



SLMACC Research Themes and Project Topics 2019/20

INFORMATION ABOUT PROJECT TOPICS

The following provides details on each of the projects identified in Part A Table 1.

Research theme	Project topics
Extension	Project 1.1 Proposals are sought for a deeper analysis on how climate change research can be more effective, communicated and taken up by rural professionals. Funded for 1 year A resource for policy makers, regional councils, industry groups and businesses - the Survey of Rural Decision Makers undertaken by Landcare Research (2013, 2015, 2017) conveys how innovative practices are adopted by farmers, refer to: https://www.landcareresearch.co.nz/science/portfolios/enhancing-policy-effectiveness/srdm Proposals are sought for a deeper analysis on how research can be more effective and communicated to rural professionals. Questions would need to be targeted and can be done via person to person interviews, phone interviews or a series of small workshops. This would be valuable to MPI in the design of extension programmes. The assessment of specific practices for their suitability for extension in specific regions and subgroups/landowners based on how that group tends to learn, the practice itself and benefit for that regions ambitions and issues, and the resources in the area that can contribute to extension. Refer to: https://www.massey.ac.nz/massey/about-massey/news/article.cfm?mnarticle_uuid=4852C4C8-4545-41D8-8CC4-C2880D116203 https://www.tandfonline.com/doi/full/10.1080/1389224X.2017.1314861?scroll=top&needAccess=true This must build on what has already been done including for water quality and other focus areas and should be considered in light of the results/findings from the MBIE Endeavour 'Primary Innovation' project (2012-17). This should include other primary sectors, including forestry and horticulture, with a focus on creating and enabling environment for innovation and long-term land management. There are different and quite sophisticated mechanisms for extension that can be used, such as to name a few: The Task Force on Climate-Related Financial Disclosures (TCFD) and Climate Changes, Impacts and Implications (CCII) MBIE research programme promote Scenarios; Serious games have been used (e.g. Blackett (NIWA), Lawrence (Victoria), Verlade & Edwards (Scion / MWLR); Provision of adaptation decision making tools and methods (e.g. UKCIP, Real Options Analysis and adaptation pathways, Hawkesbay and Rangitāiki SLMACC's.)

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	Further work would be to build on the typology of use to rural professionals. There are several science concepts that can improve decision making, uptake, and managing transitions some examples are: Innovation systems evaluates how effective the system is that supports innovations in mitigation and adaptation. Social learning provides a framework for disparate communities of interest to develop plans for action. Soft systems analysis and Systems thinking help unpack barriers to action, and develop mechanisms for decision making contexts. The science of how transitions are managed (to an environment of low carbon can provide effective ways of driving innovation in the primary sector businesses, i.e. identifying drivers that govern the current farm/forest/horticulture management approaches; identifying how innovation can be encouraged, developed (strategic niche management). This should be designing an extension programme, implementing it, analysing how effective it is, then adapting and repeating.
Extension	Project 1.2 Extension of Fire Risk under Climate Change Funded for 1 year Fire risk under climate change is something we know is an issue. Understanding fire risk for different species is a small part of this. Potential for extension work on how fire risk is managed where farms and forests interact, particularly as we weave more trees into the landscape. This should address fire landscapes made up of the mosaic of farms and small forest blocks and those in close proximity to communities such as within the rural-urban interface. We need to understand: 1) The change in risk and uncertainty around future extreme fires; 2) Where the confluence of urban and rural landscapes exists. 3) What are climate adaptation options to manage risk e.g. more fire breaks, monitoring, etc. 4) Adaptation and mitigation by landowners to reduce fire risk. Research with an extension focus on the rural-urban interface working with residents could reduce fire risk and increase preparedness to minimise impacts. 5) A cultural element is needed in this research to work in partnership with Maori communities to address adaptation and mitigation and thereby decrease the threat to vulnerable communities and culturally significant sites.
Adaptation	Project 2.1 Assessment of the Resource Management Act (RMA) and the policies and plans of City, District and Regional councils in allowing flexible land-use to enable adaptation to climate change Funded for 1 year This project would be a scoping exercise over 1 year. There are case examples from overseas (e.g. Australia) which may provide the basis for a review and synthesis of lessons and experiences to date. There is a proposed work package in Resilience to Nature's Challenges (RNC) 2 Rural, and Resilience in Practice Model looking at

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	adverse events specifically (Resilience in Practice Model). “Conventional/Current adverse events and recovery policies for primary industries affected by hazard events, may have unintended long-term consequences, locking in undesirable or unsustainable pathways, and preserving the status quo. Gaining insight into the mechanisms through which post-event support is delivered, perceptions and drivers of recovery in rural settings, and opportunities to enable transformations towards more resilient responses is urgently required. This work package will develop a theoretical framework for exploring ‘lock in’, path dependencies and non-decisions for preparing for, responding to, and recovering adverse events for primary industries. Focusing on recent examples from drought and water management, we will apply the framework and develop three comparative case study examples, working closely with affected regional stakeholders, including Environment Southland (drought), Marlborough District Council (drought and earthquake) and Bay of Plenty (flood). <i>Outcome: to understand the extent to which regional and district plans limit flexibility of land use change to adapt to climate change and the development of a framework to limit lock in of decision making into unsustainable pathways by councils.</i>
Adaptation	Project 2.2 How do individual farms thrive while responding to the collective drivers of climate adaptation, emissions mitigation, water impacts, biosecurity and biodiversity? Funded for up to 2 years This project would be for up to 2 years and a focused assessment of how a set of individual farms (that span a wide range of conditions in NZ) can make short and long term management decisions to deal with the above drivers, while maintaining or increasing profitability. This should build on previous work e.g. DairyNZ Case Studies (as per Dairy Action for Climate Change (DACC) also the work of Phil Journeaux for Maori incorporations. Any outputs should be a ‘suite of actions’ not a recipe that can be applied on a per farm basis. The project would look to fill in gaps that existing projects haven’t covered (e.g. Northland, West Coast ...). Resilience assessment has been used in previous SLMACC projects to consider the impacts and response to drought (Cradock-Henry and Mortimer, 2013) across low-input, high-input and organic dairy farms, and in dryland (sheep and beef) systems (Cradock-Henry and McKusker 2015). These studies relied on a small number of in-depth case studies with selected farms, in different regions, but were necessarily constrained by the available time and resource (ca. 12-months, \$100-125K). Nonetheless, the findings provide insight into the range of stressors that farmers are exposed to, strategies for mitigating risks, and the potential for adaptation. This project requires multiple researchers, with collective experience in risk and resilience assessment, farm systems, economics and decision-making.
Adaptation	Project 2.3 Key areas foresters will have to consider adapting their practices for managing forests Funded for 1 year

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	Key areas foresters will have to consider adapting their practices for managing the effects of: high intensity rain, higher fire risk, and higher risk of losses relating to pests, diseases and weeds. These issues have been well identified and are already themes in Scion Research's 'Preparing for Climate Change' programme. Proposals will be sought for wider and/or deeper research into these areas. Scion notes the findings from the SLMACC review and the wider set of stakeholders including farmers/hapū planting for 1BT and environmental outcomes. (These are added as new themes below.) Adaptation: more research is required to provide businesses and communities (including Maori communities/hapū) with <i>quantifiable</i> and <i>catchment level</i> productivity and risk data that can be used to understanding impacts on operations and finances and environmental or social goals. We will make data available to end-users, including the specific requirements of iwi, for their own assessments and management of risk. As direct engagement with many stakeholders is not always practicable, a 'climate services' approach could be used to develop customised information products that include data, information and knowledge for specific sectors or regions. Model and generate scenarios of different climate futures, land use systems and how different systems interact to affect forest productivity, the wider environment and communities, including changes in extreme events. Develop understanding on climate change impacts on planted indigenous forests.
Adaptation	Project 2.4 Review of FACE (Free Air Carbon Dioxide Enrichment) conclusions in relation to impacts of enhanced carbon dioxide on future farm practices Funded for 1 year One of its key facets is the impact elevated atmospheric CO₂ has on grazed grassland making the NZ FACE site the only one of its kind in the world. It has been operating for 20 years now. The rapid rate of change in farming practices, such as inclusion of plantain and other forages (herbs, grasses, and brassicas), and changes in grazing management practices, may modify the value of this information. Undertaking this work should consider how applicable outcomes/results will be for future pastoral systems.
Adaptation	Project 2.5 Support for identification and quantification of risk for the primary sectors to climate change to support the Climate Change Legislation on Adaptation and Risk Funded for 1 year Compilation of information to support the development of an Adaptation Risk Assessment and Plan under the Climate Change Legislation for the primary sectors. This needs to focus on managing and quantifying risk in biological systems (i.e. Sustainable Land Management not infrastructure). Biological systems are more complex due to the interactions between climate and plant and animal physiology and the potential for multiplying risks, e.g., as climate increases occurrence and impact of pest and diseases, which results in

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	more tree death which increases fire fuel loading; or how phenology changes affect key ecosystem functions such a pollination, flowering, fruit set. Research is required on how risk - resilience, vulnerability- to climate change affects cultural values, communities and iwi/hapū, and how adaptation processes account for cultural and societal values. This needs to tie in with the framework that is used to assess risk and the Plan framework identified as needed for the legislation.
Adaptation	Project 2.6 Enhanced model for drought identification by including soil moisture holding capacity and/or future drought prediction in the current drought model Funded for 1 year NIWA were funded to kick-start the drought index work. This work will also enhance the forecasting module of the drought index. An area to be addressed in the NIWA model is the use of water holding capacity of different soils which should be added and used as the starting point.