
ACCIMAPS

Introduction

This report contains a series of AcciMaps, created by combining all of the data collected during this project. We have used this approach to summarise the key findings within a socio-technical system (wider contextual influences).

The wider project was underpinned by a Human Factors Systems approach. The approach is based on the premise that there is no single or root cause, but that many factors interconnect to result in harm. Recognition is given to the interaction between these factors because harm does not happen in isolation (Tappin, Bentley & Vitalis, 2008). Therefore, intervention cannot focus on individuals or individual-level behaviour change alone. Reducing harm and optimising the system requires focus and change across all levels.

AcciMaps (Rasmussen 1997) are a way of showing how harm can result when many factors across the system interconnect. The maps, as used below, show a multi-linear process emphasising the influence different factors can have on a normal work situation. The goal of these maps is not to identify errors or assign blame but to capture where person/organisation and structural components of the system are underperforming, help identify where to make improvements and avoid harm occurring downstream.

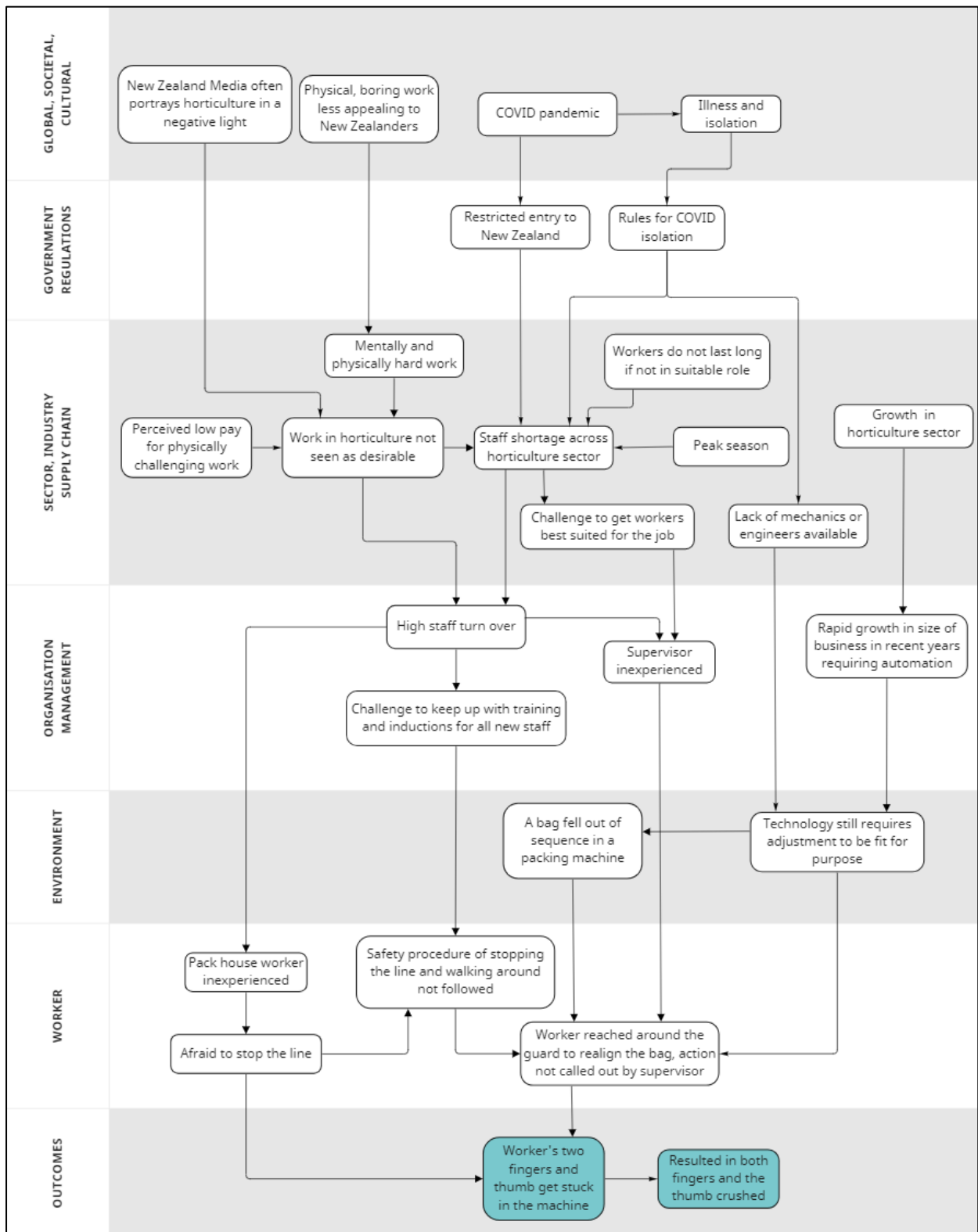
The maps show a series of commonly reported scenarios to help identify which systemic-factors are interacting to cause harm. The points at which these factors meet have been named harm hotspots. Each one is accompanied by an evidence-based but hypothetical narrative to aid in reading the map.

To read an AcciMap, identify the blue box(es) at the bottom which relates to the incident outcome. The map is a vertical chart, with each box showing factors and influences from different levels in the system. Each level up, is theoretically further away from the worker and incident than the level before. The arrows join factors when relationships between the factors exist.

In the packhouse

Below are three AcciMaps each providing an evidence-based but hypothetical scenario from in the packhouse. They show how factors at different levels such as increased pressure during peak season and the high cost of living can impact work and workers all throughout the system. When these factors interrelate, it can lead to harm.

Fingers jammed in a machine



Fingers jammed in a machine: Narrative

A worker gets two fingers and a thumb stuck in a machine designed to load vegetables/fruit into bags. They are left with crushing injuries which require immediate hospitalisation and a long period off work. The packhouse worker was new to the job and not fully integrated into the team dynamic. This meant that when a bag fell out of sequence, the worker panicked, didn't follow the safety procedure of stopping the line, but instead reached around the guard. Automation can cause pinch points where packaging can get stuck and needs to be manually released.

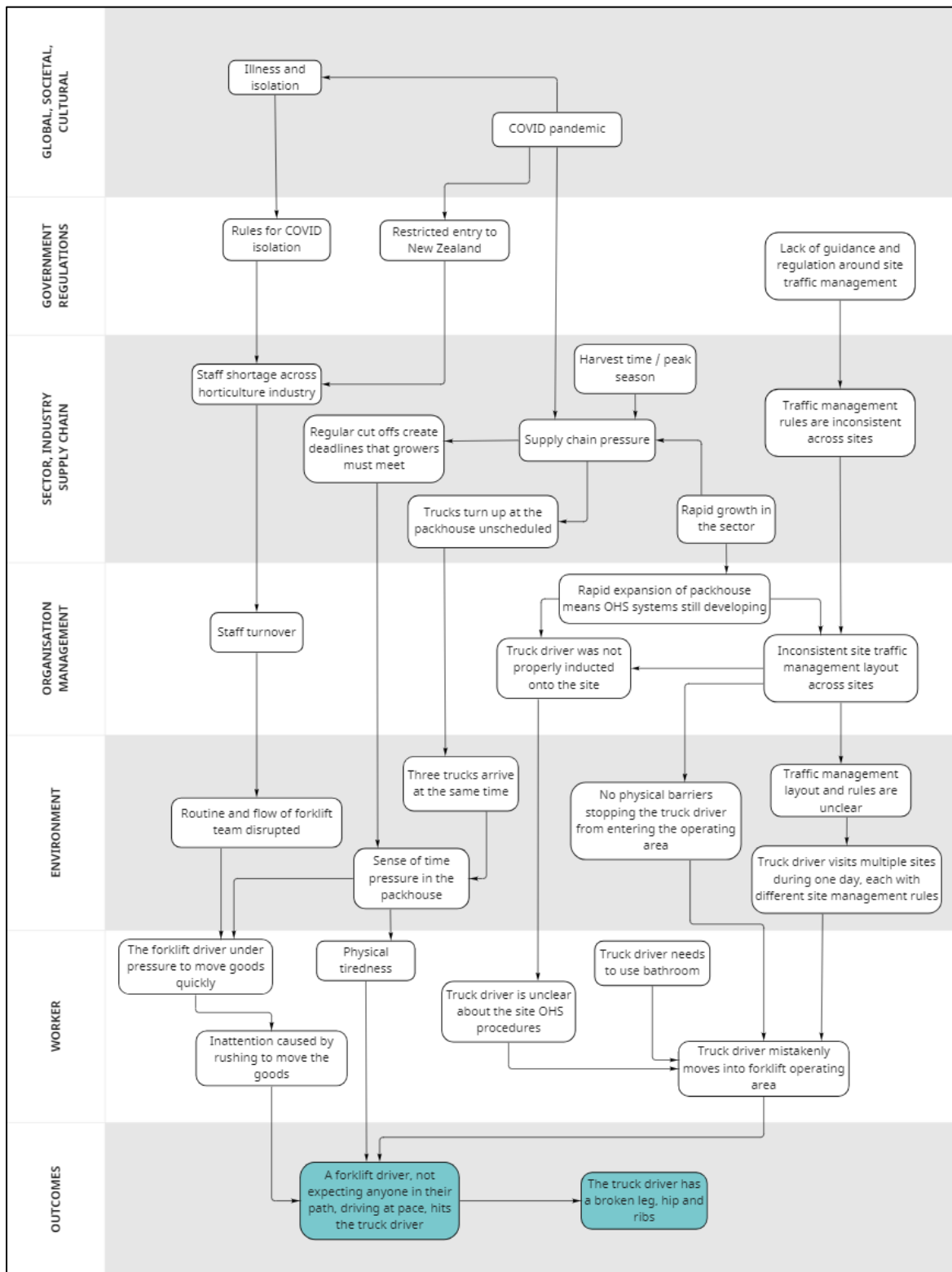
This action wasn't initially noticed by the supervisor who was also new to the job. There are limited staff available currently due to the isolation restrictions from COVID-19. Additionally, there is a high staff turnover which makes it difficult for staff, such as the supervisor, to gain confidence and skill in their work. It is also a challenge for managers to keep up with all the training and inductions required.

Due to the rapid growth in the business and the sector in recent years, packhouses such as these have turned to automation to keep up with demand. A lot of the technology is designed overseas or not specifically for horticulture. There are adjustments and modifications required to ensure the technology runs smoothly and there are limited numbers of mechanics or engineers available due to the pandemic and border restrictions.

The staff shortage is a result of many factors. The work is seen as mentally and physically hard and the pay is perceived to be low for such work. The New Zealand media have contributed to a negative view of the sector and the work appears to be less appealing to New Zealanders. Workers typically don't last long if they are not well suited to the role. There is a shortage of well-suited people for various roles particularly key people such as supervisors, it is a challenge to get the best people for the job.



Forklift versus pedestrian



Forklift versus pedestrian: Narrative

A forklift driver, not expecting anyone in their path hits a truck driver, and the truck driver sustains a broken leg, hip and ribs. The forklift driver was driving at pace when the truck driver mistakenly moved into the forklift operating area. The truck driver simply wanted to use the bathroom before leaving however was unclear about the site's health and safety procedures and traffic management layout.

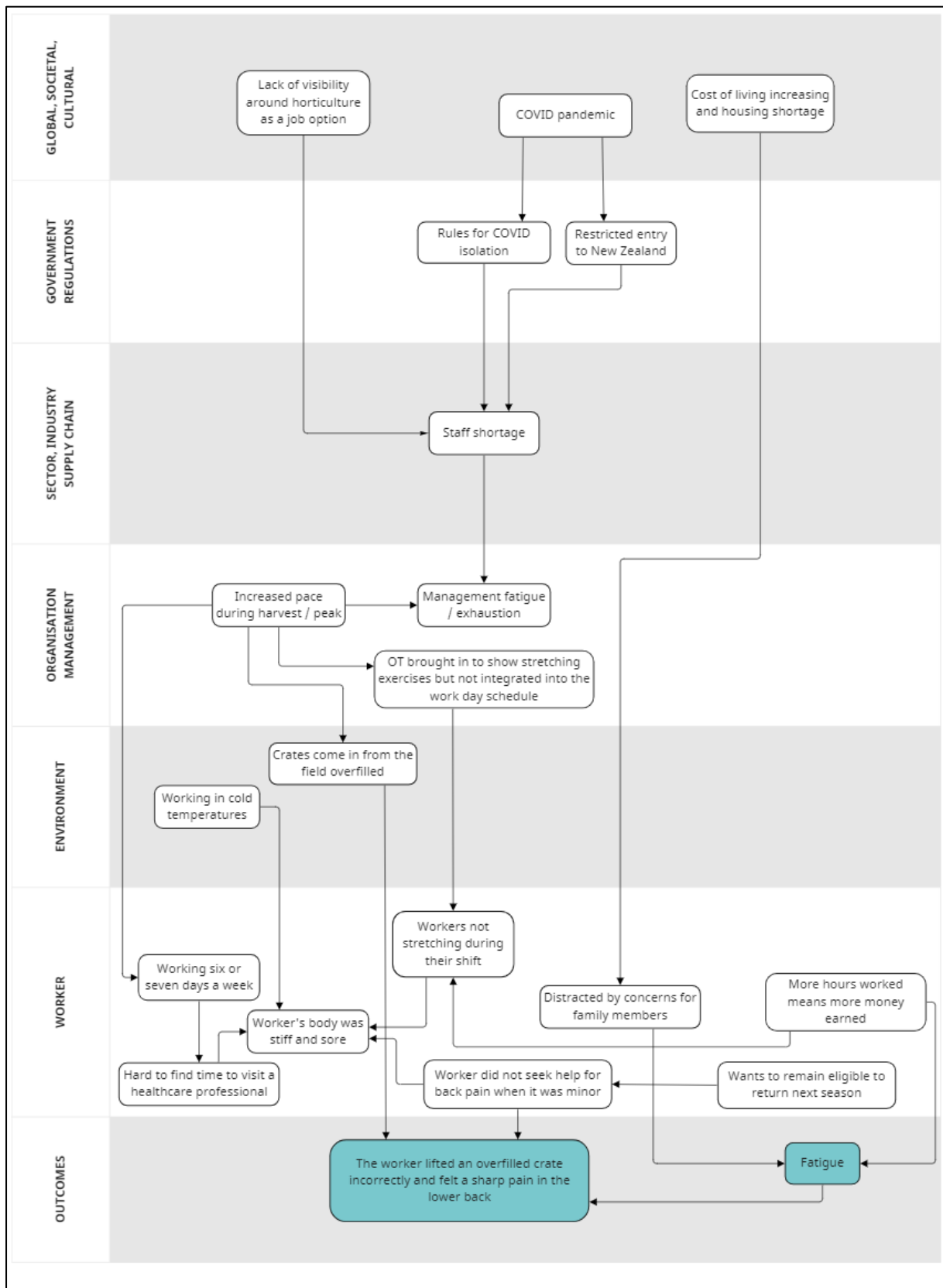
The forklift driver was focusing heavily on moving the goods because on that day, three trucks had arrived at the same time and there was pressure to work fast. There was a wide-spread sense of pressure in the packhouse which meant many were tired. The flow of the forklift team was disrupted because COVID-19 rules and a high staff turnover meant some key members of the team were absent. New workers took time to get used to the flow of work. Restricted entry to New Zealand has meant a sector-wide shortage of staff and qualified workers are not easy to replace.

There were no physical barriers stopping the truck driver from entering the operating area. Rapid growth in the sector has led to rapid expansion in the pack house, so installation of the safety barriers was yet to happen. There are generally inconsistent traffic management layouts across sites which makes the rules at each unclear. The truck driver visits multiple sites during one day, each with their own rules. And under time pressure, people may use the most efficient rather than the safest option. There is a lack of guidance and regulation around site traffic management generally, leaving organisations to work it out themselves.

It is peak season and the whole supply chain relies on getting the produce packed and moved fast. Regular cut offs create deadlines that growers must meet so everyone is working at pace and tired with not enough staff to do all the work.



MSD back injury



MSD Back injury: Narrative

A worker lifted an overfilled crate incorrectly and felt a sharp pain in their lower back. The worker had back pain a month or two ago and at that time it was minor. Fatigue was also a factor for the worker at this time.

Help was not sought for the minor back pain because, as a part of a team, the worker did not want to let the others down by taking time off or rotating to another job. There is a culture of working through minor pain and just getting the job done. It was also difficult for the worker to find a time to visit a healthcare professional. There was a two-week waiting time for appointments and working long and unpredictable hours meant it was challenging to find a time.

The earlier back pain meant the worker was stiff and sore and the temperatures were cold. Stretches were not integrated into the work day because the more hours worked, the more money that was earned. Supervisors suggested taking breaks but often the workers chose to work through. The cost of living and a shortage of housing meant earning sufficient income was important, as was keeping the job for next season. The stress of these factors also played a role in the physical pain experienced by the worker and meant they were distracted while at work. This also led to fatigue.

The crates were coming in from the orchard overfilled. This wasn't an issue in the orchard as the workers filling them were strong and had the ability to lift heavier crates. There is an increased pace of work during harvest and peak season. This may also have been a reason for the overfilled crates. The peak season is an intense and high-pressure time for everyone, including managers.

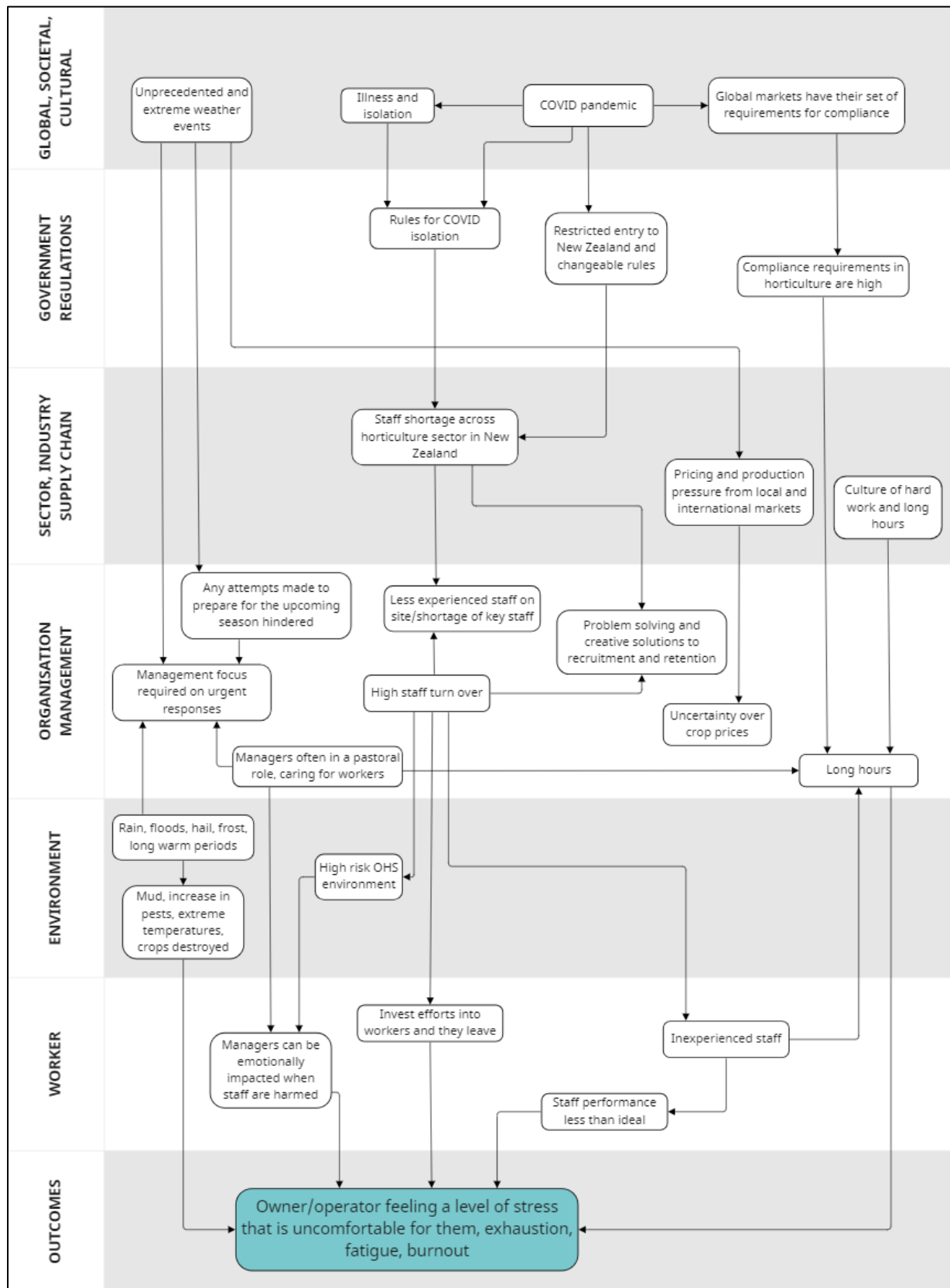
The staff shortage that resulted from a lack of visibility around horticulture as a career and the COVID-19 pandemic rules for isolation added an extra load to the managers. Everyone is under pressure, working at pace, and don't want to let their colleagues and team mates down, so injuries go unreported until they become serious enough to stop someone working.



Management

Below is an AcciMap providing an evidence-based but hypothetical scenario faced by some managers in horticulture. The map shows how factors at different levels such as the COVID-19 pandemic and unprecedented weather events can impact work and workers all throughout the system. When these factors interrelate, it can lead to exhaustion, fatigue and burnout.

Management exhaustion



Fatigue and exhaustion: Narrative

During the previous two seasons managers have been required to handle many unprecedented events. The COVID-19 pandemic coupled with extreme weather events such as flooding made any attempts to plan ahead near impossible and many operate on survival mode.

Poor weather has led to lost crops and impacted the percentage of produce at export quality, flooding the local market and influencing the price received. Pressure is placed on the growers from the supermarkets who react when prices are too high. The reality is, many growers had to walk away from crops due to poor weather or unavailable staff.

Management focus was required on immediate and urgent responses and at times required them to step into pastoral roles, caring for their workforce. Many managers were emotionally impacted when staff were harmed, ill, or struggling which contributed to their mental load. A loss of key staff also meant the flow of work was disrupted as there weren't always replacements to step in.

Similarly, efforts were going to training and inducting new staff only to have them leave or fall ill. Staff inexperience and turnover meant they had extra work to do. Additionally, they were having to be creative and find alternative labour sources during a time when the borders were closed. We heard how difficult it was to think creatively and strategically when under pressure and feeling so tired.

Some told us about the culture of long hours and hard work in the sector. The long hours were a result of the urgent responses, problem solving, staff shortages and not having enough skilled people to do the jobs. However, many also explained that this is the nature of this work and it always has been. There is reportedly a culture of wanting to help and to get things done.

The compliance cost and burden on growers was reportedly contributing to the stress and pressure they felt. Sometimes the compilation of requirements is incompatible or not suitable for New Zealand. Further, sustainability requirements are increasing, for example in Europe where there is a demand for home-compostable labels. Meeting this requirement means trying to understand the individual countries' requirements, developing new labels and new machinery to apply them. This costs and requires time and investment.

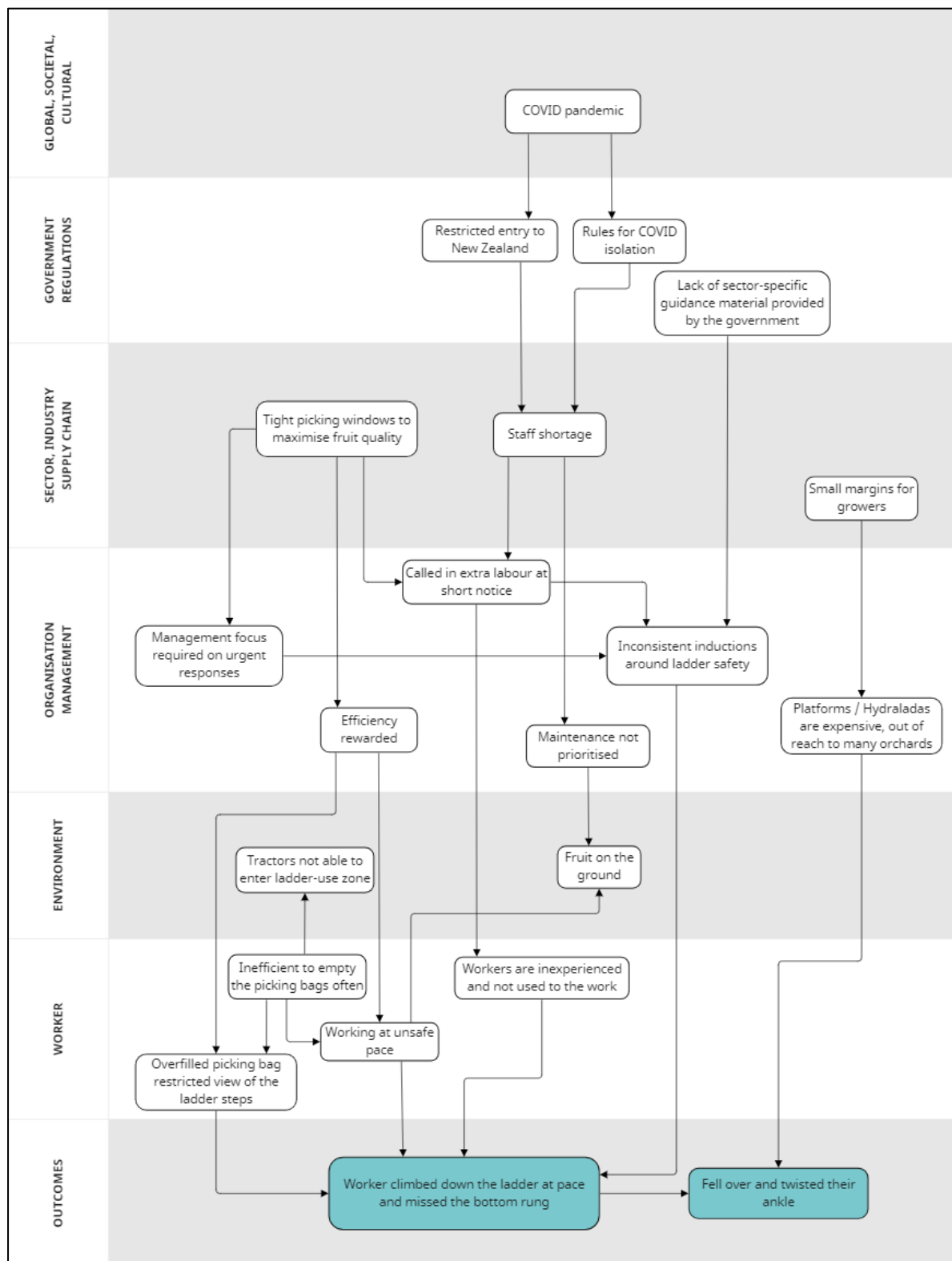
This map illustrates the system-wide pressure on managers, owners and operators leading to situations of stress and compromised mental health.



On the orchard

Below are three AcciMaps and accompanying narratives outlining an evidence-based but hypothetical scenarios from on the orchard. The map shows how factors at different levels can impact work throughout the system and ultimately, in this case, lead to an eye, back and repetitive strain injury.

Fall from a ladder



Fall from a ladder: Narrative

A worker climbed down the ladder at pace and missed the bottom ladder rung, slipping and twisting their ankle. On their front, they were carrying an overfilled picking bag which restricted the view of the ladder steps.

The picking bag was overfilled due to the way in which the tasks can be completed. To pick the fruit required climbing the ladder, and emptying the picking bag requires climbing down to the bin. The worker is paid on piece rate, and is therefore rewarded for efficiency. They were working at pace, thus emptying their picking bag earlier would slow them down. Fruit that does not meet the pick specifications is dropped on the ground. Usually, it's mulched back in via a mower in the evenings, however, it has been difficult in the current market to find staff to do this. The fruit on the ground makes it uneven and contributed to the worker twisting their ankle.

Efficiency is rewarded because there are tight picking windows that the fruit need to be picked in to ensure the highest quality. To get all the fruit picked the organisation decided to call in extra labour at short notice and was unable to complete all training and inductions prior to them starting. They may have been contractors and different people were showing up on site each day, making it hard to keep a record of who had completed what training.

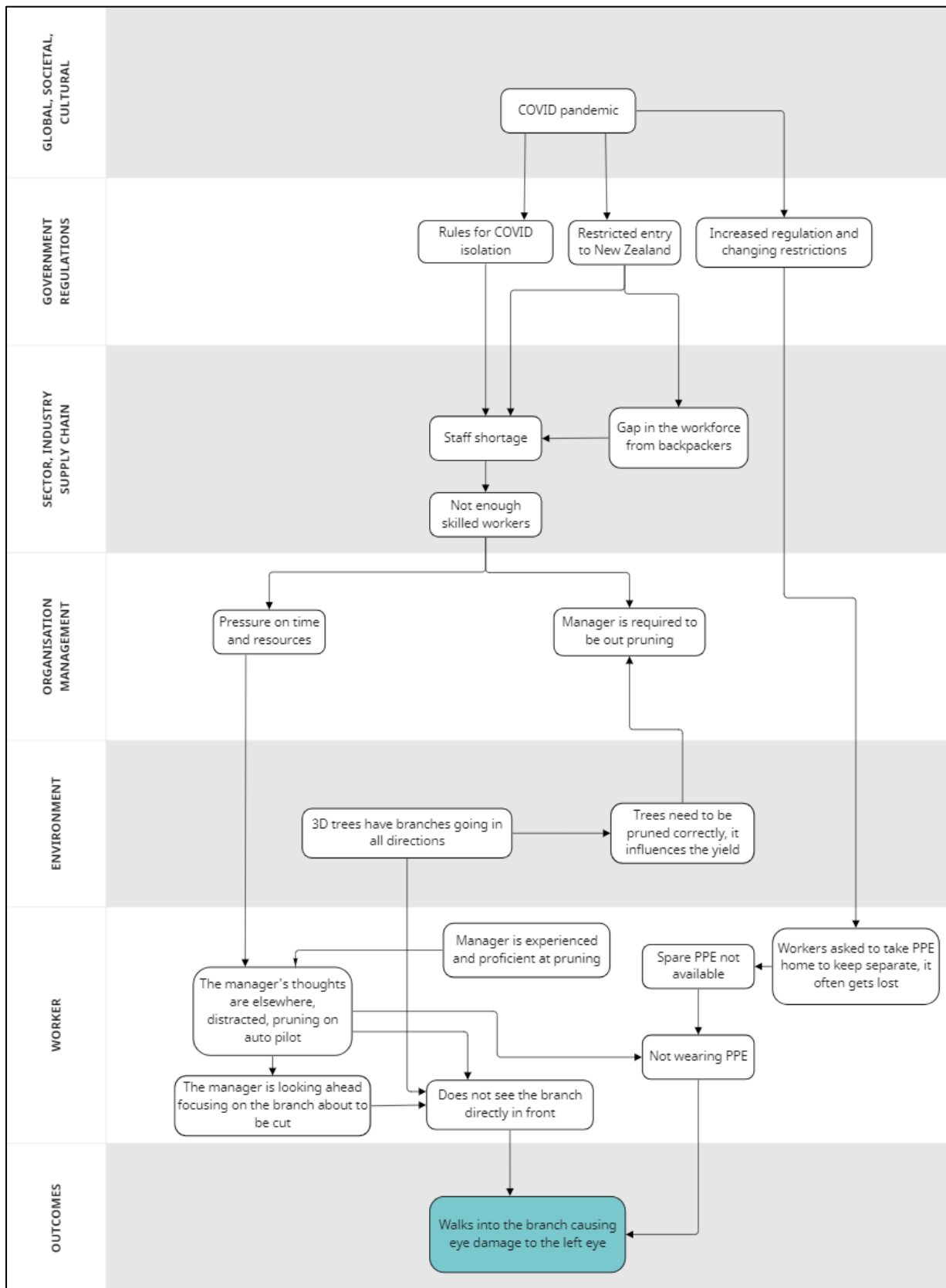
While many in the industry agree that ladders are a risk and should be removed from orchards, it is not possible for most growers. Many growers operate on small margins which means platforms and Hydraladas are expensive and out of reach to many growers. Some of the workers also complain that the platforms slow the work down and they are unable to earn as much money. These platforms require skilled operators and when there is a staff shortage, it is not easy to find such qualified people.

There is a lack of support and guidance material for organisations around safety practices and processes, for example, ladder etiquette. It therefore requires organisations to form their own induction and training processes and programs. This is leading to variation across the sector and extra time pressure on managers, owners and/or operators.

The impact of the COVID-19 pandemic restrictions has led to restricted entry to New Zealand which has resulted in a staff shortage. The sector relies on international labour sources such as backpackers to help during peak picking season.



Eye injury



Eye injury: Narrative

In this scenario, the manager is required to go out and help with the pruning. They are, in this case, the worker. While out pruning the manager walks directly into a branch and damages their left eye. The manager doesn't see the branch directly in front of them because they are looking ahead, focusing on the branch about to be cut. Their thoughts were elsewhere, distracted by organisational pressures so the pruning is happening on auto-pilot.

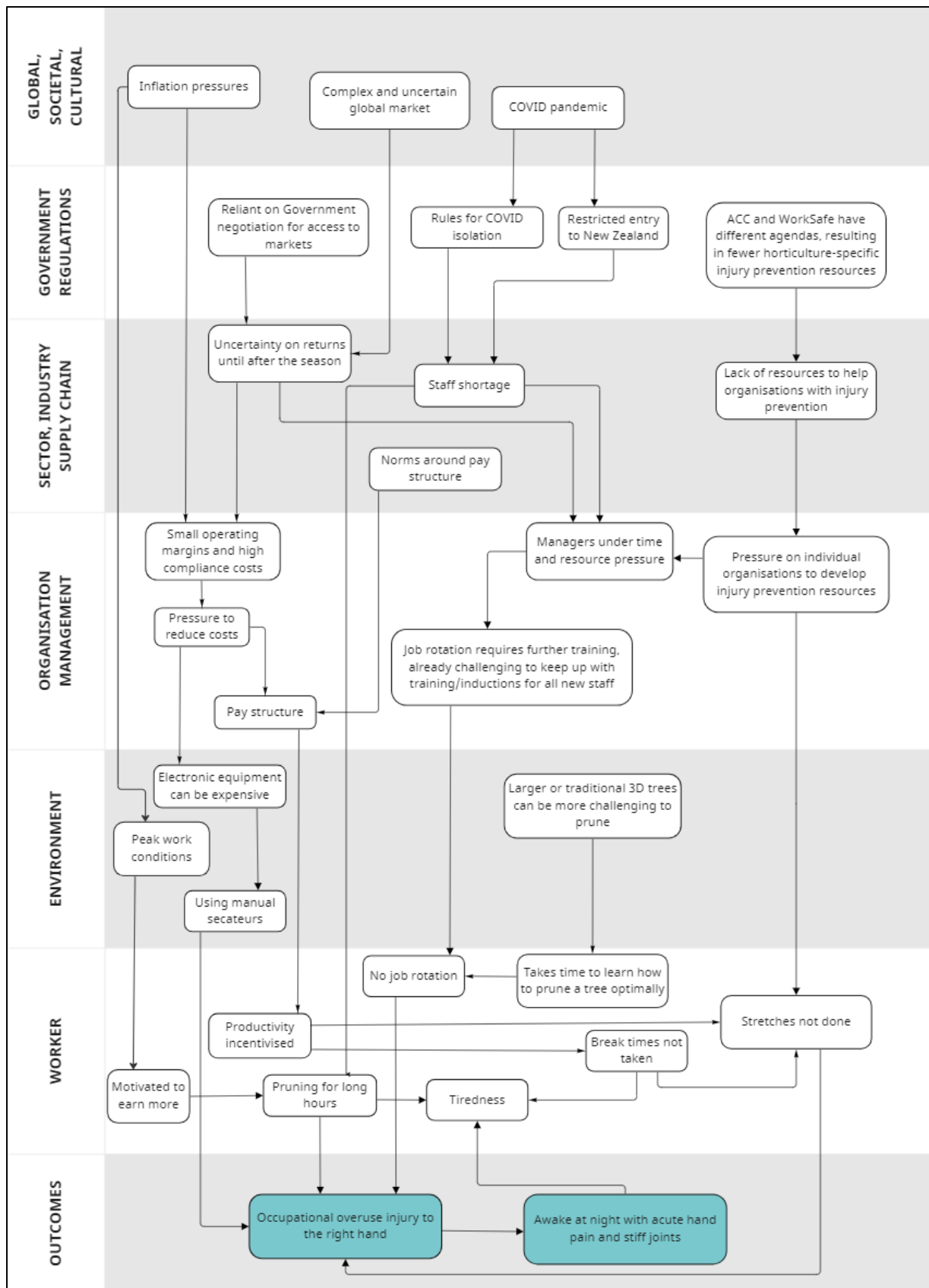
This person has been pruning for decades and knows how to do it quickly and efficiently. The job needed to be done; there were not enough skilled workers to complete the work and the trees need to be pruned correctly because it influences the yield. Some of the older trees have branches going in lots of different directions which is why it's not always easy to see those straight in front.

While pruning, they are not wearing eye protection. The eye protection was not readily available. There weren't spare glasses around, the workers had taken their individual pairs home. They were asked to do this for COVID-related reasons. Often these glasses get lost or don't make it back to the job. As the worker was skilled in pruning, their mind was on other tasks and they did not think to seek out a pair of protective glasses before beginning to prune.

As in the other cases above, a shortage of staff has resulted from restricted entry to New Zealand and rules for COVID-19 isolation. This has meant fewer skilled staff and simply not enough staff to get the work done. So, the manager got out and did it themselves.



Occupational overuse injury



Occupational overuse injury: Narrative

A worker on an orchard has presented with acute hand pain and stiff joints. The acute pain is the result of a repetitive strain injury. Long hours of pruning with manual secateurs have contributed to this injury.

The worker was unable to rotate to another job after first experiencing the hand pain as most if not all other jobs on site require the use of a worker's hands. Job rotation also requires extra training and potentially time off-site. The time away and price of the training adds cost to already tight margins.

The worker has been pruning traditional 3D trees (or larger trees such as Avocados). They must be pruned correctly to ensure optimisation of the yield and it takes time to build this skill. The larger trees are often picked using platforms which require a qualified operator. Losing key people to injury, such as supervisors or qualified people, can add pressure to the whole work system. People often work in teams and may not want to let the team down by rotating out or taking time off for injury. This may be one reason why injuries are underreported.

The worker did not stretch (including their hands) during their shift, despite supervisors suggesting they do so. A contributing factor in this was the desire to maximise earnings and as they are paid per tree, they did not consider taking a break. Guidelines were not available from government or sector sources on good practice around stretching and injury prevention which put onus on the organisation to develop their own practices. This was challenging given the time and resource pressure management are under.

The structure of paying per tree is standard in the sector, and is likely influenced by operating on small margins. Inflation pressures have led to increased running costs for organisations and increased living costs for everyone. The pressure is on both the organisation to keep costs down, and the worker who may work longer hours to earn sufficient income.

The staff shortage within the sector adds stress and pressure to managers, owners, and operators as well as workers who may have their workloads or team dynamics altered. A lack of access to the international labour pool and the local workforce impacted by COVID-19 illness and isolation rules have led to a staff shortage. Workers are required to remain at home if any symptoms appear, and at times whole families working in the orchard are unavailable for work. Although COVID-19 has had a huge impact on the sector over the past few years, it has highlighted weaknesses in areas of the system that have not previously been considered.

There remains a backlog from the COVID-19 pandemic and it's placing pressure on the supply chain. There are delays in receiving and sending goods and in getting the right machinery needed for the job. The global market is complex and uncertain and the culmination is resulting in continued pressure on the growers.

