

Potential impacts of price-based climate policies on rural people and communities: a review and scoping of issues for social impact assessment

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1 Background

The New Zealand Government has a strategic approach to develop policies that reduce greenhouse gas emissions. These policies will comprise our principal effort as signatories to the Paris Agreement on nationally determined reductions in emissions. The Interim Climate Change Committee (ICCC - a ministerial advisory committee)¹ is preparing evidence and analysis of policy options to reduce emissions.² The options will affect rural land uses such as agriculture, forestry and horticulture.

Land-use change is a likely mitigation option for climate change and the likely extent and nature of that land-use change is under consideration (Dorner et al., 2018). The ICCC needs an understanding of the potential consequences of price-based climate change policies on rural communities, particularly where those policies could result in land-use change from ruminant livestock industries (mainly sheep, beef and dairy) towards plantation or conservation forestry, or to horticulture.

The main drivers for land-use changes, over and above changes occurring as a result of general market trends, would arise from financial rewards for carbon sequestration in forests. These rewards are in addition to commercial returns on timber from plantation forestry. Furthermore, additional or enhanced plantation and indigenous forest areas will add benefits from conservation, biodiversity, outdoor recreation or tourism. Alongside rewards for forestry are potential financial penalties for greenhouse gas emissions associated with ruminant livestock industries, which could drive a change from intensive, ruminant livestock farming to horticulture or arable farming.

Modelling to date, undertaken for the Productivity Commission (Dorner, et al., 2018), indicates that land-use change, in particular the conversion of sheep and beef land into forestry, is likely to be a key way New Zealand can achieve low-emissions targets by 2050. Modelling demonstrates 1.3 to 2.8 million ha of land could move into forestry in response to carbon price policies, with the additional carbon being sequestered in new forests making up a substantial part of New Zealand's overall (net) emission reductions. Early modelling also indicates a potential shift in land use from dairy farming to horticulture and specialist cropping.

The ICCC has requested this review of available literature about past experiences in New Zealand with the social impacts of land-use change. The review focuses on how, in the past, new policies have affected producer profits, land values and land uses, predicating social and community changes. The review did not consider literature on farm management and decision making, or effects at the micro level such as on farm incomes or on-farm employment. Rather, the focus is on how land-use changes can flow into impacts for rural people and communities and shift the social fabric of rural places.

The review will help to guide social assessment of specific policy proposals. It establishes a basis for that more detailed work, drawing on available social science knowledge. It assumes future social assessment of policy alternatives, as they are developed, will examine the scale, location and

¹ <https://www.iccc.mfe.govt.nz/who-we-are/terms-of-reference/>

² The paper is focused on assessment of policies to reduce emissions. There is a parallel area of impact assessment of the social impacts of policies and strategies that aim to mitigate the impacts of climate change, such as weather events or coastal flooding. These sorts of impact mitigations are not the subject of this review.

significance of their potential social effects, with and without mitigation, and help to design active management of the transitions involved.

2 Objectives

This review provides a preliminary discussion of the potential impacts of price-based climate policies on rural people and communities. The review has a particular focus on the social consequences of land-use change resulting from financial rewards for carbon sequestration in forests and/or financial penalties for greenhouse gas emissions associated with ruminant livestock industries.

The review also provides suggestions regarding future social assessments of climate policies, and expert comment on potential case study areas and socio-economic indicators for identifying which communities and groups could be most vulnerable to social impacts, and which ones could be most resilient to land-use change. These indicators are provided as a starting point to assess, monitor and mitigate actual and potential social impacts of climate mitigation policies.

3 Approach

This review of available literature about social impacts of land-use change in New Zealand is the first step in social impact assessment (SIA) of price-based policies and is therefore strategic and scoping in character. SIA is a process for considering the implications of proposed policies, plans and projects (Taylor, et al., 2004a; Vanclay, et al., 2015). Applied to policies and plans SIA is referred to as strategic assessment. The widely accepted process for SIA usually entails scoping of the key issues, variables and assessment areas, followed by base-line studies, assessment of options, and then the monitoring and management of change once implementation is underway.

The review utilises an extensive New Zealand literature on social aspects of rural change since the 1980s and the removal of producer subsidies at that time. It adds recent evidence from market-led changes and concurrent changes in technologies, employment, populations, social networks and communities. These historical experiences provide the basis for considering how rural New Zealand might change over the next 30 to 50 years.

The author has been involved in many of the studies referred to and was able to draw on this first-hand experience.³ In addition, this paper has benefitted considerably from the highly useful review by Mackay, et al. (2009). Their paper and annotated bibliography, reviews New Zealand and international literature on rural social change for the crucial period from the 1980s, a period commonly referred to in the literature as one of “rural restructuring”.

New Zealand is regarded internationally as an exemplar of the process of neo-liberal, rural restructuring and the impacts this has had on rural people and communities. The Mackay et al. review usefully locates New Zealand literature in the international theoretical debates about the social impacts of rural policy changes along with wider changes in society and also environmental management. With other authors, they proposed a new conceptual understanding of rural New

³ The review benefitted from discussions with, comments from, and material provided by Emeritus Prof. Harvey Perkins, University of Auckland; Dr Mike Mackay, Lincoln University; Andy Reisinger, MfE; Michael Bennett, Manager, Post Quake Farming Project; Gerard Fitzgerald, FAS, and staff of MOTU research.

Zealand in terms of multifunctional rural spaces (Mackay, et al., 2009; Argent, 2002; Holmes, 2008) and the notion of a “hybrid”, “global” countryside (Mackay, et al., 2014).

In addition to the literature review reported here, the ICCC supported consideration of case studies and indicators by providing maps and quantitative information on land-use change under potential climate change policies. These helped give a sense of the scale of change and identify regions and sub regions that could see a particularly large amount of land-use change. Case study possibilities are discussed below to illustrate the general findings of the review and areas where future social impact assessments might be concentrated for best effect. Indicators are provided as a starting point for future policy analysis.

4 Assessments of rural change

This section provides a review of the social impacts of land-use changes experienced in New Zealand since the 1980s as reported in the social-science literature. The purpose is to bring an understanding of experiences of social change to the assessment of climate policies that could alter land uses on New Zealand farms.

4.1 1980s rural restructuring

The 1980s economic reforms in New Zealand were a response to over production in the agricultural sector boosted by government subsidies, and the costs of these subsidies to the public sector in an increasingly globalised economy with less preferential market access (Sandrey and Reynolds, 1990). In addition to reforms in agriculture there were reforms of major rural resource sectors such as coal mining and forestry, which were corporatized and privatised. There were also reforms of local government, centralisation of rural social services and restructuring of farm financing, rural supplies, and primary processing. This combination of changes in the public and private sectors is referred to here as rural restructuring.

The scale of these combined changes was unprecedented in terms of policy-driven change in New Zealand, or internationally. Although they affected every farm operation and every rural community, the social impacts were uneven as individuals, families, farm operations and rural communities varied in their ability to cope with change (Wallace, 2014). Social scientists recognised the effects of rural restructuring on the diversity of economic activities on farms and in rural communities, on the social structure of agriculture and on the ability of farm families and communities to respond. A large body of research ensued.

Early overviews of the social impacts of rural restructuring on farmers and the agricultural sector (Fairweather, 1989, 1992; Sandrey and Reynolds, 1990) were largely economic in their focus and they identified reduced farm expenditure, difficulties repaying farm debt, falling land prices, shedding of farm labour and contractors, and constrained employment. The fall in sheep numbers was noticeable as was diversification of farm incomes to meet the needs of farm households.

The overall average farm size was decreasing, although this average change reflected some corporatisation and amalgamation of land into larger holdings along with farms subdivided into smaller, lifestyle blocks. These blocks brought new (amenity) residents into many rural areas (counter urbanisation), particularly within commuting distance of urban centres (Mackay, et al.,

2009; Mackay et al., 2014; Perkins, 2006). Another feature was that low-income residents and welfare beneficiaries were attracted to small towns for cheap housing, often with limited or no work options (Wallace (2014).

Of particular interest throughout this period of restructuring is the overall persistence of the family farm during and beyond the farm crisis of the 1980s (Woods 2014). Longer-term changes in the social structure of farming appear most obvious in the super-productive areas of irrigated dairy farming, as in Canterbury over the last 20 years, where there is evidence showing a move towards much larger farm size and cow herds than the national average, along with different social structures. These include a move to contract milking with a heavy emphasis on employed labour verses family farm operations (Taylor, et al., 2018).

An early understanding of community-level impacts of restructuring in rural sectors came from Cloke (1989), who provided an assessment of the effects of agricultural deregulation on rural New Zealand, focusing on the settlements of Ahaura on the West Coast and Hororata in mid Canterbury.

In Ahaura, the restructuring was found to have a largely negative impact, one that combined the effects of reforms in agriculture (particularly dairy farming) and forestry. Labour was lost in both sectors and some farmers turned to alternative enterprises and employment on and off farm, including collection of sphagnum moss, horticulture and gold mining. In Hororata, a livestock and cropping area, social impacts included new migrants moving to cheap housing and development of rural lifestyle blocks. At least a quarter of the farms changed ownership. In contrast to Ahaura, land prices remained strong, with the City of Christchurch close by and interest from external capital, investing in the potential of the area with irrigation. There was some diversification of livestock including to deer and dairy farming. In the period after Cloke's study was published in 1989 there was extensive conversion to dairy farming in the Hororata and Te Piritā areas with access to groundwater for irrigation. The area is now part of the Central Plains irrigation project (Taylor, et al., 2007).

In relation to policy changes in the forestry sector, Sampson et al. (2008) studied the impacts on people and communities of Hari Hari and Whataroa in South Westland. Social impacts arose from combined effects of restructuring of the NZ Forest Service, reorganisation and formation of the Department of Conservation and closure of saw mills with reductions in native forest logging. Losses of employment were the key, primary effect. Negative impacts included loss of employment and out migration, declining school rolls and local services from the resulting loss of population, and difficulties maintaining key services such as banking services and primary health care. These negative impacts were to some extent ameliorated, however, by expansion of farming into dairying and increases in tourist activity and associated employment. The changes also saw a shift into more seasonal employment and a loss of social connection to forestry-related sectors, along with a loss of sense of place and community identity.

In a comprehensive review focused on the resilience of rural communities, Pomeroy and Newell (2011) emphasise that the vigour of rural communities and their ability to withstand "shocks" lies in their reliance on the primary sector. Prior to that research, a series of 19 community studies had considered longitudinal processes of community formation and change including the social impacts of rural restructuring, with a focus on rural settlements and their surrounding natural resources

(Taylor et al., 2001).⁴ The subject 19 communities included forestry and mining, as well as agriculture, horticulture and tourism as discussed further below. A key point from these communities is that changes due to rural restructuring must be understood in the context of longer-term, resource-sector cycles, technological changes, wider demographic changes and other societal changes, such as for women or Māori. The research found that low incomes, welfare dependency and related social issues are common across rural New Zealand and particularly problematic in down cycles of the primary economy. Both Taylor et al. (2001) and Pomeroy and Newell (2011) found that the resilience and adaptability of rural communities relies to a large degree on the level of economic diversification present, as this ameliorates periods of intense economic change or stress.

Another feature revealed by these and other research studies at the community level was the inter-related changes that took place through rural restructuring. In a community such as Otautau, for instance, there were underlying changes in the agriculture and forestry sectors, from production to processing. In the same period, reform of local government saw the loss of key residents active in community life. Similarly, banking, retailers and stock and station firms amalgamated and centralised their activities, with their staff that typically had strong leadership roles in small rural towns lost to community life (Taylor, et al, 1998).

Off-farm employment by farmers (including farm women) is another trend that emerged in the 1980s (Taylor and McCrostie Little, 1995). This trend is examined further in a detailed study of multiple job holding in New Zealand as an adaptive strategy in agriculture (Taylor et al., 2004b; Robertson et al., 2008) and across a number of rural sectors, not just in agriculture. Interestingly, Fitzgerald et al. (2002) found, based on analysis of work histories of people engaged primarily in non-agricultural sectors such as forestry, mining and commercial fishing that these workers typically moved between sectors over time. Agriculture was the sector most rural workers commonly spent at least some time in, either contemporaneously (multiple job holding), in a working year (seasonal work) or over their working life. It was evident that the skills required for work in agriculture, such as operation of heavy machinery, were readily transferrable between sectors, such as agriculture, forestry, mining and construction, providing rural households with expanded opportunities to build their incomes, while providing employers in rural areas and towns with a larger pool of labour.

Another aspect of multiple incomes for farm households was the opportunity it provided for farm women to work in paid employment off the farm. Even small amounts of part-time work was important for farm household finances and benefited farm finances through reduced drawings for needs such as school uniforms. Off farm work also signalled an important shift in community views about the active roles of farm women on and off their farms (McCrostie Little and Taylor, 1998). Other benefits of multiple job holding were that participation in paid employment by additional members of farm households widened the labour market for both the agricultural and tourism sectors. It also benefited farm individuals psychologically and assisted them to step into retirement (and succession) with alternative options in meaningful work (Robertson et al., 2008).

4.2 Conversions from sheep and beef to dairy

Amongst the strategies New Zealand farmers and outside investors employed as they responded to the period of rural restructuring was the conversion of sheep and beef and mixed cropping

⁴ Research funded by the Foundation for Research, Science and Technology.

properties to dairy farming. Pawson et al. (2018) traced the boom in dairy farming in New Zealand since the creation of the Fonterra conglomerate in 2001 and identified often fraught public debates about an ongoing focus on low-value commodities and the environmental impacts of intensive (“productivist”) land uses. They argued this narrow development option contrasted with the emerging, alternative of a multifunctional countryside.

The changes involved in conversion to dairying undoubtedly boosted production in many rural areas but also had far reaching social impacts. Two types and areas of conversion are evident and they have similar, but not totally comparable, effects. The first is conversion of existing grazing and cropping properties, largely in Southland, to dairy farming as North Island farmers migrated south. The second is the conversion of grazing and mixed cropping farms, largely in Canterbury, to dairy farming, almost entirely with the provision of large-scale irrigation systems.⁵

Changes in land use in Southland began in the early period of rural restructuring, as described by Houghton et al. (1996) and Ledgard (2013). After a long period of growth, total stock numbers in Southland had plateaued by the mid-1980s. From that point there was a very significant shift in the type of livestock, from sheep and beef to dairy farming along with a reduction in cropping. There was also a shift into productive forestry and to deer farming (Wilson, 1994). This shift is often referred to locally as a dairy boom. There was almost a 50% reduction in arable land from 1984, with a sharp fall in sheep numbers, and a sharp increase in the number of dairy cows and dairy-farming properties (Ledgard, 2013). At the same time, the area in winter feed crops and run-off blocks increased for sheep and beef and dairy production. Ledgard also tracks the environmental effects of this shift and the intensification of production with increased presence of sediment and nutrients such as nitrates in waterways.

The most obvious social-economic impacts of the changes in land use in Southland was a fall in employment in the sheep and beef sector and an increase in employment in the dairy-farming sector. There have been parallel changes in processing of farm products with a reduction in meat processing and an increase in dairy-product processing (Moran, et al., 2017). Restructuring of the meat industry, for example, had a negative effect on small towns such as Maitai (Lovell, et al., 2018), as discussed in more detail below.

Forney and Stock (2014) add an important social analysis to this period of land-use change. Their research found that the large-scale conversion of land uses to dairy farming in Southland had far-reaching and positive impacts on social life in rural communities through changes in employment, levels of population, and the regional economy as a whole. They also found that the impacts on social life challenged community identities based on sheep farming. Yet conversions also allowed sheep and beef farmers to engage in or complete processes of farm succession, confirming the link between land use change and generational change on farms as established by McClintock et al. (2002).

Conversion to dairy farming also changed the broad social structure of farming, with its reliance on a single large processor and a small number of other processors (Forney and Stock, 2014). Farmers and rural communities based on dairying are now heavily reliant on the organisation, infrastructure,

⁵ Note there is a long history of small-scale dairy farming on wetter, foothill areas and coastal properties in Canterbury, primarily for town milk supply.

transport systems, manufacturing systems, marketing and prices of the Fonterra cooperative. While communities close to processing plants, benefit from the employment generated there, such as at Clandeboyne, in South Canterbury, it was evident that as that plant expanded over time there was much less emphasis on local employment and workers typically commuted from Temuka and further afield to work there (McCrostie Little, et al., 1998).

A recent study of the irrigated area of the Amuri Plains (Taylor et al., 2018) confirmed evidence of a generational change with the introduction of irrigation, as identified in earlier research on the Amuri (McClintock et al., 2002). Whereby, dryland farmers on the plains either left the area altogether and sold to incoming dairy farmers, or converted the farms themselves and passed irrigated dairy farming to the next generation. There was a notable shift to a younger profile of farmers and farm workers and an increase in younger families.

This was not an easy period of change for the community and there was social tension between the older and younger generations of farmers and their farming systems. Old traditions of strong community social support and voluntary effort changed in focus and priority but the social capital and resilience of the community remained strong. Established families in the district tended to provide important social stability during the transition period, as they were the leading members of community groups and organisations and were able to advocate for their community and provide the leadership for initiatives to deal with local issues. An example was the way farmers and local businesses moved to address a shortage of suitable housing as additional workers moved into the Amuri (Davison, 2006; Taylor et al., 2018).

Another important aspect of social change identified in the Amuri area and elsewhere in Canterbury, and also in Southland (Rawlinson, 2011, Tipples and Wilson, 2005 and Tipples et al., 2012; Taylor et al., 2014) is the rapid utilisation of migrant workers from overseas to meet the demands for labour in the expanding land use of dairy farming. This change brought increased demand for housing along with services such as rural schools and increased ethnic diversity. Many rural communities have become more ethnically diverse with flow-on effects for community social organisations including local schools and churches.

School rolls increased with an incoming workforce, ensuring they continued to play an important role in community life. The Amuri Area School, for instance, continues to provide a community hub, with the community library, sports club rooms and grounds, swimming pool and gymnasium/hall located there and close by. The community and sporting groups are strongly engaged with these facilities and make regular use of them along with the school (Taylor et al., 2018).

Environmental issues also emerged as an issue for the community, one that created a new set of tensions as the landscape changed into an intensive farming system and questions arose about the effects of intensive land uses on river systems, groundwater and other water uses such as outdoor recreation and drinking water supplies. It was clear these negative effects need to be balanced better with economic and social benefits of irrigation, such as increasing population and vibrant businesses (Taylor et al., 2018; Waimakariri District Council, 2008). This balancing act became the task of Zone Committees of Environment Canterbury, as part of the Canterbury Water Management Strategy.

There is good evidence from the Amuri study that the area went through a period of social transition after which the pace of social change slowed. A new social structure has evolved to a model of ownership (often using external equity) of contract farm managers and employees. Share milking is much reduced. Systems of improved employer-employee management and environmental management have evolved. New housing was constructed. Migrant workers are well integrated into the farming system and community. Social service providers and community organisations have adjusted to the new population and social order, including their working hours, and have accommodated cultural differences (Taylor, et al., 2018).

4.3 Changes in the forestry sector, employment and associated communities

Production forestry in New Zealand is focused on large areas of the central North Island, although pastoral farming remains the predominant land use there and in other parts of the country. Nutrient deficiencies, land capability and available moisture tended to focus attention of land owners on production forestry as a land-use option. Other incentives were the dwindling supplies of native logs and, in the 1930s, the need to employ surplus labour, which saw large scale plantings take place in many areas. These areas included Northland, Canterbury, Otago and Southland, albeit on a lesser scale to the central North Island.

While planting and silviculture were dominated by the state through the NZ Forest Service, milling and processing of wood products was largely a private sector activity, and plants were developed to produce pulp and paper for domestic use and export. Some communities grew rapidly as a result, creating single industry “boom towns” such as Tokoroa and Kawerau. These single-industry towns drew early interest of social scientists because of their particular social features, distinct from their small-scale rural locations. Their features included rapid population growth, relatively young populations, high proportions of Māori, and comparative ethnic diversity from overseas migrant groups, including workers from the Pacific Islands. They also often experienced a lag in available social services because their populations grew so rapidly. A particular feature was the new class structure of these towns, with social status based in occupational structures of the industry compared to farm ownership and farming ability on agricultural land (McClintock, 1998a).

By the 1980s, several processes of change were evident in the forest sector. First the milling and processing of timber went through an ongoing process of technological change, centralisation and increasing foreign investment (McClintock and Taylor, 1983; McClintock, 1998a, 1998b). Secondly, state involvement in forestry changed with the sales of state forests and the dissolution of the New Zealand Forest Service in 1987 (McClintock, 1998a, 1998b). These changes brought many social impacts for towns such as Tokoroa, Kawerau, Murupara and Kaingaroa in the Central North Island, Golden Downs (now removed), Hanmer, Tapanui, Mātaura and Tuatapere in the South Island, which were the focus of a number of community studies (McClintock and Taylor, 1984). Thirdly, forest policy saw severe restrictions on milling of native timber, bringing changes to communities with associated milling operations as in South Westland (Sampson et al., 2008).

Another upsurge in exotic forest planting took place from the early 1980s through to the mid-1990s, driven by a range of private investors from large companies to urban investors, farmers, local councils and iwi. The area planted extended to include new and expanded areas as in the East Cape, with the planting of land previously used for grazing.

The upsurge in forest planting caused concerns about land-use change amongst some farming communities. Farnsworth (1983), building on the work by Smith (1980, 1981), comments on the social impacts of changing land uses from pastoral farming to forestry in Northland at a time when forest planting was accelerating in that region. Their analysis indicated that the principal concerns of pastoral farmers at that time were around the changing social character of rural areas, particularly for small localities losing employment and population, whereas the larger settlements were gaining employment. Issues emerging for rural communities included the changes in land ownership to forest companies, new occupational structures with a professional forestry group and a larger forest worker group, more routine and less flexible work, uneven work between planting and harvesting, and a loss of local decision making and influence over planning decisions. Interestingly, several of these issues are similar to those raised by pastoral farmers in respect to the conversion of pastoral land to dairy farming.

The evidence from these studies was, however, that rural depopulation at a wider scale was not as evident as suggested locally. In the East Cape area, for instance, researchers examined the relationship between land-use change to forestry and characteristics of communities (Fairweather et al, 2000b).⁶ The research found little change in the population as a whole. Forestry and farming areas had low population to start with and the analysis found that farming areas experienced half the population loss of forestry areas. On the other hand, there was a significant increase in population for farming areas located around Gisborne that gained from rural subdivision into lifestyle blocks. The larger towns gained population and the city, and district as a whole, were stagnant.

Some further explanation is found in an accompanying study of employment changes (Fairweather et al., 2000a). For comparative purposes, forestry and pastoral (sheep and beef) farming both generate employment but in different ways, sectors and locations. There is evidence that forestry generates employment both locally and regionally. The study found that total employment was highest for forestry but mostly located in processing, which occurs in regional centres. The forestry boom did not give a consequent boost for rural areas and smaller rural localities unless they had a contracting, log transporting or milling operation present, or were one of the forest-industry towns. These comparisons to agriculture may, however, be incomplete because agricultural servicing, including transport firms, and processing in meat works, also consolidated on fewer sites over time. As with forestry, the full sector must be considered to gain a full picture.

Community studies shed further light on the social changes experienced by forestry areas. As explained above, these communities went through changes based in policy reform, including restructuring of the NZ Forest Service and the end of indigenous forest logging. On top of these changes were the further introduction of labour-saving technology, contracting of many forest-based activities, consolidation of milling and processing, and increase in foreign ownership.

In Tuatapere, Southland, for instance, consolidation and loss of mills as the native forest resource was cut, plus restructuring of the NZ Forest Service, saw a loss of jobs, an availability of low-cost housing as workers moved out, and an influx of low-income people. Business and services left the town. Subsequent social issues included parenting problems and personal stress, and people associated with the forest industry lost their connection to it and their sense of community was

⁶ This study used GIS data to overlay land-uses with mesh-block data for the census in the period 1986-1996

undermined. The community response included efforts to diversify the economy into tourism in particular, with development of the Hump Ridge walking track (McClintock and Fitzgerald, 1998).

Similar effects on communities and social cohesion were experienced in Murupara in the Central North Island. Located in the Kaingaroa Forest, Murupara served as a centre for the forest industry and local farmers. It was also a key centre for Ngati Manawa people. It was a major centre for the NZ Forest Service, who built a single-men's camp, houses and workshops there. From a "boom" town in the 1960s the town lost people, services and businesses in the 1980s with economic restructuring. Some houses were relocated, others fell into disrepair. Māori (85%) became the main population. The strong basis for community organisations and social cohesion was undermined by these changes with high unemployment and problems such as family violence (McClintock, 1998b). In a later study Pomeroy (2016) focused on community resilience in Murupara and noted demographic impacts as the population of the town became older. She also noted that since this change took place, the town had developed resilience based in its cultural background, identity and availability of Māori land. She found that the future of the town was dependent on the ability of iwi leaders, including youthful leaders, to chart a path forward.

Social scientists define social resilience in rural places as the ability of communities to respond to sudden changes and adverse events. They acknowledge that resilience relies on community capacity to adapt (Pomeroy and Newell, 2011). Further understanding of the basis for resilience in towns experiencing externally driven change is provided by Lovell et al. (2016, 2018).⁷ Their research considered the town of Mātaura in Southland, which experienced the combined effects of forest-product processing ending when the paper mill closed in 2000 plus restructuring in the meat works over time, with large-scale redundancies in 2012. As a result of reduced employment, working age people and families left the town and the population fell. Most affected were older workers, who struggled to redeploy within the works from the mutton chain to beef processing. These workers were also less open, or able, to find work elsewhere or to commute to work. The loss of working people and a "busy" community eroded community capacity through reduced social interactions.

Lovell et al. (2016) examined the complex relationship between community capacity and resilience and the ability of a community to bounce back from adverse events. The following factors rely on those identified by their study as important to community capacity:

- Participation – support for local groups through money and time (volunteering)
- Leadership – strong local leadership with a participatory ethos
- Social cohesion – the strength of local social networks and inclusion of different groups
- Sense of place – belonging to the place, history, heritage and landscape of an area
- Community attitudes – level of positivity or negativity amongst the community
- Social action – the ability to diagnose and act on issues as a group or groups.

The sustainable livelihoods framework is another important perspective on rural resilience related to community capacity. A study of Waipu Catchment on the East Coast was based on ten years of action research. It focused on the area because of an assessed vulnerability from a highly erodible environment, past weather events such as Cyclone Bola and future climate change, a dominant

⁷ In the 2018 paper the authors refer to Mātaura (named in their 2016 paper) as Hopeville in order to protect anonymity of respondents who they quote at length. Mātaura is preferred here as no direct quotes are used.

Māori population and large areas of Māori land. The framework utilised an understanding of five capitals: natural, financial, physical, social and cultural. The study emphasised the latter two capitals, calling them together “community capital”. The research found that in these two capitals the Waipu community had strong whānaungatanga and kaitiakitanga: strong social connections, local identity, tikanga and leadership based around the marae, and traditions of reciprocity including remittances from family members working elsewhere. Local seafood resources were identified as a key component of livelihoods based in natural capital. The authors advised that government interventions to help build resilience in the catchment must be grounded in the available capitals (Edwards, et al., 2018). The study recommended that leadership to restore the catchment should lie in iwi structures and a partnership approach by government (Warmenhoven, et al., 2014).

4.4 Conversions to horticulture

Conversion of land use from pastoral farming to horticulture is another important change that took place from the 1980s in a number of areas, especially the expansion from earlier planting of kiwi fruit in the Bay of Plenty (from the 1930s) and expansion of viticulture in Marlborough (from the 1970s). In addition to production for the domestic market, horticultural production covers a wide ambit of export crops including grapes, pip and stone fruit, kiwifruit berries, vegetables and flowers. As with other sectors, there has been considerable reorganisation of production and integration of ancillary activities such as packing and transport systems since the 1980s.

Kiwifruit is a leading crop in conversions of pastoral land to horticulture, particularly in the Bay of Plenty area. Horticulture was well established in the area and fruits grown there included citrus, feijoas, avocados, berry fruit and stone fruit (McClintock, 1998c). Production of kiwifruit grew steadily from the 1980s, although there have been periods of over production, low prices and retraction, most recently with a setback due to the issues with PSA disease.

In the Bay of Plenty, much of the conversion was from dairy farming to kiwi fruit as dairy farmers typically split up suitable properties into a number of orchards, often for family members to take up production. Initially, during the first period of transition, prices of rural land increased rapidly. (McClintock, 1998c). A study of the community of Katikati found that when kiwifruit production expanded in the 1990s jobs were created in the picking and packing season in particular. This research also drew on Stokes (1983) and Martin (1983). The expansion brought in a mix of transient and seasonal workers and attracted newcomer residents, including retirees. The population grew rapidly with growth in housing and also commercial and other services (McClintock, 1998c).

Employment in kiwifruit continues to depend on a large pool of casual and seasonal labour, although the number of contractors have increased as well, carrying out tasks such as thinning, spaying and mowing. As in other rural areas, young people often leave for education and work opportunities and there is a low level of unemployment (McClintock, 1998c). As a result, growers have depended increasingly on short-term migrant workers each season. Workers come from a number of sources including international students, back packers, grey nomads and nearby towns. In late 2018, the Government expanded the Recognised Seasonal Employer (RSE) scheme for foreign workers in

kiwifruit, in response to the low level of unemployment in the Bay of Plenty and the increasing demand for workers.⁸

An interesting feature of many areas of horticultural production, such as in the Bay of islands, Bay of Plenty, Hawkes Bay, Wairarapa, Marlborough and Central Otago is that they attract amenity migrants because of their climate and the multiple functions of their countryside. This multifunctionality (see below), with an attractiveness to visitors and lifestyle oriented living as well as horticulture, can have the effect of pushing up prices of housing when there is also a demand for accommodation for temporary and seasonal workers (McKay et al., 2014).

4.5 Effects on the multifunctional countryside

As rural communities adapted to the series of changes driven by government policies and other factors since the 1980s, it became increasingly apparent to researchers that a multifunctional countryside was emerging (Mackay et al., 2009; Pawson et al., 2018). Furthermore, the underpinnings of multi functionality, were identified in the combination of production, consumption and protection (Mackay et al., 2009; Mackay et al., 2014; Perkins and Rosin, 2018). This multifunctionality is central to the resilience of rural communities faced with fundamental changes in environmental policy. It plays a major part in building the resilience and adaptability of rural people and communities in the face of climate change and other potential drivers of change.

Multiple functions were first observed in terms of the resilience of farm households in the face of economic restructuring and successive droughts in the late 1980s, by their engaging in multiple job holding and alternative enterprises on farms, as found in the Ashburton District (Robertson, et al., 2008). It became clear that farm households were engaged in different sectors to maximise farm household income. It was also evident that additional rural sectors such as tourism and horticulture, were padding diverse opportunities for a range of rural people, including newcomers, as found in Central Otago (Mackay et al, 2014).

Small holders and people engaged in commuting to work, or in home-based employment, added to the diversity in these rural spaces. Some of these people were identified as “amenity migrants”, drawn to rural areas by rural landscapes and character, opportunities for outdoor recreation and new agricultural and horticultural production (Mackay et al., 2014).

Recently, the premises of production, consumption and protection underlying the multifunctional countryside were extended by the concept of a “biological economy”, one that looks to add value to agricultural and horticultural production through an assured chain of quality from producer to consumer, while protecting the environment and enhancing social wellbeing (Pawson et al., 2018). Examples documented by researchers include merino fibre and wine (Perkins et al., 2015) as evident in regions such as the Wairarapa and Central Otago, with strong links found in these places between agriculture and the visitor sector (Perkins and Rosin, 2018; Mackay et al., 2014; Howland et al., 2014). In particular, post-mass tourism was identified as independent visitors looking for unique or “authentic” experiences and to recreate and consume rural products in high quality natural and cultural environments. They take advantage of new land uses and landscapes such as vineyards and

⁸ https://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=12155294
https://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=12053443

wineries, while also experiencing traditional agro-industrial activity, other heritage, landscapes and cultural resources. Traditional farmers have become part of this activity, engaging in agritourism and providing services such as farm tours, artisan food, local markets days and other events, hospitality and accommodation.

4.6 Key lessons from social impacts of land use change in New Zealand

The following is a short list of policy-relevant insights drawn from the review of literature on social impacts of land-use change in New Zealand.

- Changes in land use and land ownership are closely interrelated and together these are drivers of social change, bringing new people and new types of social organisation into an area.
- Small towns acting as service centres and locations for primary processing are inevitably linked into processes of land-use change and have experienced considerable changes in employment and population (up and down) depending on their ability to attract economic activity.
- Social services such as schools and health services are vulnerable to changes in population and communities that lose a key service typically experience such a change as a negative event in terms of their ability to maintain community capacity, and vice versa.
- Some social groups are vulnerable to economic changes in rural areas and these can include the unemployed, those on low incomes and welfare, the elderly, Māori, newcomers, temporary workers, and workers who have difficulty gaining new skills or transferring skills between jobs.
- Family farming has remained an important form of social organisation in rural New Zealand, although forms of equity partnership, leasing and contracting of farm operations have brought changes to this basic form of social organisation.
- Multifunctionalism adds diversity of labour market and livelihood opportunities for rural communities to draw on and helps individuals adapt to changes in one sector. For instance, the studies show how people in the forestry and agriculture sectors drew on work in the tourism sector during periods of adaptation and stress for household budgets.
- Increased land values and farm incomes apparent with some forms of land-use change have enabled farm families to engage with and complete the process of farm succession and retirement.
- During periods of policy reform and economic change, the most vulnerable farm businesses were those with high debt costs and low equity. Often these were younger farmers or newcomer farmers.
- Rural communities are more socially and culturally diverse as a result of rural restructuring and while this diversity has challenged traditional social norms and organisation it has also added new social and economic opportunities.
- Economic, social and psychological stress are increased by periods of change and require systems of support for farm families and others affected by periods of change.
- The ability of communities to adapt (resilience) depends on community capacity, including leadership and community resources such as volunteerism.

- Active management of social change, as discussed below, assists in developing equitable transitions in sectors broadly affected by change. Management of change is most effective when organised and designed in collaboration with communities and stakeholders.

5 Case study areas and indicators

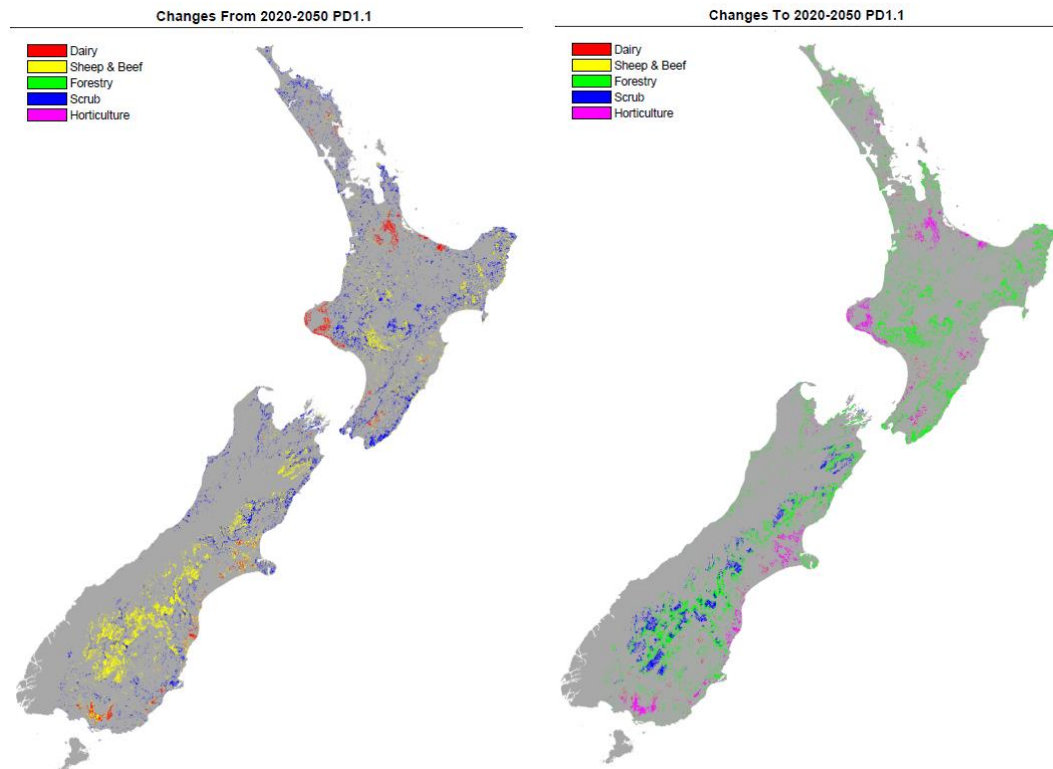
5.1 Mapping of land-use projections

It is anticipated that a more detailed strategic assessment will follow this current review and scoping exercise. One challenge for this follow-up assessment is the national scale of the proposed climate policies. In order to make sense of the possible policies and their effects on rural people and communities over an extended period of time, regional and sub-regional case studies are suggested here.

Modelling to date indicates that the potential changes in land use are best understood at regional and sub regional levels. Motu Research is providing ICCC with information and maps that indicate where land-use changes are most likely to occur, and they will undertake additional quantitative analysis of the impacts on land values, employment and other indicators in particular locations. The purpose of including maps at this point is to indicate the potential regional variations social assessment will need to consider.

An indication of the national scale and location of land-use changes is provided in Figure 1. It should be noted that these maps provide results for one, base scenario (PD 1.1). This scenario assumes an emissions price would apply to both forestry (i.e. providing a reward for carbon sequestration) and agriculture (i.e. providing a penalty on emissions from agriculture). The maps show land-use changes over the period 2020 to 2050, indicating what land uses will change from and what they will change to. It should be noted that it is possible to run different scenarios using different sets of assumptions and this work will continue and inform future SIA as policies develop.

Significant change away from current land-uses would occur in areas with extensive sheep/beef farming in lower-value hill country – mostly Canterbury, Otago, Marlborough, Manawatu-Wanganui in terms of total area – where there would be increases in “scrub” (first-growth indigenous forestry) and exotic forestry. Potential significant changes away from dairy are expected to occur in the North Waikato, West Taranaki, Southland and Canterbury, areas where cropping and horticulture either are strong already, or have been strong historically (e.g. Taranaki, Southland and Canterbury). The “Changes to...” map shows that, almost exclusively, sheep and beef land and existing scrub moves into forestry, while dairy land moves into horticulture. In some areas, the dominant land-use change is not away from livestock production but is the conversion of scrubland into production forestry.



5.2 Case studies approach

Case studies are a useful and widely accepted way of focusing strategic assessments. They enable the assessment of policies to focus on particular aspects, for instance on a biological area or ecological zone, a human factor such as total population, settlement types (dispersed or concentrated), iwi, land use and economic activity, or an administrative area (local authority). Case studies allow:

- the collection and analysis of baseline data with a more fine-grained approach than is possible at a national scale;
- assessment teams to consider the interrelationships between areas of expertise, for instance the interrelationships of social, economic, infrastructural, land capability, land uses, ecological, hydrological and cultural factors;
- in-depth analysis of qualitative indicators and consideration of community participation in designing and managing processes of change.

The work to identify potential case study areas is ongoing, using the spatial analysis conducted by Motu Research for the ICCC. Their spatial model, which can be disaggregated to area unit and mesh-block levels, allows us to identify where land use changes are likely and the types of land uses that we can expect regions of New Zealand to move away from and convert to.

Several case study areas show promise:

- **Northland**, or part of Northland, with long experience in forestry development and current expansion of horticulture, would make a useful case study area. The region also has a high Māori population and many areas of relative social disadvantage.
- **The East Coast/Cape** area of the North Island is likely to experience further conversion of sheep and beef land to productive and conservation forestry. With considerable experience of land use changes from sheep and beef to forestry post Cyclone Bola, there is a useful basis for starting the assessment. High proportions of Māori land and high Māori populations reinforce the need to include this sub region.
- **Taranaki** is a region that has moved through a number of transitions in its economy over the last 30 years and there is a strong sub-regional difference between dairy farming areas that may move into horticulture and hill-country areas, where sheep and beef could move into forestry. Also, the Government has already initiated a process of transition for Taranaki from the past emphasis on oil and gas development, as part of national climate change policies.
- **Hurunui/Kaikoura** Districts in Canterbury Region includes considerable tracts of steep hill country producing sheep and beef, alongside production forestry and conservation land. It is part of the extensive areas of Canterbury hill country expected to experience land uses changes from pastoral farming to a mix of production forestry and indigenous regeneration. An additional factor in this area is the work already commissioned by Ministry of Primary Industries known as the Post Quake farming Project,⁹ which is considering likely land-use changes as the result of future financial incentives to store carbon. The project will provide baseline information and a better understanding of the effectiveness of change management initiatives already underway. These are linked to expected future carbon benefits from forestry, along with recreation and tourism benefits and opportunities for farms to diversify their income streams.
- **Canterbury** – the preliminary regional analysis indicates that this area could see considerable conversion of land uses from irrigated dairy farming to horticulture and intensive cropping. The region is of interest because the conversion to dairy is relatively recent, as discussed above, and there is a useful body of existing research about the most recent period of land-use change, providing an excellent social-economic baseline for future assessments. A particularly important factor that will drive future land uses in Canterbury is the large investment made by the farming community in irrigation infrastructure and the ongoing costs of water supplies and storage (on and off farm). Also of interest are the constraints recently imposed on intensive farming by the regional plan. Large landowners are already investigating options in horticulture, and cropping for seed crops and vegetable oil.
- **Southland** is another region where there has been considerable research into social impacts of land-use changes and active interest by Venture Southland in investigating alternatives to dairy farming. Of particular interest here is the possible conversion of some dairy farming land to horticulture or cropping north of Invercargill, on soils previously used for crops such as oats.

⁹ <https://www.facebook.com/postquakefarming/>

5.2 Indicators of social change

Indicators of social change are needed to conduct future analysis of the social impacts climate policies on rural places within a spatial frame of area units (the likely principal level of analysis); meshblocks (needed for more fine-grained spatial analysis); and particular settlements and communities. Indicators should ideally have data available at the meshblock level, or that are easily prorated to the meshblock level. Some indicators only have a qualitative measure and these also should be explored in future research.

Examples of useful indicators are:

- **Usually resident population** - trends in total population (census and SNZ estimates) provide a broad indication of the viability of a community, and the level of services it is able to maintain.
- **Population change** – changes 2001-2013 (census) with an upward trend seen as generally positive. Rapid change up or down tends to result in pressures on housing and social services. Long-term instability of a population indicates underlying issues with the sustainability of natural resource uses.
- **Projected population** (SNZ estimates) - provides an indication of the likely social conditions of the community in the short to medium term, using a standard technique that combines factors such as birth rate, internal migration and housing starts.
- **Age breakdown** – major groups/dependency ratio (census) provide an indication of the proportion of key groups such as children 0-14, youth, working age people, elderly and old elderly (80 plus). The composition of the population affects many aspects of community wellbeing, delivery of social services and capacity for work and voluntary activity.
- **School rolls** (Ministry of Education) – reflect the age composition of a community and the ability of schools to act as a social hub. A falling roll is regarded as a negative trend for most rural communities.
- **Social services** – the mix of social services, with provision of education and health services key to most rural areas – usually dependent on the number and composition of the population. Closing of social services indicates potential disruption to community life and opening of a new service is typically a positive sign.
- **Māori population** (census, Ministry of Education school data, iwi statistics) - the total and proportion of Māori, and tribal affiliations, indicate the likely strength and vulnerability of the Māori community.
- **Total employment** by industry sector (census and LEEDS data base) – employment drives population and changes in particular sectors and is a strong indicator of potential social changes in a community including the nature of work and community identity.
- **Employment status** – the level of unemployment (census/labour market survey) indicates the capacity of the community to supply labour to new economic activity and vulnerability to social issues associated with unemployment and welfare dependency.
- **Workforce participation** (Labour market survey) – indicates the potential of a community to expand employment and an understanding of part-time versus full-time work.
- **Household income** (usually expressed in quintiles) – indicates the relative income levels in a community with higher levels usually seen as a positive factor.

- **Deprivation index** (census/University of Otago) – provides an understanding of the social-economic status of a community, with a high index (low status) usually reflecting a period of negative social-economic change.
- **Areas of Māori land** (Ministry of Justice) – indicates the potential for impacts of land-use change on Maori, positive and/or negative.
- **Land use capability** (NZLRI) – indicates the limits and potential for land-use change.
- **Land use types** (various) – indicates current economic activity and employment, farming types and associated community wellbeing. Projected land use types (scenarios) indicate potential community change. Actual changes in land-use often result in changes in land ownership and subsequent social change.
- **Personal stress** – levels of mental health problems and suicide reflect the levels of stress in a community, particularly in a period of change or through natural events or economic change such as restructuring or plant closures.
- **Volunteering** – provides an indication of social capital and the ability of a community to act on its own behalf to provide a range of social services, sporting activity and community events.
- **Community capacity and resilience** – provide an indication of the ability of a place to adapt to change.

6 Managing the necessary transitions

Practitioners of SIA recognise the importance of adaptively managing transitions that arise from proposed and actual environmental policies. Societal changes are complex with numerous, interrelated factors. Furthermore, affected people have a natural desire to be involved in both identifying social effects and navigating their way through them towards an end goal of increased human wellbeing. As a result, SIA practitioners broadly accept the need for participatory approaches and adaptive management (Taylor, et al., 2004) and have developed a specific tool of Social Impact Management Plans (Holm, et al., 2013).

New Zealand will need to adapt to the effects of climate change such as adverse climate events, the effects of reducing emissions, and the effects of mitigations necessitated by climate change. Dorner et al. (2018) conclude that the necessary changes in land use will likely require strong, credible positive or negative price incentives. These incentives will require and benefit from additional, complementary policies that encourage and support behavioural changes at the levels of individuals and communities. To gain wide public support the changes will also have to be as fair as possible to everyone affected.

The New Zealand Government has already made a commitment to “just transitions” with the Just Transitions Unit in the Ministry of Business, Innovation and Employment.¹⁰ The Unit will:

- *“focus on the impacts of major climate change policy decisions on households, communities, industries and regions*

¹⁰ <https://www.mbie.govt.nz/business-and-employment/economic-development/just-transition/>

- *look at opportunities created by the transition to a low emissions economy and the support the Government can provide to aid the transition process, in partnership with iwi, regions, sectors and communities*
- *work with other government agencies active in this area, especially the Transition Hub located within the Ministry for the Environment, and the Provincial Development Unit.”*

This work programme has a current focus on the transitions necessitated by phasing out oil and gas exploration permits on the region of Taranaki and could form the basis for managing the issues of social change considered in this paper.

Rural support organisations and sector groups are important for supporting change by farmers. Wallace (2014) points to the importance of the NZ Rural Support Trust, formed in 1988 to fund and organise an independent network of coordinators, “to provide counsel and guidance for struggling rural families” (page 59). Issues faced by farmers included low or nil equity in their properties, difficult farm decision making processes, relationship issues and mental health concerns. The coordinators included people with established leadership roles in their communities and experience in community initiatives and social services. A key part of their role was to support farmers through the obvious distress of debt restructuring, and in some cases the uptake of New-Start Grants to leave their properties (Wallace, 2014; Taylor, 1990). The Trust remains active today in supporting farmers through adverse events and periods of psychological stress.

Community action groups were another important part of the response to the combined effects of rural restructuring and weather events. Some of these groups were formed simply to oppose changes. Others turned to more positive efforts such as trusts formed to run local health services, tourism promotion groups, groups organising heritage developments and a range of community development initiatives and events (Wallace, 2014; Mackay et al., 2009).

A fair approach to managing change will require government to work with rural communities in a way that helps to build their capacity to organise and lead change, and develop new partnerships including with iwi.

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