples as to, like, how is precision fermentation currently being used already?

Anna Crosbie [00:11:47]:

Of course. And and what I should say first up is it's it's not new. It's not a new technology. So, rennet, which is used in the cheese making process, about 80% of global supply for some time has been created using precision fermentation. Precision fermentation has been used for decades to create insulin. It's been used for decades to create things like vanilla essence, b 2 and b 12 vitamins, and it's been used for decades to make all sorts of different enzymes for food manufacturing. So it's not it's not new, so it's quite proven as a technology. What's new for for us here in Southland and indeed, New Zealand is sort of in the last decade, it's become a really popular way to create alternative proteins as as we've mentioned.

Anna Crosbie [00:12:36]:

So, one of the early companies is called Perfect Day, and they're based in the US. And about 8 years ago, I think it was now, they they were an early startup. So they are producing whey protein using precision fermentation, and they are disrupting the the global whey protein market by supplying an ingredient, an alternative protein ingredient to other businesses. So they don't create their own brands. They're working with companies like Nestle and Starbucks and others to say, if you're making a Kit Kat bar or a manufactured food product, we can provide the whey protein ingredient. So that's where it's it's being used. It's being used, around the world. It's being used to create meat and dairy fats without the animal.

Anna Crosbie [00:13:22]:

So it's it's, yeah, it's really interesting to see the breadth of the different types of food manufacturing products. So the other important thing to, stress, Rachael, is if we focus on dairy, it's not going to disrupt the bottle of milk that we go to buy in the supermarket. It's producing dairy ingredient products such as as whey powder, for example.

Rachael Halder [00:13:43]:

Which is, you know, where a lot of our income is derived from, I guess, is being able to have those high fat protein components in our milk. So does, is that, you know, sort of maybe why it should matter? Why is that why we're discussing it?

Anna Crosbie [00:13:57]:

Yes, I think so. And certainly for me, the more I delved into the research doing this work with Sandra, that the more I thought, gosh, yes, this is a discussion we need to have. I personally don't think that precision fermentation is suddenly going to kick off at a massive rate here in New Zealand. We're not suddenly going to have a plethora of different companies investing in precision fermentation technology here, but it is being invested in overseas and it is happening overseas. So as a dairy country, you know, why does it matter? We all know the importance of dairy to our economy. We know the importance of dairy to the Southland region. I think it's 1 in 4 of every dollar of New Zealand's foreign exchange receipts is related to the dairy industry, 35% of exports. And I think it's 26,000,000,000 that the dairy export is worth to New Zealand.

Anna Crosbie [00:14:47]:

So it's a really important sector. And the fact that it's widely accepted that the dairy ingredient market, again, not whole milk, the dairy ingredient market is the most vulnerable sector to precision fermentation because of the ability to create these whey proteins. And that's because milk is a homogeneous product. So when you have milk, it's always I think it's 13% solids. And of those solids, I've written it down here, 20% of the solids in milk is always whey. So if you were a scientist in your precision fermentation lab and looking to commercialize a product, you can replicate milk and its constituent parts really easily and disrupt it. So that's one reason why it's important. We are a food producing nation and a food exporting nation, so we just need to stay in the game and stay in the conversation and keep on top of what's happening globally and keep up in terms of our knowledge and capability.

Anna Crosbie [00:15:53]:

You know, we are world leading and world renowned in terms of our expertise when it comes to growing great food and making great food products. We have a fantastic reputation, so we need to keep that up and stay in the game if there's disruption happening. The other question is, which came up a lot in the research I did, is how it's not going to necessarily be an either or. So we'll always have a dairy sector, I imagine, but how can our dairy sector continue to flourish whilst precision fermentation also happens? So it's a it's the and, and cliché, isn't it? So how will we differentiate New Zealand milk and New Zealand milk products from lab produced substitutes that are being manufactured overseas? So I think that's the really key question for us. How will we differentiate our product in these global markets? And as well, very quickly, why discuss it and why does it matter? There's also opportunities for us. So we have, again, world leading expertise in engineering, stainless steel engineering, process engineering, you know, all sorts of things related to our our vast and deep dairy industry. So is there an opportunity for us to tap into some aspect of the global precision fermentation journey? And for example, I live up here in rural Tasman and I know there's a local engineering company here is currently investing in stainless steel, in the stainless steel engineering space. Can they figure out how to make bioreactors for use in precision fermentation? So as well as making stainless steel tanks for the dairy industry or the viticulture sector, can we become a global leader in that sort of expertise? So there's, there's pockets of opportunity.

Anna Crosbie [00:17:38]:

The other one, Sandra and I've certainly talked about quite a bit is we have masses, you know, I don't know the number off the top of my head, but the amount of biomass, bio waste in New Zealand is phenomenal. Can we identify other biomass energy sources for the precision fermentation process. So I mentioned that it's, it uses bacteria and fungi and they need feeding and at the moment precision fermentation requires huge amounts of sugar as the the food stock for the precision fermentation. So could we crack the use of some sort of bio waste that we have a lot of and create some other sort of food stock? Because as precision fermentation grows, so will the need for some sort of sugar or other biomass to feed these little cells. So it shouldn't be seen as a big, scary, disruptive thing. There's also opportunities and I think that's why we just need to keep discussing it.

Rachael Halder [00:18:34]:

Yeah. And as you sort of mentioned earlier, you know, the likes of insulin and that has just been such a big game changer in the world of medicine long ago. And you know that to think about that has precision fermentation. Yes. Is kind of a good way to be like, oh, wow, it's actually has been here a long time, but now it's being implemented in such a different way. And I don't know about you, Sandra, but, yeah, it is. It's interesting to hear your thoughts Anna already on it. And I guess we we've seen the likes of Fonterra has already invested in it, haven't they? As they want to be a part of the conversation and the importance of knowledge is power, right? In this instance.

Rachael Halder [00:19:11]:

And if you don't know anything about it, you know, how are you supposed to see those opportunities that could come through? Absolutely. Sandra, did you have any comments after Anna's sort of explanation there?

Sandra King [00:19:22]:

No, it's great. And I think it's really it's great how Anna's pointed out that it's not going to be, it's not scary, but the more you know about it, the better. And yes, great knowledge. Yeah.

Rachael Halder [00:19:31]:

And so when people were, when we were looking at this project at the start, was precision fermentation obviously came to the top of the pile in some of the minds of farmers that you'd asked?

Sandra King [00:19:39]:

It wasn't in the first round of feedback. It sort of come through a bit further down the track with the workshops and then the advisory group. So it wasn't, didn't sort of come through in the online engagement that come through more when we got face to face.

Rachael Halder [00:19:56]:

Wow. Interesting.

Sandra King [00:19:56]:

Yeah.

Rachael Halder [00:19:57]:

And so I guess, and then the next sort of thing talking about it is during this discussion paper, you went out and you got advice from sort of, well, not advice. I get you. You talked to stakeholders sitting around precision fermentation. Can you sort of little, maybe just tell us a little bit about who you talked to or, you know, what they said, common themes, that sort of stuff.

Anna Crosbie [00:20:19]:

Absolutely. And I'll start with Fonterra because they are the obvious place to start, aren't they? And it was, look, it was really great, had great collaboration with Fonterra. They have a chief science and technology officer, Jeremy Hill, and he contributed freely his time, which was excellent. And as you mentioned, so Fonterra, they're in the tent. And Jeremy confirmed that they remain deeply committed and will remain deeply engaged with the technology of precision fermentation. And they are involved in a startup venture in the Netherlands and the business collaboration. And they've also been reactive in the research space in terms of their their staff capability and increasing their knowledge of of what it is and what does it mean. I mean, Fonterra are also very clear that they they don't necessarily think precision fermentation will disrupt the dairy industry at the pace and scale that some other people believe it might.

Anna Crosbie [00:21:10]:

So they certainly think it's going to be that end to end play of, look, the dairy industry will continue, and we just need to figure out where we're going to sit in relation to precision fermentation. They were also clear to, you know, we don't want to go off startling the horses, but they want us to make it clear that it's it's not necessarily going to touch that whole milk, bottle of milk in the shop. And as we've said already, it's about the dairy ingredient industry. So, yeah, look, I think it's fantastic for New Zealand that Fonterra have invested time and money and expertise and that they are inside the tent. And, you know, they'll be leading the sector in terms of that that knowledge, I should imagine. In contrast, we also talked with, Daisy Lab, who are our first new little precision fermentation startup. And really exciting to see the journey that Daisy Lab have have taken in recent years. So they're still in the pre commercial stage.

Anna Crosbie [00:22:05]:

They are still going through that deep technology journey of learnings and getting the necessary expertise, but they are looking, yeah, to to become a a producer of alternative proteins here in New Zealand. So doctor Nikki Freed, who's one of their cofounders, she contributed to our paper. She noted that New Zealand is, in her opinion, particularly exposed to disruption because we're so heavily reliant on products that have the most potential to be disrupted by precision fermentation because they can be easily made. So it's that milk powder, dairy protein powders, and they're sold globally, of course, as a bulk commodity. So it's harder to differentiate a bulk commodity. If you're a consumer buying, I'm just going to think of something random, the KitKat bar, and the KitKat bar has a dairy ingredient product in its recipe, we don't really care or know if that dairy protein has come from a cow or precision fermentation or from New Zealand or elsewhere. It's it's a hidden, hidden ingredient. So that means they are particularly susceptible to commercial disruption.

Anna Crosbie [00:23:15]:

We spoke to, Anna Benny, who is a neighbor, lives in Otago down there close to you guys. She is a food technologist and dairy farmer, and she's been very vocal, on this topic for some years now and very keen to start or to encourage a deeper and wider conversation about this. And because she is a dairy farmer, she brought that really interesting interesting perspective of what does it mean for the dairy farmer? How do you go about preparing for this? And what do you need to know? So, if people I know Sandra is going to talk later about access to the document. There's there's some detailed input from a range of stakeholders that I won't go through the details here in any more brief, but a nice variety of perspectives was what we were aiming to get.

Rachael Halder [00:23:59]:

And that I think even you've mentioned a couple of times, there is a lot of information out there. And I guess for a lot of people, maybe listening precision fermentation, isn't a new, a new thing that they're learning. And you've mentioned, you know, these people have been in the game for a long time and I'm not a 100% sure, but Fonterra's investment in precision fermentation was made long ago, not just recently. So I think that said, it's just coming to the forefront now as we talk about feeding the world and how is all of this food going to be produced. And so all of these lab based proteins are starting to be commercialized, which is the new part, right?

Anna Crosbie [00:24:39]:

Yes. Yeah. A lot of those startups have gone through that that deep learning and that difficult iterative, you know, innovative stage, and there are now more products on the shelves. So it's getting more visibility. I think also globally, if we sort of step up and take that higher macro look, you know, there's a lot more happening around the globe to do with food security. We've got governments investing heavily in precision fermentation facilities. United Arab Emirates, Singapore, the Netherlands have some examples that come to mind. So governments are seeing precision fermentation as a solution to their own country's food security strategic goals.

Anna Crosbie [00:25:18]:

So I think that's something that will probably continue to happen. I think the other thing that's happened in recent years is the the carbon and environmental slash sustainability accounting that's required of food producers. Those demands have ramped up. And in Europe, we've got the thing called scope 3 emissions, which is where companies have to account for their supply chain. So a a global company of the scale of one such as Nestle, if they can use a precision fermentation whey protein, for example, and it has minimal carbon environmental sustainable accounting that it has to accommodate, it's hugely attractive to companies when they're under the scope 3 reporting regulatory requirement. So there's a couple of those global macro things that are I think will continue to make precision fermentation appealing to food producing companies who are looking for ingredients.

Rachael Halder [00:26:17]:

But again, it also comes with that pro con that growing that amount of feedstock for precision fermentation to scale up is probably its biggest hurdle?

Anna Crosbie [00:26:28]:

Yes. And I think the the cost, I mean, it's it's very easy in my in my naive, I'm sure the scientist was listening early to me explaining precision fermentation, they may have thrown their hands up in the air. It's very easy to to hear my, earlier summary of what precision fermentation is and think you can do it, you know, in the the lab in the back of the yard kind of thing. It it's very, very expensive. So a commercial facility, really, it's in the the realms of, you know, 200 to 600,000,000 New Zealand dollars, for for example, is is one example. Wow. It takes several years to go through that R&D journey in terms of knowing what you want to produce and how the microorganisms you choose and in your bioreactor and using your feedstock and your temperature. You know, the existing companies aren't going to give away their commercial IP in terms of knowing the sweet spot.

Anna Crosbie [00:27:20]:

So you've got to find all that out yourself. So it takes time. So companies like Fonterra and, and some others in New Zealand who have been involved in some of the research that the report outlines do think that that scale up is going to take time. And the magic genie in the bottle or the crystal ball gazing bit is we just don't know what that time's going to be. Some forecast scenarios say, look, protein produced by precision fermentation might reach price parity with dairy ingredients by next year or 2030. We don't know. But that's when it reaches that price parity with dairy, that's when the disruption curve will really tick up. Mhmm.

Rachael Halder [00:28:00]:

Which, like you said, is a little bit of that crystal ball, isn't it? There's a lot . . .

Anna Crosbie [00:28:03]:

Yeah. Totally.

Rachael Halder [00:28:04]:

. . . lot of variables at play here. So I guess you touched on it a little bit around the whole GE, GM sort of space. But what about regulation? How does that look for precision fermentation?

Anna Crosbie [00:28:16]:

So it varies in different countries, and we're quite different to the norm as far as the sense I got. So I mentioned earlier that the precision fermentation process uses the host, which is genetically modified, but the ingredient that it's making is extracted, and that is the same as the mother ship, if you like.

Sandra King [00:28:36]:

Yeah.

Anna Crosbie [00:28:36]:

So many countries do not classify the extracted single ingredient as genetically modified because it is the very same as the source DNA. New Zealand, we regulated the process rather than the product. So in New Zealand, because the product has been produced via a process that uses bioengineering, we treat it differently. So that's that's the distinction. There is a hyperlink in the report if listeners are particularly interested. There's a couple of reports that have been done that go into the regulatory space in some detail. So there is that resource there for people to follow-up on. But despite our sort of more stringent regulatory environment here, we do permit the domestic production of food from precision fermentation.

Anna Crosbie [00:29:24]:

So it can be done here, but the general consensus is that until our own domestic regulatory settings are loosened a bit, we don't believe that New Zealand will become the home of precision fermentation startups because other countries and regulatory regimes are more attractive.

Rachael Halder [00:29:41]:

And I guess, as you've mentioned, there's a couple of hurdles we would have to hop over for that and, you know, huge amount of capital required to sort of start something up that would be capable of it, as well as those feedstocks and how we would actually be able to grow at scale. So, yeah, no, fascinating. But I think as we've seen in some of the seed companies and stuff, we've seen a lot of gene editing come into our agriculture sector as well. So, yeah, a moving,

moving fast in this space, but yes, kind of thinking about, you know, people out there listening, you know, how how do they prepare for precision fermentation?

Anna Crosbie [00:30:19]:

I think it really is that that knowledge in terms of understanding that disruption could feasibly happen, for sure. Actually, I wanted to make the point, and I'll slip it in here if I may, in terms of our whole milk powder exports or our casein and whey and other protein export markets. So whole milk powder is worth 8,000,000,000 per year as an export sector. Casein and whey and other dairy proteins are worth 3,000,000,000 per year. So that compares that to our seafood sector. Our entire seafood sector is worth 1,900,000,000. Our entire kiwifruit sector is worth 2.6, and our entire wine sector is worth 2.2. So it's very easy in New Zealand because dairy is so enormous that we lump dairying together.

Anna Crosbie [00:31:12]:

And I think it's really important to understand that this disruption is going to hit the dairy ingredients markets and our dairy ingredient markets, just one of them, casein and whey protein, by itself is worth more to our country than all of our entire kiwifruit sector or wine sector. So . . .

Rachael Halder [00:31:31]:

And seafood put together.

Anna Crosbie [00:31:33]:

Yeah. Yeah. The scale, I think, is important to understand. So in terms of knowledge, one is understanding the scale of what we're talking about globally. I think in terms of what individuals can do in the various stakeholders we talked to were very consistent in this. It is finding the place to have those safe discussions. It is a topic that I think is a bit polarizing for people. So human nature is to retract to our corner, isn't it? And sort of start off in our own opinion and not listen to the opinions of others.

Anna Crosbie [00:32:04]:

So I think we do need to create some spaces to have these discussions without attributing blame or opinion. Just let people explore what they think and so they can form their own opinion. I think it's, it depends as well in terms of, you know, there's a role for government. There's a role for sector organizations. There's a role for groups like Thriving Southland in terms of how do we support farmers and landowners and industry players? How do we provide economic incentives? How do we have that discussion as a nation around the regulatory framework and where that water should or could go? And how do individuals choose to engage with those processes and influence those decisions that are being made by government

sectors, regulators, etcetera. You know, we know that government is busy and doesn't have much money and change doesn't happen often unless it's driven from the the grassroots up. So how do how do individuals decide to play a part in this as well, I think, is a good question. I think the other thing is increasing or understanding awareness of the safety of precision fermentation and understanding that, you know, has been used for rennet and insulin and vanilla essence always used.

Anna Crosbie [00:33:18]:

So it's not necessarily that big spooky scary thing in the corner that we might think it is. Yeah. And the dairy farmers we talked to, that was interesting because, as I said earlier, particularly if dairy farmers are carrying debt, and many do, of course, you do a dairy farmer doesn't have a lot of scope to prepare for disruption or to build on resilience or start to diversify because you're head down dairying to pay back your debt. That's the sort of the long term goal, isn't it? So I think for some dairy farmers, it's just going to be becoming more aware and looking at how they can build value in their own farming operations because they need that financial resilience to build resilience to these big disruptors. And I think that's, again, there's there's a place for the the dairying companies, isn't it, isn't there to support the producers in the aspect as well?

Rachael Halder [00:34:10]:

Mhmm. And I guess, you know, to to circle into a high moment as such, you know, it is well, us exporting all of our product is, you know, really big for our country. But in terms of global scale, you know, it is actually not a huge percentage of the world's milk. And so people buy New Zealand milk and, you know, our Southland grass fed milk is such because of its premium product and its capabilities. And to the great, we are doing a really good job of making a product that is something people want to buy. And so precision fermentation isn't taking that away from us. But I think, like you've said, it's interesting to think about it differently. It's talking about ingredients that are used in key products that people enjoy and, you know, use the instance of a Kit Kat.

Rachael Halder [00:34:56]:

And most people just enjoy a Kit Kat because it's chocolate and people know chocolate's made with milk, but people don't often go to the effort of understanding where that milk originally came from. So, yeah, fascinating fascinating thoughts Anna. And I think if anything, it is just a learning, isn't it? Being aware of all of these technologies that are a part of food now and just basic growing food is not really the same same anymore.

Anna Crosbie [00:35:25]:

So the moving feast to excuse the pun.

Rachael Halder [00:35:27]:

Yeah.

Anna Crosbie [00:35:28]:

And it's important as well to shout out and the documents people again can download it and there's some useful hyperlinks we've provided. There has been quite a bit of research that's been done in New Zealand in recent years by people such as the My Land and Water National Science Challenge, by Emerging Protein New Zealand, by Te Punawhakarunui, which is the New Zealand Food and Fibre Think Tank. So there's some quite meaty bits of research that are reasonably recent that you can access via this hyperlink, the hyperlinks in the report. And it's really good to look at at what different people in New Zealand I mean, between them, just those three examples, for example, you know, they have involved a huge number of our scientists, our CRIs, our universities, our industry bodies, the whole sort of gamut of stakeholders. So there's some interesting perspectives available to people if they want to delve into that detail in terms of some forecast scenarios of what disruption might look like over different timescales and what that might mean. So we're not, you know, we're not starting from ground zero. We we, as a country, we have given us some thought already, but it's how do we use that and apply it and how do we make sure the farmer and the landowner is aware of some of this high level research that often, you know, doesn't get disseminated as well as we might want it to.

Rachael Halder [00:36:49]:

Mhmm. And as always, how do we, you know, be a part of the conversation and learn from it so that we yeah. Making decisions with all of the information. So thanks, Anna. And I guess, Sandra, just would love to loop back to you. And, you know, can you sort of tell us how we can access this discussion paper and and how we might actually read some of this extra stuff that Anna's talked about?

Sandra King [00:37:08]:

Sure. If you want to actually read and download the discussion document, that's on the Thriving Southland website where all good information lives. So you can go onto our website and if you just search for Southland Food and Fibre or precision fermentation, that should come up for you. It's also in the banner. So you might see it flicking on as soon as you hop onto the website. So we, we really encourage you to have a look at it and have a read through it. And as Anna suggested, have a wee look at the hyperlinks as well in the research into it.

Rachael Halder [00:37:39]:

Cool. You know, obviously, we've talked about at the start. This was discussed at the panel and, you know, it came through a series of feedback. Are we still with Thriving Southland and still keen to discuss this? Is there an opportunity to do more or, you know, what what next?

Sandra King [00:37:51]:

Yeah. I think it's definitely done what we wanted to do. It was a discussion document, and it's definitely created that discussion, and it's gathered quite momentum. So we're actually sort of talking around now. Could we pull together our discussion panel and bring some of these experts together for people to hear about? So we're just kind of working through that at the moment. Also might just do a shameless plug here while we're here. We're also looking for some co funding for the other blueprints. We've got 6 of them that we'd still love to get out.

Sandra King [00:38:21]:

So if anyone would like to sponsor one of those and happy if you could reach out to us at Thriving Southland, that would be great. But, yeah, we just really encourage you to discuss it in your catchment groups or with other farmers and just use that information. And hopefully, we might be able to have a discussion panel where you can come along and actually hear from with some more experts.

Rachael Halder [00:38:35]:

Cool. And I guess to to finish up for this little podcast episode, Anna and Sandra, could you sort of share with us, you know, maybe what your biggest learning was and, you know, what you found really interesting? So maybe starting with you, Anna.

Anna Crosbie [00:38:54]:

I think for me, it was unpacking the components of our dairy export markets and and realizing the size of the dairy protein market and the or the the milk powder market in relation to things like seafood and viticulture and kiwifruit and just understanding the size of our exposure. That was my big, big takeaway.

Rachael Halder [00:39:17]:

Cool. And Sandra?

Sandra King [00:39:19]:

Well, the whole thing blew my mind. It was fascinating. But I think to the fact that it's actually been around and some of it's been around for a long time, it's not a totally new process, I guess, but it's a different way of looking at it now.

Rachael Halder [00:39:32]:

Cool.

Anna Crosbie [00:39:32]:

If I'm allowed an extra, I know you asked for one, but the other thing in my mind was talking to the people I talked to and also just the people I, you know, mix with in daily working life. The number of people who have said, oh, that's so good that Thriving Southland has commissioned us. Can you share it with me when you're finished? And now that it's finished, you know, I've had requests from banks, from government ministers, you know, a range of different people going, actually, this is really great. We do need this kind of simple 101 level neutral piece of resource. So, I think big hats off to Thriving Southland for commissioning it because it's really filled a gap, I think.

Sandra King [00:40:11]:

Oh, cool. No. Thank you.

Sandra King [00:40:13]:

Thank you.

Rachael Halder [00:40:13]:

So awesome, so finishing up, I think that it's just, you know, this discussion paper and being a part of the Greater Southland Just Transitions project and looking at this food and fibre sector in a little more depth is all around, you know, what Thriving's originally set out to achieve was trying to keep the southern farmers engaged in all things, you know, primary sector and what our province is busy doing. So we hope this has been insightful for you. We would love you to read the discussion paper in full. It is actually relatively short, in terms of papers with lots of pictures. So well done, Sandra and Anna.

Anna Crosbie [00:40:47]:

Yes. Less than 30 pages, people. Less than 30 pages.

Rachael Halder [00:40:51]:

Less than 30 pages and exactly. And half of, half of those have got big pictures on them. So very, very user friendly.

Sandra King [00:40:57]:

It's a picture book.

Rachael Halder [00:40:58]:

It's like a picture book. Yep. With some good highlighted points. And it's got a lot of extra stuff. So you can go where you are most interested. You can click into different things and yeah, and, and just enjoy learning about something maybe you didn't think you were going to when you first, started your day with your cup of coffee. But, hey, have a good day, everybody.

Rachael Halder [00:41:17]:

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