

Sandhiya Gounder, Karly Burch
and Mira O'Connor

Will Migrant Pacific Workers Be a Part of Aotearoa New Zealand's Farming Futures?

A call to design future agritech industry transformation plans with a reciprocal framework

Abstract

In 2020 and 2023 the New Zealand government depicted a vision for technology-enhanced farming futures in the Agritech Industry Transformation Plan. However, the plan overlooks the critical role of seasonal, migrant Pacific workers in sustaining Aotearoa New Zealand's horticulture industry. It also contains little practical planning for what a transition from a largely human to a largely robotic workforce should entail. We show how these omissions reflect an extractive framework which threatens workers' wellbeing and the sustainability of Aotearoa New Zealand's horticulture industry. We provide recommendations for how future agritech industry plans can consciously adopt a more sustainable reciprocal framework.

Keywords agricultural technology (agritech), RSE scheme, collaborative design (co-design), extractivism, ethic of reciprocity, agricultural work

Sandhiya Gounder is enrolled in a PhD in sociology at the University of Otago. Her PhD research explores the Fijian government's attempt at achieving national unity in Fiji, focusing on the dynamics of tripartite coalition politics in Fiji. **Karly Burch** (she/her) is a lecturer in sociology at the University of Auckland. Her current research projects explore the material politics of nuclear pollution, artificially intelligent robotics in agriculture, and collaborative research for sustainable technofutures. **Mira O'Connor** is a research assistant at the University of Auckland and completed a master's in geography at the University of Otago in 2022. Her master's research was centred around including agricultural workers in an agricultural technology collaborative design project, and reflecting on this process of inclusion through an anti-colonial lens.

Introduction: where are the workers?

Horticultural labour remains the most significant issue in the sector globally. In New Zealand this is felt particularly for the kiwifruit, apple and grape sectors. The need for on-farm and on-orchard automation to help address this issue is only going to grow, providing New Zealand with a multi-billion dollar commercial opportunity. (Ministry of Business, Innovation and Employment, 2020, p.33)

The New Zealand government's 2020 and updated 2023 Agritech Industry Transformation Plan (AITP)¹ depicts a vision for Aotearoa New Zealand's farming future: a 'high-skilled' agricultural² workforce would engage in 'high-value' work (ibid., pp.8, 10) with the support of agricultural technologies (agritech). As the introductory quote illustrates, this vision focuses specifically on Aotearoa New Zealand's horticulture industry,³ although it extends globally: the AITP imagines that growers within and beyond Aotearoa New Zealand could benefit from locally produced agritech. The plan's vision encompasses a range of topics, from agritech's role in achieving goals of environmental sustainability, to its role in increasing productivity, increasing future

work opportunities and increasing workforce diversity. The plan also points to collaborative design (co-design) as playing a role in achieving these goals.

While the industry transformation plan programme was closed by the new coalition government in late 2023 (Ministry of Business, Innovation and Employment, 2023b), the AITP continues to provide a useful glimpse into the ways dominant visions of more automated farming futures can overlook the critical role the current agricultural workforce plays in sustaining Aotearoa New Zealand's horticulture industry – for example, how the labour of seasonal, migrant Pacific workers currently sustains Aotearoa New Zealand's horticulture industry via the recognised seasonal employer (RSE) scheme (Immigration New Zealand, 2023;

horticulture industry. Instead, we recommend that authors of future agritech plans consciously adopt a reciprocal framework through: 1) uncovering extractive assumptions about agricultural workers and work; 2) changing the language used to discuss work and workers; and 3) providing agricultural workers with opportunities to co-design their future work trajectories.

Extractive labour relations are intrinsic to capitalist economic systems (Koshy, Byrd and Jefferson, 2022; Marx and Engels, 1948). In this article we define an extractive framework as values and practices that prioritise the interests of employers over the fair treatment and welfare of workers. In the realm of industrial relations, capitalists are regularly looking for innovative ways to gain more capital, often

serving as the 'outposts' which 'grow' labourers for Australia and Aotearoa New Zealand (Dziedzic, Voloder and Raela, 2023; Movono, Scheyvens and Aukram, 2023).

Alternatively, a reciprocal framework promotes economic sustainability as it more accurately represents the reality of employment relations: employers and employees are already mutually reliant upon each other, and without both productive and reproductive labour, capitalism would collapse (Federici, 2012). Reciprocity is not a new concept, particularly among indigenous peoples and scholars. Reciprocity between people and the environment is a fundamental element of many indigenous values and knowledge systems (Diver et al., 2019). An 'ethic of reciprocity' can also be found in many indigenous and anti-colonial research methodologies which directly respond to dominant modes of exploiting, dispossessing and degrading indigenous peoples, their lands and their knowledge (Liboiron, 2021; Raman, 2023; Rosiek, Snyder and Pratt, 2020, p.340; Tuck and McKenzie, 2014; Tuhiwai Smith, 2021). More specifically, reciprocity is a value grounding both kaupapa Māori and Pacific research methodologies, themselves designed to reflect everyday ways of relating for Māori and Pacific peoples (Naepi, 2019; Walker, Eketone and Gibbs, 2006). Recognising the importance of reciprocity for Māori and Pacific peoples is particularly important in the context of Aotearoa New Zealand's horticulture industry, where Māori made up approximately 17% of the horticultural workforce in 2018 and Pacific RSE workers 33% of the horticultural workforce in 2020 – with RSE quotas climbing every year (Green and Schulze, 2020; Immigration New Zealand, 2022, 2023; New Zealand Kiwifruit Growers Incorporated, 2020).

Drawing on insights from the RSE scheme and from the authors' engagement in a publicly funded agritech co-design project, MaaraTech, we develop recommendations for how future agritech industry transformation plans could consciously adopt a reciprocal framework. This reciprocal framework would acknowledge the mutual reliance already existing between employers and employees,

While an extractive framework can be economically rewarding for employers in the short term, its lack of enduring reciprocal relations leads to many uncertainties around worker retainment

McConnell and McConnell, 2023). An agritech vision which overlooks the current agricultural workforce is problematic for two reasons. First, it allows policymakers to neglect their responsibility to articulate what the social transformation from a largely human to a largely robotic workforce should look like in practice. Second, it obscures how the AITP and the RSE scheme are inherently interconnected: for example, how the AITP's future visions are influenced by the outcomes of the RSE scheme and how the RSE scheme will be influenced by any agritech industry transformation. We will address these interconnections in more detail below.

Through a literature review, document review and critical analysis, we show how the AITP's underrepresentation of RSE workers and lack of practical planning regarding their future work trajectories reflects an extractive framework which threatens workers' wellbeing and the sustainability of Aotearoa New Zealand's

at the expense of workers' livelihoods and wellbeing. Technology has long played a role in entrenching capitalist power relations (Marx and Engels, 1948). While it does not have to be the case, new technologies offer possibilities for employers to further exploit workers (Liu, 2020; Walsh, 2020).

While an extractive framework can be economically rewarding for employers in the short term, its lack of enduring reciprocal relations leads to many uncertainties around worker retainment (Anderson and Tipples, 2014). An extractive framework is particularly risky during a time of industry transformation: if workers cannot see themselves as a part of an industry's future vision, they may be less inclined to continue working throughout the transition period. These risks are becoming more evident for Aotearoa New Zealand's horticulture industry since Pacific leaders have begun raising concerns about their countries

and nurture this into a mutual, fair and respectful exchange of benefits. As readers will notice, we view extractivism and reciprocity as existing on a spectrum. This means entities such as the RSE scheme and the AITP are neither fully extractive nor fully reciprocal. Therefore, our call for adopting a reciprocal framework is intended to encourage policymakers to become aware of this spectrum and to do their best to make decisions that foster reciprocity and limit extractivist practices: for example, through developing agritech visions and policies that promote sustainable and mutually beneficial relationships between employers and employees.

In making our argument we begin with an overview of the reciprocal and extractive frameworks currently shaping the RSE scheme. We then illustrate how the same extractive framework appears within the AITP, before introducing our recommendations for consciously adopting a reciprocal framework when drafting future agritech industry transformation plans.

The RSE scheme: reciprocal, extractive or both?

Hints of reciprocity in the RSE scheme

The RSE scheme was established in 2007 to address labour shortages in Aotearoa New Zealand's horticulture sector and to aid the development of Pacific countries. There are nine countries currently included in the scheme: Fiji, Kiribati, Nauru, Papua New Guinea, Sāmoa, Solomon Islands, Tonga, Tuvalu and Vanuatu (Immigration New Zealand, 2023). Many narratives exist around the RSE scheme which paint a complex picture. Often the scheme only makes the news when controversies arise (e.g., Chittock, 2022; Prasad, 2022). Yet many continue to refer to the RSE scheme as a 'triple win', for workers, their home countries and their employers (Gibson and McKenzie, 2014a, p.208; Wilson and Fry, 2022).

The importance of RSE workers for Aotearoa New Zealand's horticulture industry has been growing over the 17 years that the scheme has been in place. For reference, RSE quotas increased by 19% between 2021 and 2022 (Immigration New Zealand, 2022). The cap on RSE workers reached 19,000 in the 2022/23 season and

increased to 19,500 in the 2023/24 season, with promises from the new coalition government that those numbers will rise to 38,000 or more (Immigration New Zealand, 2022, 2023; Luxon, 2023; McConnell and McConnell, 2023; Movono, Scheyvens and Aukram, 2023). RSE workers are also known for their productivity, dependability and enthusiasm, which greatly benefit their employers and the overall performance of the sector (Maguire and Johnson, 2016, 2017).

While Aotearoa New Zealand benefits greatly from RSE workers, RSE workers also experience some benefits in exchange

enough to immunise workers against the consequences of a predominantly extractive framework which shapes RSE policy and how many employers relate with RSE workers.

The extractive realities of the RSE scheme

While the hints of reciprocity in the RSE scheme are all important, the scheme's potential to foster reciprocity is troubled by its underlying extractive framework. This extractive framework can appear in how people talk about workers and their expertise. For example, the same scholars touting the RSE scheme's positive

The importance of RSE workers for Aotearoa New Zealand's horticulture industry has been growing over the 17 years that the scheme has been in place.

for their labour. Some scholars have shown that the scheme has become a critical income source for many Pacific peoples, their families, their communities and their countries (Gibson and McKenzie, 2014b). Others have argued that, at an individual level, RSE workers are able to earn a higher income than they would in their home countries (Brickenstein and Tabucanon, 2013; Hammond and Connell, 2009; Maclellan, 2008). Journalist Patrick O'Sullivan (2018) showed that income revenue from the RSE scheme has provided workers and their families with opportunities to build and improve homes, to pay for higher education for children, and to save and invest. Others have discussed how income gained from the RSE scheme has provided opportunities for workers to fund various community projects (Gibson, McKenzie and Rohorua, 2008; Maclellan, 2008). In addition, some have noted that the skill sets workers develop through their work in Aotearoa New Zealand have helped them to create opportunities for themselves in their home countries (O'Sullivan, 2018; see Dun, Klocker and Head, 2018 for an example from Australia). All of these aspects are important, but unfortunately are not

dimensions of reciprocity might also refer to RSE workers as 'unskilled' (Gibson, McKenzie and Rohorua, 2008, p.187). Seventeen years into the RSE scheme's implementation, it is now possible to see how these linguistic framings contribute to real consequences for workers, their families and communities. As we will illustrate below, employers are not the only ones responsible for negative consequences experienced by RSE workers; immigration policies (such as the RSE scheme) create the conditions for extractive employment relations to thrive.

The consequences of this extractive framework are perhaps most evident in recent media articles which continue to paint a damning picture of RSE worker exploitation (see Frame, 2022; Solignac, 2022; Tuiono and Menéndez March, 2022). Yet, taking a wider historical lens, it is possible to notice that the extractive framework driving the RSE scheme was already present in Aotearoa New Zealand's horticulture industry. Local workers were driven away from agricultural jobs in the early 2000s due to factors such as low wages, requirements for domestic migration, and work being classified as low-skilled (Anderson and Tipples, 2014). These extractive processes were what sparked the

necessity to hire migrant workers in the first place. However, rather than developing policies to address the underlying extractive labour relations that drove local workers away, the same extractive frameworks continue to shape RSE policy today. For example, RSE workers often endure poor-quality accommodation, overcrowding, inadequate cooking facilities and rising accommodation costs (Maclellan, 2008; Petrou and Connell, 2018). RSE workers are expected to pay their own living expenses throughout their stay; however, there might not always be paid work opportunities available to support them with

RSE programme if they do not comply with their demands (Bailey, 2009, p.186). This creates a situation where workers might be afraid to speak up about issues affecting their health and wellbeing. In addition, the RSE visa provides permission to work under one employer. This prevents RSE workers from changing employers, thus increasing their vulnerability to an abusive employment environment (Bedford, Nunns and Bedford, 2020). RSE policy also prevents workers from receiving unemployment benefits or pensions within Aotearoa New Zealand (Brickenstein, 2015,

Employment, 2020, pp.7, 10, 27). In some cases, underlying assumptions about workers and their work are presented directly: for example, through descriptions of seasonal agricultural work being 'low-skilled' (ibid., p.47). However, in most cases the plan's assumptions about current agricultural work are only evident through inverse reasoning. For example, the idea of agritech creating opportunities for 'better jobs' implies that current work in agriculture is not that great. Through direct and inverse reasoning, the language in the AITP frames current agricultural work as not good, not meaningful, not rewarding, not high value, and unskilled. The plan offers a solution to this problem: creating agritech. However, it jumps to this solution without attending to the underlying issues leading to the poor working conditions in horticulture: an extractive framework.

Without awareness of this extractive framework and possibilities for fostering reciprocity, policymakers might decide to use the negative consequences experienced by RSE workers as evidence to prove that agricultural work in Aotearoa New Zealand is not good work. This might, in turn, lead them to the conclusion that the only answer to this problem is for agritech to replace human workers. This is a dangerous form of circular logic in which policymakers use the negative consequences of an extractive framework as evidence to promote policies that continue to encourage extractivism, which in turn produces negative outcomes which become evidence for further extractivism, and so forth. It is dangerous because policymakers basing their decisions on this evidence will be reproducing extractive frameworks under the label of evidence-based policymaking. For example, they may use the negative effects of the RSE scheme (produced through an extractive framework) as evidence that agritech needs to replace human workers. Based on this evidence, policymakers may decide to omit the current agricultural workforce from the AITP and other dominant visions about farming futures, which will reproduce the same extractive framework. If implemented, these visions could lead to the further exploitation and devaluation of agricultural workers.

A second way an extractive framework is visible within the AITP is in its lack of

The 2020 and 2023 versions of the Agritech Industry Transformation Plan mention labour shortages as a central driver for agritech development.

those expenses (Johnston, 2022).

Extractive frameworks can also be seen in how the work requires workers to leave their home communities, often without the social supports they need to thrive (Koshy, Byrd and Jefferson, 2022). Worker isolation is a huge issue within the RSE scheme, as the scheme does not allow workers to bring their families to Aotearoa New Zealand (Gibson, McKenzie and Rohorua, 2008). This lack of social support causes significant hardship which harms many people in a range of ways. For example, workers might need to live in an isolated rural setting away from friends and family. This isolation might lead to a loss of important cultural connections, which in turn might lead workers to resort to alcohol as a stress release mechanism (Kumar, 2012). Moreover, workers' absence from their home communities also has an impact on their family members back home. For example, children of RSE workers often experience fear and loneliness due to the absence of parents or family members (Moala-Tupou, 2016).

An extractive framework can also be seen in low levels of workplace representation and benefits for RSE workers (Brickenstein, 2015, 2017; Fonseca, 2022). Researchers have also documented how employers sometimes threaten to send workers home and blacklist them from the

2017). In short, while the RSE scheme may have hints of reciprocity, it is dominantly shaped by an extractive framework which has led to many negative consequences for workers, their families and communities.

Signs of an extractive framework within the AITP

The 2020 and 2023 versions of the AITP mention labour shortages as a central driver for agritech development. However, as with the RSE scheme, the AITP fails to acknowledge a history of unexamined extractive frameworks that led to these labour shortages in the first place. Since the plan was not implemented, an extractive framework was mostly visible through: 1) the language used to describe current agricultural work and workers; and 2) a lack of practical planning for and communication about the RSE scheme which currently sustains Aotearoa New Zealand's horticulture industry.

When it comes to language, the AITP describes how future agritech developments will be 'ensuring activity is supporting better jobs', providing 'secure, high-value jobs' and creating a 'measurable increase in jobs, and in particular high-value jobs, coupled with increased skill levels' (Ministry of Business, Innovation and

practical planning for and communication about the RSE scheme: how the RSE scheme is currently sustaining Aotearoa New Zealand's horticulture industry, and how it will be transformed with the introduction of new agritech. While the AITP provides imagined scenarios about new forms of agritech that could increase productivity and lead to more sustainable farming methods, it fails to consider the practicalities around the social transformation that will be required to make these visions a reality. A lack of consideration of the social transformations required for the plan to succeed is an issue which threatens worker security and wellbeing. However, it also threatens the sustainability of Aotearoa New Zealand's horticulture industry. This is because workers might not want to continue working in an industry where they are not included in its future vision, particularly if they continue to be exploited throughout the industry's transformation. The omission of these critical social dimensions within the AITP highlights an extractive framework which uncritically assumes that workers will be available until they are no longer needed.

Towards reciprocal agritech industry transformation plans

While agritech might be on the horizon, human workers will still be required to sustain Aotearoa New Zealand's horticulture and wider agriculture industries for the foreseeable future. This section provides practical examples of how policymakers can adopt a reciprocal framework when drafting future agritech industry transformation plans.

Uncovering extractive assumptions about agricultural workers and work

To foster the transition to a reciprocal framework, it will be important for authors and advocates of future agritech industry transformation plans to discuss the underlying assumptions they have about agricultural workers and work. This will support policymakers to notice where extractive frameworks might be influencing their language and recommendations before taking action to address them – topics we will discuss in the next sections.

The following list outlines some outstanding questions that the authors of this paper have about the AITP's possible implications for agricultural workers and the sustainability of Aotearoa New Zealand's horticulture industry. We hope policymakers will consider and address these questions as they draft future agritech industry transformation plans:

- Will agricultural workers be included in the co-design of agritech and future agritech industry transformation plans?
- What should the social transformation from a largely human to a largely robotic workforce look like in practice

The study's authors illustrate how deficit language obfuscates the vital role workers play in sustaining highly profitable horticulture industries ...

in Aotearoa New Zealand's agriculture industry?

- Do policymakers assume that RSE workers will continue to sustain Aotearoa New Zealand's horticulture industry until agritech takes over?
- How will the agriculture industry practically balance the tensions of sustaining a human workforce as it transitions to an agritech-supported or fully automated workforce?
- Will policymakers develop a plan for responsibly terminating or transforming the RSE scheme in alignment with future agritech industry transformation plans?
- Will Pacific leaders and workers be included in the co-design of the RSE scheme's transformation?

Changing the language used to discuss agricultural work and workers

Language is a powerful tool that can have intended and unintended consequences, so choosing appropriate language to describe people and their work requires both reflection and care. As mentioned in the previous section, the AITP uses extractive language to discuss agricultural workers and work, which devalues the vital role

that workers currently play in sustaining Aotearoa New Zealand's horticulture industry. Dun and colleagues argue that migrant workers in Australia, working within a similar system to the RSE scheme, should be reframed as 'knowledge holders' rather than as 'unskilled' or 'low-skilled' labourers (Dun, Klocker and Head, 2018, p.276). These authors illustrate the ways in which migrant workers transfer their own agricultural knowledge into their work in Australia and take new knowledge back to their home countries. Their analysis highlights the ways in which language describing agricultural workers as low-

skilled or unskilled is not evidence-based. The study's authors illustrate how deficit language obfuscates the vital role workers play in sustaining highly profitable horticulture industries: in other words, how an extractive deficit framing of workers and their work encourages further extractivism.

Table 1 outlines some of the extractive language and underlying assumptions about current agricultural workers and their work included in the AITP. We present this alongside examples of reciprocal language that better reflects the value that RSE workers bring to the horticulture industry – for example, RSE workers' high ratings in terms of productivity, dependability and enthusiasm (Maguire and Johnson, 2016, 2017). As mentioned, reciprocity and extractivism exist on a spectrum, so this language is intended to support policymakers to recognise this spectrum and to consciously make decisions which promote reciprocity and deter extractivism. While language is not enough, it can help to expose and prevent the unreflexive reproduction of circular logics discussed above.

While some of the changes are obvious, such as replacing the word 'unskilled' with

**Will Migrant Pacific Workers Be a Part of Aotearoa New Zealand’s Farming Futures?
A call to design future agritech industry transformation plans with a reciprocal framework**

Table 1: Examples of extractive versus reciprocal language that can be used to discuss agricultural workers and their work

	Extractive language	Reciprocal language
Agricultural workers	Low-skilled, unskilled	Skilled, knowledge holders (Dun, Klocker and Head, 2018)
	Not high value	Valuable, essential
Agricultural work	Insecure	Secure (This needs to be paired with an understanding that insecurities are the product of an extractive framework and that job security can be created over time through adopting a reciprocal framework.)
	Upskill	Reskill

‘skilled’ or ‘knowledge holder’, others are more subtle. For example, while the AITP may not have directly used language such as ‘insecure’ when discussing current agricultural work, this was implied by future work being described as ‘secure’. In addition, we do not think it is appropriate to simply replace ‘insecure’ with ‘secure’ without recognising that job insecurity is a product of an extractive framework. Thus, transitioning towards a reciprocal framework would require noticing the root cause of the insecurity (extractive labour relations) and responding in a way that promotes increased reciprocity between employers and employees. We recommend using ‘reskill’ as opposed to ‘upskill’ because ‘upskill’ maintains a deficit framing which assumes current agricultural work is unvaluable and low-skilled.

Providing agricultural workers with opportunities to co-design their future work trajectories

Changing the language used in future agritech industry transformation plans is fundamental to promoting more reciprocal employer–employee relations. However, simply changing the language without taking action will lead to tokenism, where agricultural workers and their work are discussed in more respectful and reciprocal ways, but agricultural workers themselves are not included in decision-making processes about the future of their work (Burch and Legun, 2021). Promoting job security for agricultural workers would require more than simply using the term ‘secure’. We recommend that reciprocity be practically fostered through providing agricultural workers with opportunities to co-design their future work trajectories

and using that information to inform future industry transformation plans.

As noted, the AITP has mentioned co-design as a method that will be important for achieving its agritech visions. For example, the 2023 AITP update mentions the importance of co-design between the private sector and government for improving the growth and wellbeing of Aotearoa New Zealand’s agritech sector (Ministry of Business, Innovation and Employment, 2023a). Additionally, both versions of the AITP include knowledge and insights from multiple groups and industries, such as the use of strategies co-designed with a Māori advisory group (Ministry of Business, Innovation and Employment, 2020, 2023a). Engaging in co-design with agricultural workers requires special care and attention, given access issues and power imbalances (Burch and Legun, 2021). Thus, we recommend including humanities and social science scholars in these processes to ensure that questions of power are adequately acknowledged and attended to when including agricultural workers in co-design processes and when considering the social dimensions of agritech innovation (Burch et al., 2022, 2023; Fielke et al., 2022).

Including agricultural workers through co-design will not only benefit workers. Closer engagement with agricultural workers would provide agritech designers with more certainty that the technologies they are designing will fulfil their intended purpose and successfully integrate into complex indoor and outdoor workplaces (Burch et al., 2022). This will also be beneficial for research funders, who would not need to worry as much about their investments going to waste. Thus, adopting a reciprocal framework could lead to a

quadruple win where agricultural workers, agritech designers, employers and agritech funders benefit from the deliberate nurturing of more reciprocal relations with workers.

However, engaging in co-design with a reciprocal framework will take time, particularly when trying to include people usually marginalised from decision-making processes. This contrasts with the common expectations regarding speed and efficiency within traditional technology design practices, which is also promoted within the AITP. The AITP states that innovation should be quick in order to keep up with the global agritech market, stating, for example, that ‘innovation is the engine of productivity. Fundamentally, the growth of the sector must be driven by a fast path from research idea, to new product in market’ (Ministry of Business, Innovation and Employment, 2020, p.39). This kind of push for rapid growth does not leave time and space to include workers, or, more generally, to engage in responsible research and innovation practices (Bronson, 2018, 2019; Burch and Legun, 2021; Gugganig et al., 2023; O’Connor, 2022; O’Connor, Burch and Gounder, forthcoming).

Engaging in reciprocal forms of co-design would require slowing down and being more intentional regarding other aspects of future industry transformation plans: for example, adjusting the pace of agritech innovation. While reciprocal relations between employers and workers should be fostered in future plans, making a shift from an extractive towards a reciprocal framework should also lead to other changes, in areas such as social and environmental sustainability. Kono, an Aotearoa New Zealand-based company that produces food and beverages, provides a useful example of the positive outcomes that can arise from adopting a reciprocal framework in horticulture.

We first learned about Kono through our colleagues from the James Henare Research Centre working on MaaraTech’s Māori engagement team. As a team, they engaged in kaupapa Māori research with Kono to learn more about how Māori-owned businesses were thinking about and engaging with agritech (Burch et al., 2022). A subsidiary of Māori-owned Wakatū Incorporation, Kono has a 500-year vision of food and farming which guides its decisions regarding

the economic, environmental and social dimensions of its horticultural practices. Reciprocity can be seen in the values that underpin Kono's operations, including whanaungatanga ('Together we are more') and manaakitanga ('We rise by uplifting others') (ibid., p.26). It can also be seen in the organisation's commitments to minimising the effects of its horticultural practices on the local environment (e.g., through reduced chemical inputs). When our project colleagues visited Kono, they were able to talk with workers, including migrant workers from the Pacific, who shared appreciation for Kono's value-based approach to leadership which aligned with many of their own cultural values. In engaging reciprocally with the workers, our colleagues were able to hear their thoughts on new agritech – often in the form of high-tech, expensive technologies proposed by outside actors. It also provided an opportunity for workers to share ideas they had for lower-tech, less expensive agritech alternatives which could greatly improve their everyday work. This example illustrates how adopting a reciprocal framework in business and agritech design has the potential to create many positive ripple effects for Aotearoa New Zealand's horticulture industry and the workers who sustain it.

Conclusion

In this article, we have drawn on examples from the RSE scheme and the AITP to illustrate how dominant visions of more automated farming futures in Aotearoa New Zealand currently reflect an extractive framework. This extractive framework can be most readily seen in the AITP through: 1) the language used to describe current agricultural work and workers, and 2) a lack of practical planning for and communication about the RSE scheme, which currently sustains Aotearoa New Zealand's horticulture industry. While the AITP is no longer active, it continues to provide insights into the challenges of and possibilities for developing agritech transformation plans that value reciprocity over extraction.

Through a literature review, document review and critical analysis, we have shown how a dominant agritech vision which overlooks the current agricultural workforce is problematic because it allows

policymakers to neglect their responsibility to articulate what the social transformation from a largely human to a largely robotic workforce should look like in practice. This omission allows for the uncritical reproduction of an extractive framework. It is important to recognise this in order to avoid making policy decisions based on circular logics. For example, using the negative effects of the RSE scheme (produced through an extractive framework) as evidence that agritech needs to replace human workers. Then using this

provided an example of reciprocal employer – employee relations currently being practiced by the Māori-owned horticultural organisation, Kono.

Transitioning towards a reciprocal framework within future agritech industry transformation plans will require acknowledging the vital contributions agricultural workers, including RSE workers, make to Aotearoa New Zealand's horticulture industry. It will also require policymakers to develop a comprehensive plan for including workers in discussions about their future

Transitioning towards a reciprocal framework within future agritech industry transformation plans will require acknowledging the vital contributions agricultural workers ...

evidence to justify deficit language about agricultural workers and their work, as well as the omission of the current agricultural workforce from dominant visions about farming futures. We discussed how this deficit language and omission will, in turn, encourage the reproduction of the same extractive framework. We caution that, if implemented, these extractive framework-shaped visions could lead to the further exploitation and devaluation of agricultural workers. We also highlighted how this exploitation and devaluation of agricultural workers and their work threatens both the wellbeing of agricultural workers and the sustainability of Aotearoa New Zealand's horticulture industry.

We argue that the best way for policymakers to avoid these circular logics is through actively adopting a reciprocal framework when drafting future agritech industry transformation plans. To this end, we outlined three recommendations to support policymakers: 1) uncover extractive assumptions about agricultural workers and work; 2) change the language used to discuss work and workers; and 3) provide agricultural workers with opportunities to co-design their future work trajectories. For inspiration, we also

work trajectories, and any relevant agritech developments which might shape the direction of these trajectories. By embracing a reciprocal framework, future agritech transformation plans have the potential to harness the knowledge, perspectives and expertise of agricultural workers and to foster more sustainable farming futures for Aotearoa New Zealand.

¹ When discussing the AITP we are referring to both versions of the plan, unless otherwise stated. The 2023 version is shorter and is simply updating readers on any progress made towards the goals developed in the 2020 plan.

² Agriculture encompasses the dairy, farming, horticulture and viticulture industries.

³ We use the term horticulture to refer to both horticulture and viticulture.

Acknowledgements

The research reported in this article was conducted as part of 'MaaraTech: Data informed decision making and automation in orchards and vineyards', a project funded by the Ministry of Business, Innovation and Employment (UOAX1810). We would also like to thank the anonymous reviewers for their insightful comments on earlier drafts of this article.

Will Migrant Pacific Workers Be a Part of Aotearoa New Zealand's Farming Futures? A call to design future agritech industry transformation plans with a reciprocal framework

References

- Anderson, D. and R. Tipples (2014) 'Are vulnerable workers really protected in New Zealand?', *New Zealand Journal of Employment Relations*, 39 (1), pp.52–67, <https://doi.org/10.3316/informit.676461205163558>
- Bailey, R.L. (2009) 'Unfree labour? Ni-Vanuatu workers in New Zealand's Recognised Seasonal Employer scheme', master's thesis, University of Canterbury, https://doi.org/10.20622/jltaj.12.o_toc1
- Bedford, C.E. (2009) *Unfree Labour? Ni-Vanuatu workers in New Zealand's recognised seasonal employer scheme*, https://doi.org/10.20622/jltaj.12.o_toc1
- Bedford, C., H. Nunns and R. Bedford (2020) 'Giving RSE workers more voice in New Zealand', *DevPolicyBlog*, 16 October, <https://devpolicy.org/giving-rse-workers-more-voice-in-new-zealand-20201016-2/>
- Brickenstein, C. (2015) 'Impact assessment of seasonal labor migration in Australia and New Zealand: a win-win situation?', *Asian and Pacific Migration Journal*, 24 (1), pp.107–29, <https://doi.org/10.1177/0117196814565228>
- Brickenstein, C. (2017) 'The development impact of seasonal worker schemes: a comparison of European and Pacific experiences', *Migration and Development*, 6 (1), pp.60–82, <https://doi.org/10.1080/21632324.2015.1116191>
- Brickenstein, C. and G. Tabucanon (2013) 'Circular migration as climate change adaptation: reconceptualising New Zealand's and Australia's seasonal worker programs', *Precedente, Revista Jurídica*, 3 (7), <https://doi.org/10.18046/prec.v3.1724>
- Bronson, K. (2018) 'Smart farming: including rights holders for responsible agricultural innovation', *Technology Innovation Management Review*, 8 (2), pp.7–14, <https://doi.org/10.22215/timreview/1135>
- Bronson, K. (2019) 'Looking through a responsible innovation lens at uneven engagements with digital farming', *NJAS: Wageningen Journal of Life Sciences*, 90–91, 100294, <https://doi.org/10.1016/j.njas.2019.03.001>
- Burch, K.A., J. Guthman, M. Gugganig, K. Bronson, M. Comi, K. Legun, C. Biltekoff, G. Broad, S. Brock, S. Freidberg, P. Baur and D. Mincyte (2023) 'Social science-STEM collaborations in agriculture, food and beyond: an STSFAN manifesto', *Agriculture and Human Values*, 40 (3), pp.939–49, <https://doi.org/10.1007/s10460-023-10438-2>
- Burch, K.A. and K. Legun (2021) 'Overcoming barriers to including agricultural workers in the co-design of new agtech: lessons from a Covid-19-present world', *Culture, Agriculture, Food and Environment*, 43 (2), pp.147–60, <https://doi.org/10.1111/cuag.12277>
- Burch, K.A., M. Nepia, N. Jones, M. Muru-Lanning, H. Williams and M. O'Connor (2022) 'Robots in the workplace/Ngā karehiko kei te wāhi mahi', in A. Pendergast and K. Pendergast (eds), *More Zeros and Ones: digital technology, maintenance and equity in Aotearoa New Zealand*, Wellington: Bridget Williams Books
- Chittock, N. (2022) 'RSE expansion: union says employers should be shut out of scheme if they break rules', RNZ, 28 September, <https://www.rnz.co.nz/news/national/475605/rse-expansion-union-says-employers-should-be-shut-out-of-scheme-if-they-break-rules>
- Diver, S., M. Vaughan, M. Baker-Médard and H. Lukacs (2019) 'Recognizing "reciprocal relations" to restore community access to land and water', *International Journal of the Commons*, 13 (1), pp.400–29
- Dun, O., N. Klocker and L. Head (2018) 'Recognising knowledge transfers in "unskilled" and "low-skilled" international migration: insights from Pacific Island seasonal workers in rural Australia', *Asia Pacific Viewpoint*, 59 (3), pp.276–92, <https://doi.org/10.1111/apv.12198>
- Dziedzic, S., D. Voloder and J. Raela (2023) 'Pacific countries are not "outposts" to grow labourers for Australia, Samoan PM says', ABC News, 31 August, <https://www.abc.net.au/news/2023-08-31/flame-samoa-pacific-labour-scheme-australia/102794256>
- Federici, S. (2012) *Revolution at Point Zero: housework, reproduction, and feminist struggle*, PM Press
- Fielke, S., K. Bronson, M. Carolan, C. Eastwood, V. Higgins, E. Jakku, L. Klerkx, R. Nettle, Á. Regan, D.C. Rose, C.L. Townsend and S.A. Wolf (2022) 'A call to expand disciplinary boundaries so that social scientific imagination and practice are central to quests for "responsible" digital agri-food innovation', *Sociologia Ruralis*, 62 (2), pp.151–61, <https://doi.org/10.1111/soru.12376>
- Fonseka, D. (2022) 'RSE workers being treated "like slaves", Equal Employment Opportunity Commissioner says', *Stuff*, 12 December, <https://www.stuff.co.nz/business/130729008/rse-workers-being-treated-like-slaves-equal-employment-opportunity-commissioner-says>
- Frame, K. (2022) 'Major culture shift needed in treatment of RSE workers, immigration lawyer says', RNZ, 12 December, <https://www.rnz.co.nz/news/national/480603/major-culture-shift-needed-in-treatment-of-rse-workers-immigration-lawyer-says>
- Gibson, J. and D. McKenzie (2014a) 'The development impact of a best practice seasonal worker policy', *Review of Economics and Statistics*, 96 (2), pp.229–43
- Gibson, J. and D. McKenzie (2014b) 'The development impact of a best practice seasonal worker policy', *Review of Economics and Statistics*, 96 (2), pp.229–43
- Gibson, J., D. McKenzie and H. Rohorua (2008) 'How pro-poor is the selection of seasonal migrant workers from Tonga under New Zealand's Recognised Seasonal Employer (RSE) program?', *Pacific Economic Bulletin*, 23, <https://doi.org/10.1596/1813-9450-4698>
- Glasziou, P. and I. Chalmers (2018) 'Research waste is still a scandal: an essay by Paul Glasziou and Iain Chalmers', *BMJ*, 363, k4645, <https://doi.org/10.1136/bmj.k4645>
- Green, S. and H. Schulze (2020) *Māori in Horticulture*, Wellington: BERL
- Gugganig, M., Burch, K. A., Guthman, J., & Bronson, K. (2023). 'Contested agri-food futures: Introduction to the Special Issue', *Agriculture and Human Values*, 40(3), 787–798. <https://doi.org/10.1007/s10460-023-10493-9>
- Hammond, J. and J. Connell (2009) 'The new blackbirds? Vanuatu guestworkers in New Zealand', *New Zealand Geographer*, 65 (3), pp.201–10, <https://doi.org/10.1111/j.1745-7939.2009.01163.x>
- Immigration New Zealand (2022) 'Recognised Seasonal Employer Scheme cap increased to 19,000', 28 September, <https://www.immigration.govt.nz/about-us/media-centre/news-notifications/recognised-seasonal-employer-scheme-cap-increased-to-19-000>
- Immigration New Zealand (2023) 'Recognised Seasonal Employer (RSE) scheme', 28 June, <https://www.immigration.govt.nz/about-us/media-centre/common-topics/recognised-seasonal-employer-rse-scheme>

- Johnston, K. (2022) “‘Blatant exploitation’: migrant workers packed in freezing, damp rooms for \$150 a week’, *Stuff*, 8 August
- Koshy, S., J.A. Byrd and B.J. Jefferson (2022) ‘Introduction’, in S. Koshy, L.M. Cacho, J.A. Byrd, B.J. Jefferson and L.M. Cacho (eds), *Colonial Racial Capitalism*, Durham: Duke University Press
- Kumar, R.R. (2012) ‘Migration and development: the development impacts of short-term labour migration of Ni-Vanuatu workers to New Zealand’, MA thesis, University of the South Pacific
- Liboiron, M. (2021) *Pollution is Colonialism*, Durham: Duke University Press
- Liu, W. (2020) *Abolish Silicon Valley: how to liberate technology from capitalism*, Repeater
- Luxon, C. (2023) ‘National’s getting back to farming’, 19 April, https://www.national.org.nz/national_s_getting_back_to_farming
- MacLellan, N. (2008) *Workers for All Seasons: issues from New Zealand’s recognised seasonal employer (RSE) program*, Melbourne: Swinburne Institute for Social Research, <https://apo.org.au/node/58386>
- Maguire, J. and M. Johnson (2016) *Recognised Seasonal Employers Survey 2016: working report*, Research New Zealand for Ministry of Business, Innovation and Employment, <https://www.immigration.govt.nz/documents/statistics/rse-2017-survey-report.pdf>
- Maguire, J. and M. Johnson (2017) *Recognised Seasonal Employers Survey 2017: working report*, Research New Zealand for Ministry of Business, Innovation and Employment, <https://www.immigration.govt.nz/documents/statistics/rse-2017-survey-report.pdf>
- Marx, K. and F. Engels (1948) ‘Manifesto of the Communist Party’ (transl. S. Moore and F. Engels), Progress Publishers, <https://www.marxists.org/archive/marx/works/download/pdf/Manifesto.pdf>
- McConnell, L.M. and G. McConnell (2023) ‘National promises to double RSE worker cap, ban foreign investment in farm-to-forestry conversions’, 19 April, *Stuff*, <https://www.stuff.co.nz/national/politics/131805911/national-promises-to-double-rse-worker-cap-ban-foreign-investment-in-farmtoforestry-conversions>
- Ministry of Business, Innovation and Employment (2020) *Growing Innovative Industries in New Zealand: Agritech Industry Transformation Plan*, <https://www.mbie.govt.nz/dmsdocument/11572-growing-innovative-industries-in-new-zealand-agritech-industry-transformation-plan-july-2020-pdf>
- Ministry of Business, Innovation and Employment (2023a) *Growing Innovative Industries in New Zealand: Agritech Industry Transformation Plan*, <https://www.mbie.govt.nz/assets/growing-innovative-industries-in-new-zealand-agritech-industry-transformation-plan-january-2023.pdf>
- Ministry of Business, Innovation and Employment (2023b) ‘Industry transformation plans’, 21 December, <https://www.mbie.govt.nz/business-and-employment/economic-development/industry-policy/industry-transformation-plans/>
- Moala-Tupou, L. (2016) ‘The social impacts of seasonal migration on left-behind children: an exploratory study from Lifuka, Tonga’, MSocSc thesis, University of Waikato, <https://hdl.handle.net/10289/10614>
- Movono, A., R. Scheyvens and S. Auckram (2023) ‘NZ wants more seasonal workers – but Pacific nations no longer want to be the “outposts” that “grow” them’, *The Conversation*, 16 November, <http://theconversation.com/nz-wants-more-seasonal-workers-but-pacific-nations-no-longer-want-to-be-the-outposts-that-grow-them-217790>
- Naepi, S. (2019) ‘Pacific research methodologies’, in *Oxford Research Encyclopedia of Education*, <https://doi.org/10.1093/acrefore/9780190264093.013.566>
- New Zealand Kiwifruit Growers Incorporated (2020) *Recognised Seasonal Worker Survey* <https://www.nzkgi.org.nz/wp-content/uploads/2020/07/RSE-Doc-June-2020-WEB-FINAL.pdf>
- O’Connor, M. (2022) ‘The value of inclusive collaborative design: lessons from a virtual reality vine-pruning training tool’, master’s thesis, University of Otago, <https://ourarchive.otago.ac.nz/handle/10523/16143>
- O’Connor, M., K.A. Burch and S. Gounder (forthcoming) ‘Anticolonial co-design: a methodology for including agricultural workers in the development of new AgTech’
- O’Sullivan, P. (2018) ‘Local focus: orchardists’ reliance on imported labour: the gardens of good or evil?’, *New Zealand Herald*, 28 July, <https://www.nzherald.co.nz/business/local-focus-orchardists-reliance-on-imported-labour-the-gardens-of-good-or-evil/KPCH32YMQRZTPGPNVOG6SMDRI/>
- Petrou, K. and J. Connell (2018) “‘We don’t feel free at all”: temporary ni-Vanuatu workers in the Riverina, Australia’, *Rural Society*, 27 (1), pp.66–79, <https://doi.org/10.1080/10371656.2018.1443415>
- Prasad, A. (2022) ‘Calls for “complete overhaul” of RSE scheme but business group hits back at criticism’, *New Zealand Herald*, 19 December, <https://www.nzherald.co.nz/business/calls-for-complete-overhaul-of-rse-scheme-business-group-hits-back-at-criticism/RUZZZ4C66BDXHXYK4WA26YJEBU/>
- Raman, S. (2023) ‘What it means to practise values-based research’, *Nature*, 7 June, <https://doi.org/10.1038/d41586-023-01878-1>
- Rosiek, J.L., J. Snyder and S.L. Pratt (2020) ‘The new materialisms and indigenous theories of non-human agency: making the case for respectful anti-colonial engagement’, *Qualitative Inquiry*, 26 (3–4)
- Solignac, M. (2022) ‘Human rights abuses of RSE workers “a blow for everyone”’, *Stuff*, 14 August, <https://www.stuff.co.nz/business/xblow-for-everyone>
- Tuck, E. and M. McKenzie (2015) *Place in Research: theory, methodology, and methods*, Routledge
- Tuhiwai Smith, P.L. (2021) *Decolonizing Methodologies: research and indigenous peoples* (3rd edn), London: Zed Books
- Tuiono, T. and R. Menéndez March (2022) ‘Abuse revelations leave no choice but to overhaul RSE scheme’, 8 August, https://www.greens.org.nz/abuse_revelations_leave_no_choice_but_to_overhaul_rse_scheme
- Walker, S., A. Eketone and A. Gibbs (2006) ‘An exploration of kaupapa Maori research, its principles, processes and applications’, *International Journal of Social Research Methodology*, 9 (4), pp.331–44, <https://doi.org/10.1080/13645570600916049>
- Walsh, S. (2020) ‘Productivity and the future of technology’, in A.-M. Murtola and S. Walsh (eds), *Whose Futures?*, Economic and Social Research Aotearoa
- Wilson, P. and P. Fry (2022) ‘Righting the power imbalance at the heart of the RSE scheme’, *Stuff*, 19 December, <https://www.stuff.co.nz/opinion/130786015/righting-the-power-imbalance-at-the-heart-of-the-rse-scheme>