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Programme: Harvesting & Logistics

Project No: 6.2
Milestone Number: 2.2

Report No. H046

Stress and the New Zealand Forest Industry Workforce

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Date: 24 April 2020

TABLE OF CONTENTS

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EXECUTIVE SUMMARY

There is clear evidence that stress is having an impact on the health and wellbeing of the forest industry workforce in New Zealand. While this has legal ramifications under New Zealand's health and safety legislation (Health and Safety at Work Act 2015), international research also shows that harm to mental health invariably leads to reduction in workforce productivity and business profitability. The reverse is also true: mental wellbeing can lead to greater worker engagement and commitment which increases productivity and profitability. However, there are several good reasons why industry managers and leaders may not be aware of either the existence of a workplace stress problem, or its potential impact.

The aim of this report is to consider where the opportunities for enhancing wellbeing may lie within the New Zealand forest industry. The analysis is based on a critical review of stress and psychosocial hazards within the international forest industry and industries with similar structures and workforces to forestry (such as construction). Psychosocial hazards relate to the influence of social factors on an individual's mind or behaviour, and to the interrelation of behavioural and social factors. A psychosocial hazard or work stressor is any occupational hazard that affects the psychological and physical wellbeing of workers. This report gives attention to the way in which these psychosocial hazards are explained and researched.

The review shows that existing research within the forest industry internationally largely reflects existing knowledge regarding harmful aspects of job content and workplace conditions. However, it is argued that the focus of this research on the immediate workplace conditions obscures the impact of the wider social context and limits the potential of management to move beyond seeing those broader psychosocial factors simply as risks to be minimised. By bringing more of an ecological systems perspective to the analysis of forestry workplaces, it becomes easier to identify the elements of forest management practice that may impact stress within the workforce. It also becomes easier to identify the pathways between family, the community and the workplace that may either exacerbate or reduce workforce stress.

Fortunately, the psychosocial conditions that promote stress also have the potential to promote health, with the benefits to wellbeing extending beyond the workplace. Successful stress management is thus an opportunity for the industry to increase both its value to investors and to its other stakeholders.

Note: a version of this work was first reported in the New Zealand Journal of Forestry Science:

- Best T., Visser R. and Conradson D. (2021) *Stress, psychosocial factors and the New Zealand forest industry workforce: seeing past the risk of harm to the potential for individual and organisational wellbeing.* New Zealand Journal of Forestry Science 51 http://dx.doi.org/10.33494/NZJFS512021X93X.

INTRODUCTION

Health is a human right that goes beyond the absence of harm and includes physical, mental and social wellbeing (World Health Organisation, 2019). That principle is reflected in the ILO's health and safety standards which set an expectation that goes beyond work taking place in a safe environment to include conditions of work that are consistent with worker's wellbeing and human dignity. Implicit in these standards is that work should offer real possibilities for personal achievement, self-fulfillment and service to society (Forastieri, 2016). Health and safety management frameworks focused on elimination of harm align with these intentions when the hazards are physical, and wellbeing is enhanced simply by the absence of the hazard. However, this is not the case when the hazardous conditions are psychosocial. In the psychosocial domain, health is negotiated in the relations between our mental and physical capabilities and the social environments in which our lives unfold (Woodward, 2015). When the social environment is the workplace, that means health is impacted by the design and management of work and its social and organizational context (Cox, Griffiths, & Randall, 2003). More importantly, those impacts exist on a continuum from causing harm to promoting wellbeing (Bentley et al., 2019; Leka et al., 2015). Psychosocial conditions that are known to be hazardous to a worker's health arise from domains that also have the potential to promote good health (Leka et al., 2015). Yet rather than promoting the management of those psychosocial factors to promote worker wellbeing, the occupational health and safety frameworks in most developed countries seek to prevent harm by eliminating or minimizing the risks to worker health represented by hazardous psychosocial conditions (Chirico, Heponiemi, Pavlova, Zaffina, & Magnavita, 2019).

Recent changes in NZ's health and safety legislation are a good example of this problem. The Health and Safety in the Workplace Act 2015 (HSWA) contains a clear expectation that the work-related risks to a person's mental health should be managed by the people in charge of that work or workplace. In the interpretations (section 16) of the Act, the definition of a hazard includes behaviour that has the potential to harm, "whether or not that behaviour results from physical or mental fatigue, drugs, alcohol, traumatic shock, or another temporary condition that affects a person's behaviour". The understanding of "health" in the Act includes both mental and physical health. However, managing workplace factors that impact psychosocial health through a framework focused on psychosocial conditions as hazards may obscure the opportunity to enhance both individual and organisational health represented by those factors. Health should be addressed as something more than harm elimination or reduction (Leka et al., 2015).

Designing workplaces and work processes in ways that go beyond harm elimination and reduction improve a worker’s quality of life and enhance productivity and sustainability. Making such interventions can be a challenge when the workforce is largely employed through service

contracts, however, as is the case with the New Zealand forest industry. While the direct terms and conditions of the employment relationship are set by the contractor/employer, the scope of those conditions is largely controlled by the agreement between the contractor and the forest owner. The organisation of the work and the workplace is therefore not totally within the control of the employer. However, the HSWA places the responsibility for the primary duty of care onto a "Person conducting a business undertaking" (PCBU). This means that the obligation for managing the risk of a negative health outcome arising from mental distress sits with whoever creates that risk, regardless of where in the process of work that risk arises (and irrespective of the nature of the employment relationship between the PCBU and the worker who suffers harm).

What makes this challenging for forest owners and managers is that the feedback loops that could bring the impacts of mental distress to their attention are poorly developed. While noting signs of stress in the workforce, Lovelock and Houghton (2017)and Nielsen (2015b)both concluded that more work was needed to increase awareness of the full range of risks faced by forestry workers and the health impacts of those risks. Furthermore, the arm's length nature of their service agreements means that forest owners and managers do not have the direct relationship with worker health and safety that would enable awareness of stress and its impacts. Despite widespread annual physical health checks of workers by contractors, there is no consistent and centralised assessment process in operation within the industry (Forest Industry Safety Council, 2018). The generally available investigation methods used to generate a learning feedback loop after an accident are unable to take psychosocial factors and any associated stress into account (Van Wassenhove & Garbolino, 2008, as cited by Leka et al., 2015). Those charged with managing health and safety within the New Zealand forest industry could well be operating somewhat unaware of the potential impacts of stress in its various expressions on workers' wellbeing.

This report draws upon the research on stress within the international forest industry workforce to identify several opportunities for enhancing wellbeing amongst forest industry workers in New Zealand. It reviews how work-related stress and its risk factors are generally explained, and then considers what the existing research on work-related stress within the world's forest industries suggests about health impacts and psychosocial hazards within forestry. It considers whether focusing on workplace psychosocial hazards is the most appropriate framework for addressing stress and wellbeing within the forest industry workforce and presents an alternative view based on ecological systems theory with some suggestions as to what this might imply regarding potential interventions.

RESULTS

Psychosocial Hazards

Work related stress has generated a large body of academic endeavour that focuses primarily on how a person fits or does not fit into their work environment (Väänänen, Murray, & Kuokkanen, 2014). In this framework, work-related stress is seen as psychological strain or negative psychophysiological responses or reactions (Chirico et al., 2019) that occur either when the demands of the work environment exceed the capabilities and resources of the worker or the needs of the worker cannot be supplied by the work environment (Dewe & Cooper, 2017; Forastieri, 2016). Stress is thought to occur when that mismatch becomes chronic or unmanageable (Leka et al., 2015). The focus of research has been to clarify the relationship between the work place environment, the individual's body and their mind through tests of the impact of work place characteristics (psychosocial hazards) on particular unhelpful behaviours and psychological and somatic symptoms (Väänänen et al., 2014). Measuring both the psychosocial hazards and the symptoms has required the development of self-rating scales (Väänänen et al., 2014). Despite the proliferation of those instruments (Leka & Jain, 2010), that body of work has produced a reasonable level of agreement on the psychosocial conditions in the workplace that raise the probability of a proportion of the workforce suffering a negative psychophysiological response due to chronic and unresolvable exposure to those conditions (Leka & Jain, 2010; Maslach & Leiter, 2016).

Both the New Zealand Workplace Barometer (Bentley et al., 2019) and the World Health Organisation (WHO) review of psychosocial hazards at work (Leka & Jain, 2010) use the following definition of psychosocial hazards, as established by (Cox et al., 2003, pg 195):
"*those aspects of work design and the organisation and management of work, and their social and environmental contexts, which have the potential for causing psychosocial or physical harm".*
The World Health Organisation (2008) developed a summary table of work-related psychosocial hazards (see Table 1) for the European Framework for Psychosocial Risk Management. The New Zealand Workplace Barometer is based closely on this EU framework in that it incorporates all ten domains and adds workplace bullying to the domain of interpersonal relationships at work (Bentley et al., 2019).

Table 1: Work-related Psychosocial Hazards

Psychosocial Hazard	Explanation
Work Content	
Job Content	Lack of variety or short work cycles, fragmented or meaningless work, under use of skills, high uncertainty, continuous exposure to people through work.
Workload and work pace	Work overload or under load, machine pacing, high levels of time pressure, continually subject to deadlines
Work schedule	Shift working, night shifts, inflexible work schedules, unpredictable hours, long or unsociable hours
Environment and Equipment	Inadequate equipment availability, suitability or maintenance, poor environmental conditions such as lack of space, poor lighting, excessive noise
Control	Low participation in decision making, lack of control over workload, pacing, shift working
Work Context	
Organisational culture and function	Poor communication, low levels of support for problem solving and personal development, lack of definition of, or agreement on, organisational objectives
Interpersonal relationships at work	Social or physical isolation, poor relationships with superiors or co-workers, interpersonal conflict, lack of social support
Role in Organisation	Role ambiguity, role conflict, and responsibility for people
Career Development	Career stagnation and uncertainty, under promotion or over promotion, poor pay, job insecurity, low social value to work
Home-work interface	Conflicting demands of work and home, low support at home, dual career problems.

Source: (Cox et. al. 2000, as cited by Forastieri, 2016)

Given that the New Zealand Workplace Barometer lists forestry as one of the industries with the highest reported prevalence levels of bullying (greater than 10% of respondents reported having been bullied), the addition of workplace bullying and harassment is highly relevant to the industry. This is particularly as the definition of bullying used by the survey required the harassment to occur over a period of time and involve one or several perpetrators (Bentley *et al.*, 2019). However, World Health Organisation (2008) researchers point out that while bullying can be considered a psychosocial risk, it should also be regarded as a consequence of a poor psychosocial work

environment. The implication being that if an organisation mitigates the risks as listed in Table 1, the risk of bullying will also reduce..

The findings of other research overlaps considerably with this framework, albeit with different emphases. In their review of two decades of research on burnout and its causes and outcomes, Maslach and Leiter (2016) pointed to six key domains of psychosocial hazards: workload, control, reward, community, fairness; and values.

Workload, control and community show little deviation from the European Framework. However, Maslach and Leiter (2016) placed much greater emphasis on the role of rewards (financial, institutional or social), fairness (the extent to which decisions are perceived as being fair and equitable) and values (the alignment between the individual's values and those of the organisation for whom they work) in the development of burnout. These differences may be relevant to the NZ forest industry. Issues such as whose interests are represented in the service contracts that form the basis for employment of the workforce and how those contracts distribute risk and reward will shape the perception of whether those agreements are seen as fair and equitable. Furthermore, with a workforce that is approximately 37% Māori (Ministry of Primary Industries, 2020) there is a significant potential for differences in world views between a significant part of the workforce and the forest industry, creating mis-alignment in values (B. Hooper, personal communication, 13 August 2020).

Similarly, Pfeffer (2018), in a review of the epidemiological literature of work related stress points to ten workplace exposures that affect human health through stress. As with the psychosocial hazards associated with burnout, this framework is largely the same as that used in the European Framework. However, there are key differences that are important in the context of the New Zealand forest industry. Job insecurity, whether for one's own job or those of colleagues, is much more prominent in Pfeffer's framework, something that could be considered important in the forest industry, which employs most of its workforce on a contractual basis paid by piece rates and is subject to the threat of stand down or job loss for perceived contractual transgressions. Job insecurity is also highlighted as a key work-related psychosocial stressor by other authors (e.g. Dewe & Cooper, 2017).
Furthermore, Pfeffer included access to health care as a significant stressor reflecting the "US-centric" nature of the epidemiological literature. However, any industry reliant on a rurally located workforce in New Zealand should be aware of the reduction in access to health care for those who live outside the urban centres due to health service re-structuring between 1980 – 2001 and the consequential differences in the rates of decline in all-cause mortality rates between urban and rural regions (Pearce, Tisch, & Barnett, 2008).

As with any form of hazard, the differences between these frameworks highlight the contextual nature of psychosocial hazards and the need for identification of psychosocial risks within the New Zealand forest industry to be the subject of more research than they are currently. However, there has been research undertaken within the forest industries of other countries that is relevant to the New Zealand context. This research can point to the potential psychosocial hazards operating in the New Zealand forest industry and their impacts on health and wellbeing.

Evidence of Health Impacts of Work-related Stress in Forestry

Within the international forest industry, the study of known mental health conditions and their association with wellbeing and safety is centred on an 18-year prospective cohort study assessing health and potential risk factors within the workforce of a multinational forest industry company based in Finland that included manual labourers and machine operators (Väänänen et al., 2008). Research based on data from this study highlighted the association of burnout with negative health and safety outcomes. The construction of burnout used in the studies arising from the Still Working project was the Maslach Burnout Inventory, or MBI (MBI, Maslach, Jackson & Leiter, 1996, as cited in Maslach & Leiter, 2016) which consisted of three dimensions:

- overwhelming physical and emotional exhaustion arising from depleted emotional and physical resources with insufficient recovery (Maslach & Leiter, 2017);
- feelings of cynicism that reflect a detached attitude towards work and increasing disregard towards one's co-workers and clients (Toppinen-Tanner, Kalimo, & Mutanen, 2002); and
- a reduced sense of accomplishment and effectiveness (Seidler et al., 2014).

Assessments using this psychometric instrument occurred at various times throughout the study period and could be correlated with a number of different health outcomes recorded in various registry's kept by Finland's National Population Register Centre and the company itself (Väänänen et al., 2008).

The health outcomes explored over the life of this research program are significant to the NZ forest industry for several reasons. Firstly, they involved many participants (ranging from 3,895 employees to 10,062) that were mostly men (greater than 76%) involved in manual work or machine operation (greater than 62%). Secondly, burnout was correlated with clinically derived indicators of health (Väänänen et al., 2008) and were therefore considered more reliable than measures based on self-reporting instruments (Väänänen et al., 2014). The research facilitated by this programme all pointed to burnout being associated with negative health outcomes. An increase in the Maslach Burnout Inventory (MBI) summary score of one unit was associated with a 35% increase in the risk of mortality among workers younger than 45 years old (Ahola, Väänänen, Koskinen, Kouvonen, & Shirom, 2010). Of the sub-scales, only exhaustion produced a statistically significant hazard ratio when

adjusted for socio-demographic and baseline health factors. A similar study of the relationship between burnout and severe injuries by the same research group found a one unit increase in the burnout summary score to be related to a 10% increase in the risk of injury requiring hospitalisation or causing death (Ahola, Salminen, Toppinen-Tanner, Koskinen, & Väänänen, 2013). Of the MBI sub-scales, emotional exhaustion was associated with a 9% increase in the risk of injury, while cynicism was related to a 10% increase in the risk of injury, suggesting having both energy and motivation to act safely is required to prevent workplace injury or death. Toppinen-Tanner, Ojajärvi, Väänänen, Kalimo, and Jäppinen (2005) reported on burnout as an event prior to sickness absence for different medically certified causes of absence. They found that the MBI summary score was positively correlated with the risk of future medically certified absence after adjustment for age, gender, occupation and baseline absence. The increased risk of future illness was shown to include mental and behavioural disorders and diseases of the cardiovascular and musculoskeletal systems. Extending the timeframe on this study showed burnout predicted future hospital admissions for mental health and cardiovascular disorders among participants who had not suffered the disorder prior to the start of the study (Toppinen-Tanner, Ahola, Koskinen, & Väänänen, 2009). Although none of these studies defined a causal pathway between burnout and negative health outcomes, they do suggest work-related stress conditions are associated with increased risk of injury, illness and early mortality within a male dominated, manual and machine operator workforce. Such research has relevance to the New Zealand forest industry.

Of concern, therefore, is that there are already indications that mental distress is having an impact on New Zealand forest industry workers. The New Zealand forest industry is part of an occupational group (Forestry and Farming) that contributes 6.8% of male suicide victims in New Zealand (Suicide Mortality Review Committee, 2016). If that percentage still holds, increases in male suicide levels in New Zealand (Coronial Services, 2020) suggest that deaths by suicide are likely to exceed accidental workplace deaths for the farming and forestry occupational group. Work Safe New Zealand's National Health and Safety Attitudes and Behaviours Survey (NHABS) also noted that "stress-related or mental illness was more likely to be identified as a long-term health problem by workers who had personally experienced a serious harm incident (22% compared with 12% of those who had not experienced an incident) or a near miss incident (19% compared with 11%)" (Nielsen, 2015a, Pg 68). The same survey found that 27% of employees and 36% of employers experienced a serious harm near miss or actual incident in the preceding 12 months (Nielsen, 2015a). This is in line with international evidence that highlights (i) the interaction between exposure to actual and potential trauma and mental health disorders (Tehrani, 2004) and, more specifically, (ii) the relationship between exposure to risks and hazards and mental distress (Nahrgang et al., 2011). Furthermore, the Lovelock and Houghton (2017) review of the industry highlighted the prevalence of health conditions among workers such as hypertension and diabetes, poor lung function due to high levels of smoking, and high levels of substance abuse. All of these conditions have some

association with stress as lifestyle responses to mental distress (Forastieri, 2016; Leka & Jain, 2010; Solar & Irwin, 2010). The 2014 NHABS (Nielsen, 2015a) also lists fatigue, ill health, stress and addictions as barriers to improvement in health and safety outcomes and notes that emotional and physical stress is of high concern to those working in the industry.

Mental distress and strain are also known to have significant negative impacts on business profitability and sustainability (Leka et al., 2015; Pfeffer, 2018; World Economic Forum, 2008). Presenteeism (presenting for work while sick or injured) has been shown to reduce worker productivity, with a cost impact four times greater than that of directly treating the condition (Edington & Burton, 2003). The latest NHABS reported that 53% of forest workers surveyed had worked while sick or injured and 46% had worked while overtired (Nielsen, 2018). Similarly, a reduction in psychological health has also been associated with the sort of risky and dangerous behaviour that can lead to both accidents and quality loss arising from adverse events (Du Plessis et al., 2013; Forastieri, 2016; Leka et al., 2015). The same study that identified exposure to risks and hazards as a risk factor for mental distress also found an association between mental distress and risky and dangerous behaviour (Nahrgang et al., 2011). Finally, workers exposed to hazardous psychosocial environments are less likely to engage in re-training or further learning (Leka et al., 2015). This should be of concern to an industry looking to adapt to the physical safety risks through the introduction of mechanised harvesting systems (Steepland Harvesting Programme, 2018) and increase its workforce to take advantage of growth opportunities (Harris, 2017; Moore, 2017).

Health Impacts of Psychosocial Workplace Conditions

Within the international forest industry there are several studies that test the association between psychosocial workplace conditions and workers health in forestry and logging operations. Although none employed the psychosocial hazard framework outlined in Table 1, all have used conditions that fit within elements of that framework, such as:

- psychological demand
- intellectual discretion / job control
- time / work pressure
- work security
- income satisfaction
- social support
- exposure to risks and hazards, and
- repetitiveness / monotony

These elements have been associated with disorders of the neck / shoulders and lower back (Hagen, Magnus, & Vetlesen, 1998), mental strain (Inoue, 1996), and reduced job or life satisfaction (Hanse

& Winkel, 2008; Mylek & Schirmer, 2015).The international findings fit with a New Zealand study on fatigue, work/rest patterns and recent injury and near injury experience (Lilley, Feyer, Kirk, & Gander, 2002). This found that 78% of participants reported experiencing fatigue sometimes, often, or always, with 19% experiencing fatigue often or always. There was also a significant association between self-reported near misses in the previous 12 months and the reported level of fatigue experienced at work. Getting eight hours sleep and taking breaks was associated with reduced fatigue, but the majority of participants reported having seven hours or less sleep per night (and almost 25% reported six hours or less).These are all psychosocial conditions associated with reduced mental wellbeing. Despite the paucity of research, there is enough evidence to suggest that forestry workplaces contain psychosocial hazards that are harmful to mental health and that those hazards fit within the European framework (see table 1). There is also sufficient research in the New Zealand forest industry (Lilley *et al*., 2002; Lovelock & Houghton, 2017; Nielsen, 2015b) to suggest these conditions also apply to local forestry workplaces.

However, some research within the forest industry highlights a key difference between physical hazards and the psychosocial domains listed as hazards in Table 1. As noted above, the risk management objective for a physical hazard is to reduce the potential of that hazard negatively impacting the health condition of the worker (HSWA). The goal is for the worker to go home at the end of the day in the same health state as when they arrived. On the other hand, effective management of psychosocial risks creates the potential for the worker to go home with enhanced wellbeing (Bentley et al., 2019; Leka et al., 2015). In their study of the impact of job content (see table 1) on logging machine operator wellbeing, Hanse and Winkel (2008) found that daily task variety, job rotation and access to breaks when required were all positively associated with job satisfaction to a statistically significant degree. They also found a statistically significant positive association between job control and job rotation with reduced musculoskeletal symptoms, and between job rotation and access to breaks with reduced headaches and sleeping problems. Overall, job rotation – defined as operating a shift system that broke up machine operating hours, altering tasks to reduce machine operating tasks and restricting or controlling the number of machine operating hours – had a positive impact across all three measures of wellbeing in the study.

Similarly, in their survey of Australian forestry managers and workers, Mylek and Schirmer (2015) found a number of work context elements (see table 1) were associated with improved wellbeing. Participants who felt they had more control over their work, reported a better work-life balance and were more satisfied with their income also reported higher life satisfaction and general health. Other psychosocial conditions that were significantly associated with higher life satisfaction included job security, a positive workplace culture (defined as confidence in being able to express views), a felt level of social support, higher work efficacy and a positive work-related social identity. Interestingly, only job control, work-life balance, income, a positive culture, and work-related efficacy were

positively associated with general health. What these results reflect is that psychosocial factors can be managed, not just to reduce work-related stress but to promote worker engagement, “a persistent, positive affective-motivational state of fulfilment that is characterised by the three components of vigour, dedication and absorption” (Maslach & Leiter, 2016, Pg 104) as a state of wellbeing. Furthermore, Nahrgang et al. (2011) found engagement was positively associated with reductions in risky and unsafe behaviour, adverse events and accidents and injuries. If psychosocial risk management is approached with engagement as the goal, psychosocial factors can switch from hazards to be eliminated to protective factors that can be pursued, not only to protect workers from harm but also to promote wellbeing.

Mitigating Psychosocial Risks

While the HSWA might make it clear that any forest owner or manager must ensure, to a reasonably practicable extent, the mental and physical health of those working in the forest, the contractual nature of the workforce does not easily fit with the ‘employee’ focus of the psychosocial risk framework. A forest owner or manager could easily be excused for thinking that psychosocial risks exist only within the specific work environment of the contractor for whom the worker is employed. This approach highlights a specific weakness to thinking about work-related stress. That is, the model assumes that all of the stress experience captured in the research originates within the worker’s immediate work context (Theorell et al., 2015). Of concern for the forest industry, is that the approach ignores the broader social structures and systems (e.g. piece rate contracts) that may drive those risk factors in the immediate work context, and that people exist within adjacent systems that may have highly permeable boundaries. With such a narrow view of context, the focus goes onto the individual and what can be done to enable coping (Harkness, Long, Bermbach, & Patterson, 2005). As a result, the aim of interventions is to either modify the micro-organisational elements (for example, decision latitude, social support) that surround the individual (Väänänen et al., 2014) and/or enhance the individual’s ability to cope through counselling or stress management techniques (Harkness et al., 2005) . Consequently, macro-organisation and wider social system issues are not addressed and the potential to eliminate stress through removal of the stressors in the wider context is not considered (Dewe, O'Driscoll, & Cooper, 2010).

In considering how psychosocial factors could be managed to the benefit of both individuals and the organisations in which they work, it is important to recognise that workplaces sit within an ecological system where they exist in relationship with all other parts of that ecological system. Ecological systems theories, such as that proposed by Bronfenbrenner (1977), explain human behaviour by recognising that individuals always act within these larger social and ecological systems (see figure 1). To understand behaviour it is also important to understand the nature of the institutions and social structures within each level of the system and the ways in which those levels interact and may reinforce each other (Golden & Earp, 2012). Stokols (1992) argues that the social, physical, and

cultural aspects of this multi-layered environment each have a cumulative effect on health. There are consequently multiple influences on specific health behaviours and outcomes, and multiple opportunities to intervene. Achieving change will require interventions at a number of different points within the system (Sallis, Owen, & Fisher, 2008). Unfortunately, interventions for worker wellbeing within the New Zealand Forest Industry, as guided by the legislation and the traditional conception of workplace mental health, are focused almost entirely on the specific settings in which people work. Yet what the ecological perspective shows is that health is determined as much by what goes on in the mesosystem (where those settings interact, see figure 1) and by the social, political, and cultural settings of the exo- and macrosystems (see figure 1), as by what goes on within the specific work setting.

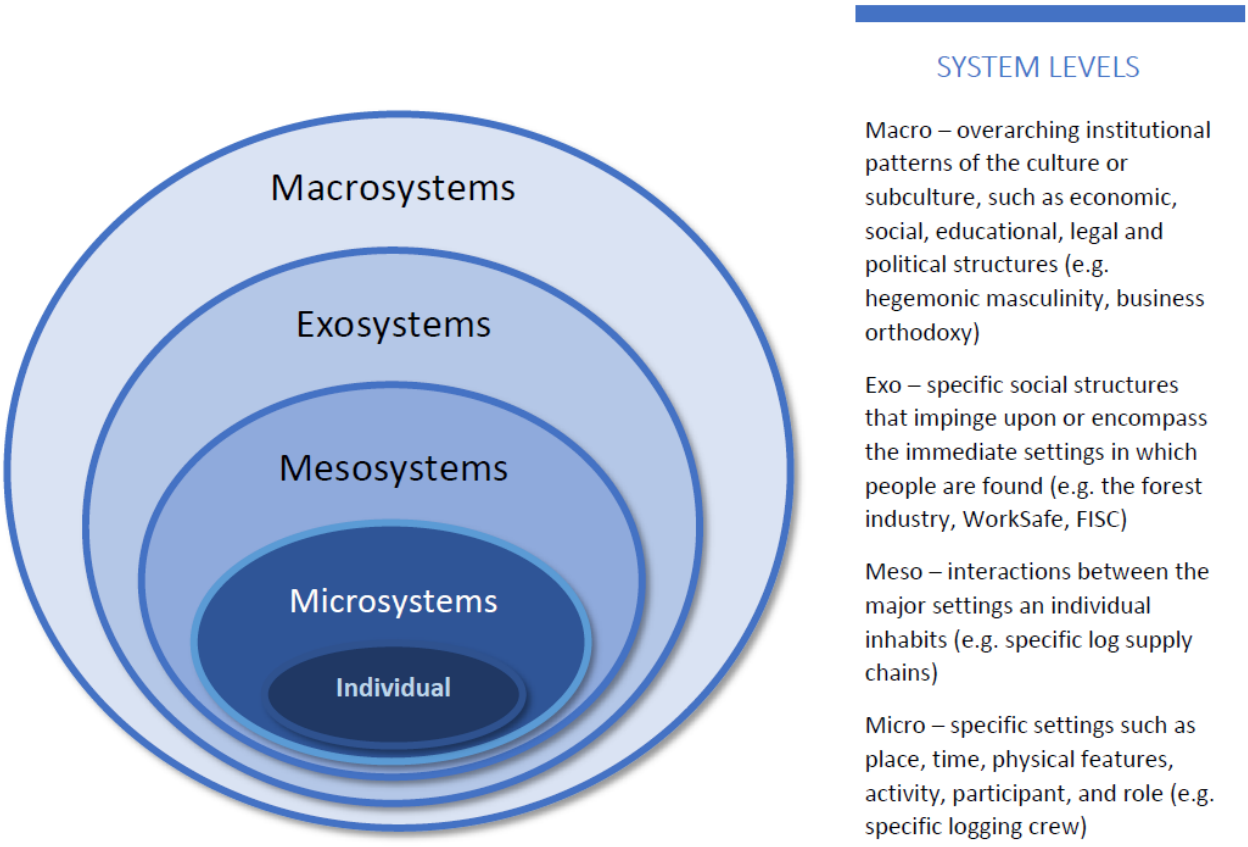

Figure 1: Bronfennbrenner's Ecological Systems Theory (adapted from Bronfenbrenner, 1977)

The significance of this point for designing wellbeing interventions can be illustrated by considering the interactions between the various industry players. Lilley et al. (2002) confirmed that the total workday length for forestry workers in New Zealand was increasing, that there were substantial groups of workers whose break times were compromised, and that there had been a reduction in the number of workers getting two consecutive days off in every seven days in the preceding 10 years. Hide, Tappin, and Parker (2010) study of cable logging places noted the inconsistent break times, and that work pace and workload were often driven by the pace of the adjacent workstations. These are all factors directly controllable within the workplace (the microsystem, in Bronfenbrenner's framework, see figure 1). However, they also pointed to the impact of elements beyond the direct

control of the contractor. The challenge of achieving daily piece rate targets, working on sites with limited operating and storage space, and bottlenecks in the downstream supply chain all directly impacted the working day length. These conditions arise from the mesosystem (interactions within the supply chain) and the exosystem (outsourcing operations using piece rate contracts). Furthermore, long commutes were found to increase the length of the workday, suggesting that urbanisation, a macrosystem change, was adding to the problem.

Demonstrating the impact of an understanding for designing interventions can be illustrated by considering the interactions between work, family, the community, and wider societal issues such as gender and socio-economic status. Lovelock and Houghton (2017) highlighted the potential for the poor health and safety outcomes of the New Zealand forest industry to originate with psychosocial stressors from outside of the workplace, such as high drug use in worker families and communities, insecure and overcrowded accommodation, and conflict with unemployed family members.

Studies from outside the forest industry have also highlighted the potential of family conflict to reduce the cognitive resources available to an employee at work (Du, Derks, & Bakker, 2017) and impact a worker's performance and wellbeing (Kinnunen, Feldt, Geurts, & Pulkkinen, 2006). While confirming partner conflict as a predictor of wellbeing (in this case, using burnout as the measure of wellbeing), Rössler, Hengartner, Ajdacic-Gross, and Angst (2015) also found an association with never having been married. This suggests that it is not only what goes on in families that impacts worker performance and wellbeing (Kinnunen et al., 2006) but also the structure of the family itself.

However, the reverse also has the potential to be true. Work can also impact wellbeing within settings outside work. What may appear to be the result of unhealthy lifestyle choices (such as smoking, use of drugs and alcohol, or a carbohydrate-dense diet associated with obesity, diabetes and hypertension) could be, in part, a negative avoidant coping response to stress arising from work, or the situations workers find themselves in as a result of the way their work is organised (Forastieri, 2016; Leka & Jain, 2010). Researchers have linked personal health issues of construction workers in Australia, including an increased use of alcohol, to the pressures of long working hours (McKenzie, 2008, as cited by Du Plessis *et al*., 2013). Evaluations of health promotion programmes within male dominated industries in Canada and Australia have found that while workers recognise the importance of healthy lifestyle choices on their physical and mental health, pressures to make money, long hours and competing demands on their time are obstacles to making those choices (Lingard & Turner, 2015; Seaton, Bottorff, Oliffe, Medhurst, & DeLeenheer, 2019).

Other health promotion research points to the impact of gender and socio-economic status on behaviour and health. Research by Kolmet, Mariño, and Plummer (2006) amongst Anglo-Australian blue collar workers highlighted how the position on the socio-economic gradient and psychosocial

work hazards such as low job control and conditions conflicting with family commitments (time, rewards) conflicts with cultural constructs of masculinity (e.g. being in control, material success, responsibilities to family, (Kolmet *et al.*, 2006)), leading to a culture that inadvertently promotes unhealthy diets, misuse of alcohol and the promotion of risk-taking and stoicism in the face of difficulties (Du Plessis *et al*., 2013; Iacuone, 2005).

Lovelock and Houghton (2017) pointed to the potential of a similar conflict in their review of the New Zealand forest industry. Participants in that study highlighted the way imposition of safety rules had cut across informal experienced-based hierarchies of status within crews and left crew members feeling powerless and unable to control their work situation and career trajectory. Lingard and Turner's (2015) conclusion, that the underlying environmental causes of construction worker's unhealthy behaviours may be structural and that health promotion measures designed to change workers' health behaviour will be of limited effectiveness as a result, could well apply to the New Zealand forest industry.

How then do forest owners and managers proceed in looking to mitigate the negative impacts of psychosocial hazards in their forest workplaces given the complexity of those hazards? Changing the mental health conditions of a workplace is best achieved by recognising that risk factors have the potential to also be protective (Leka *et al*., 2015; Maslach & Leiter, 2016) and that stress observed at work will most likely originate with multiple psychosocial factors. Some of these factors will be located outside of the direct relationship with the employee or, indeed, outside of the workplace in families, the community or society (Forastieri, 2016; Lingard & Turner, 2015; Sallis et al., 2008).

A study of 7000 Polish machine operators using the European Framework for Psychosocial Risks set out in Table 1 highlighted the inverse relationship between the level of the psychosocial risk reported by the participants and their reported levels of commitment to and enjoyment of the work and their workplace (Mościcka-Teske, Sadłowska-Wrzesińska, Butlewski, Misztal, & Jacukowicz, 2017). While the target setting for intervention may be in the forest, benefits such as improvements to productivity, quality and worker commitment will flow beyond the immediate employer to the forest owner and industry level (Leka *et al.* (2015) Similarly psychosocial protective factors experienced at work have the potential to spill over into the family environment through enhanced mood and skills such as time management (Kinnunen *et al.*, 2006) or self-esteem and social support (Ten Brummelhuis & Bakker, 2012). However, risk prevention invariably means looking outside the day to day work and workplaces in which forest workers are directly engaged. Within the organisation it means looking at the forest management practices and operations that invariably impact the way work is organised and completed within the forest.

Figure 2 sets out some aspects of forest management practices that have the potential to influence the psychosocial risk factors for stress. They represent risk factors because of their potential impact on the relationship with the contractor, particularly with respect to the contractor's profitability, the balance of power within the contract and its impact on business risk.

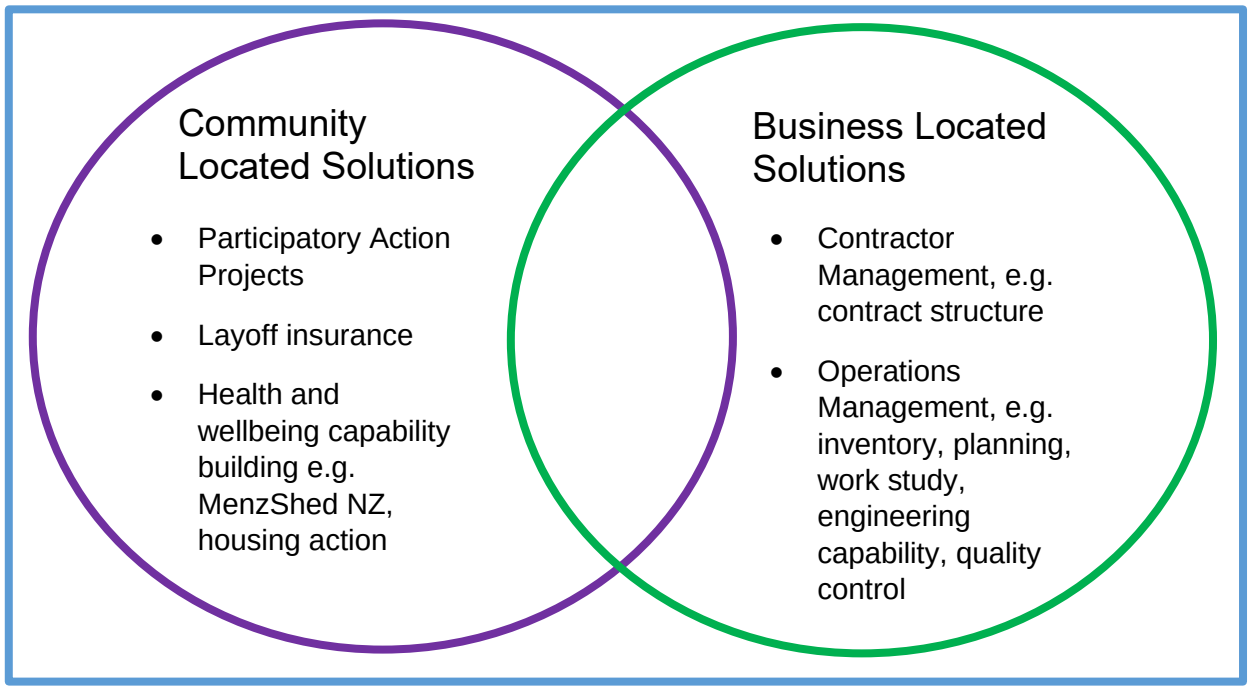

Figure 2: Solution map for forest management practices with potential to influence stress risk factors

Examples of the way in which risk is transferred to the contractor, through the contract, include the setting of a production target as the basis for payment, and the forest owner / manager's engineering of the work site, particularly the quality of the access and for harvesting, the setting layout, the maximum and average haul distances, and the skid size. Some of these elements of risk involve decisions made with information gathered for the forest owner's uses but which may not be fit for purpose for managing the contractor's risk (e.g., inventory data). Some of the key decisions may be made in the absence of data or evidence (e.g., estimating production targets without prior productivity measurement evidence). The forest owner / manager may still have control of the sources of risk despite the consequences of the risk having been handed over to the contractor (e.g., establishing piece rates using production when the payment is based on uplift and the trucking and delivery is directly contracted and managed by the forest owner). Some of the forest owner's / manager's risk can be mitigated by passing some of that risk to the contractor (e.g., the need for layoffs during market downturn). Risk is also imposed on the contractor though the terms of the contract, including the crew day rate used as the basis for the piece rate and the way in which perceived transgressions against the contract conditions are dealt with (e.g., stand downs).

However, these examples also point to interventions that have potential to increase the wellbeing of workers. Whether decision outcome increase risk or provide some protection to worker health is just

a matter of making those decisions with consideration of the impact on worker health within the decision criteria. They are all decisions about that way work is organised that can be designed with enhanced wellbeing as an objective.

Similarly, working directly with communities may be required to ensure interventions in the workplace are successful (Sallis *et al.*, 2008) as is working with the workforce and community in a way that is aligned with their socio-cultural constructs (Wold & Mittelmark, 2018). The industry workforce is predominantly male. Men will conform to the dominant constructs of masculinity whether that helps or hinders the industry's efforts to mitigate the health risks of stress. Working with that dominant construct means involving those men in the design, decision making and implementation of any efforts to mitigate mental health risks. Fortunately, there are some good examples of successful mental health initiatives (mostly focused on suicide prevention) centred on male participant empowerment. One example is the Community Response to Eliminating Suicide (CORES) developed in rural Tasmania (Jones, Walker, Miles, De Silva, & Zimitat, 2015) and Mates in Construction developed in the Queensland construction industry (Martin, Swannell, Milner, & Gullestrup, 2016). Other examples include the use of technology in mental health prevention and care to overcome obstacles to accessing help services (Luxton, June, & Kinn, 2011). It also means recognising that the community's contribution to health and wellbeing involves infrastructure and services such as housing, schools and health centres (Solar & Irwin, 2010) and that business are increasingly playing a role in the development of community capability as a community partner (Lee, 2011).

IMPLICATIONS

If the industry accepts it has mental health risks, then ecological systems theory can be used as a basis for turning those risks into opportunities to enhance the industry's value and social licence. However, it has not been the intention of this paper to be specific about recommended interventions. While the little research that does exist about the psychosocial conditions within New Zealand's forestry workplaces suggest they can be understood through the internationally recognised frameworks, Lovelock and Houghton (2017) show that even well-intentioned initiatives such as the imposition of greater controls around safe practice can be met with resistance if they do not fit with the socio-cultural constructs in operation for this particular workforce. Socio-cultural constructs of gender have also been implicated in the resistance to making healthier eating choices by Australian construction workers (Lingard & Turner, 2015). As the research reviewed here indicates, proceeding with worker wellbeing interventions in the absence of an ecological perspective carries some risk. Further research that aims to understand what those who work in the bush perceive as their biggest threats and challenges, and what they regard as their coping resources and obstacles, is required before interventions can be prescribed with confidence.

CONCLUSIONS

This report has detailed what existing research can tell forest managers in New Zealand about workplace stress as both a potential risk and a potential opportunity. It has looked at the health and safety consequences of mental distress and examined what is known about psychosocial hazards within forestry workplaces. It has suggested that mitigating those risks will require going beyond harm reduction as a strategy, to thinking about psychosocial hazards as possible drivers of a more engaged and committed workforce.

Interventions aimed at taking advantage of those opportunities within forest management practice and the environments outside the workplace will require thinking outside the boundaries of the contracts that engage the workforce and focusing on the risk factors inherent in forest management practices and the communities in which workers reside. The rewards for doing so go beyond compliance with health and safety legislation.

At its heart, the issue of providing a safe and well working environment is a moral and ethical issue.. The principles are that work should take place not only in a safe and healthy working environment but also that the conditions of work should be consistent with workers' wellbeing and human dignity. Work should offer real possibilities for personal achievement, self-fulfilment and service to society. In other words, the imperative for health and safety management is to go beyond ensuring workers survive to enabling workers to thrive.

The forest industry in New Zealand, therefore, has an opportunity to progress beyond the harm reduction focus of its legislative framework, to enhance the industry's performance and sustainability, through promoting worker health and wellbeing. An industry that makes this its target has the potential to increase the benefit experienced by all stakeholders, including the families and communities who directly depend upon it for fulfilment of their own potential.

ACKNOWLEDGEMENTS

This research is part of a three year project being carried out at the School of Forestry, University of Canterbury, with the financial support of Forest Growers Research Ltd (FGR), the Forest Industry Safety Council (FISC), the New Zealand Institute of Forestry (NZIF), the Ministry for Primary Industries (MPI) and the School of Forestry, University of Canterbury.

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