HILL COUNTRY FUTURES

Hill Country Futures Insights for Farmers

A series sharing the key findings, tools and resources from the Hill Country Futures Partnership Programme - designed to help farmers make confident, resilient decisions backed by data.

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PROJECT SUMMARY

The Hill Country Futures Partnership programme

Hill Country Futures was developed to support Resilient Farmers and Resilient Forages for the future

A thriving hill country farming sector is critical to New Zealand

The sector faces multiple challenges, including land use change, climate change, increasing regulation and changing expectations from consumers. To ensure the long-term profitability, sustainability, and wellbeing of farmers, farm systems, the environment and rural communities, support is needed for enduring resilience — this was the focus of the Hill Country Futures (HCF) Partnership programme.

HCF was a five-year, $8.1 million programme, co-funded by Beef + Lamb New Zealand (B+LNZ), the Ministry of Business, Innovation and Employment, PGG Wrightson Seeds and RAGT New Zealand.

The programme was delivered through active engagement with the hill country farming sector and a multidisciplinary collaborative research team that included B+LNZ, farmers, universities, Crown Research Institutes and consulting agencies.

HCF was focused on resilient farmers and resilient forages for the future

Our farmers farm diverse hill country landscapes across New Zealand. Selecting plants that meet a number of criteria — ease of establishment, animal productivity, environmental challenges — is important.

Farmers need data, field trials and modelling to help them make decisions about what to plant and where to create a resilient hill country farming future.

But making decisions about plant selection is not done in isolation. Recognition and understanding of the drivers, challenges and opportunities farmers face is also needed to support them achieve and maintain a resilient future.

An extensive and diverse range of resources and tools are now available

Resources and tools have been produced for farmers, rural professionals and researchers to support the resilience of New Zealand hill country farming systems. These include easily accessible extension materials, tools, and scientific publications.

Keen to know more?

Podcast (An introduction to the programme)

Podcast (Panel discussion)

Hill Country Futures - Resilient farmers and resilient forages for the future

Acknowledgements

The success of this programme would not have been possible without the help, support and input from farmers, researchers, organisations, and other hill country farming stakeholders.

PROJECT SUMMARY

Future-proofing the hill country – farmer interviews

We listened and talked to around 300 New Zealanders, primarily sheep and beef farmers

Hill country farming is vital to New Zealand's economy and regional communities

Our hill country farmers face a wide range of challenges — the impacts of climate change, evolving expectations from consumers, new environmental regulations, and changes in land use.

To help our farmers increase their resilience to these challenges and future-proof the hill country, we need to understand what is important to them.

Between July 2019 and March 2020, we listened and talked to around 300 people in the industry, over half of whom were hill country farmers.

We wanted to know what is happening in hill country farming, what matters most to them and what their vision is for the future.

We also wanted to know how to support our farmers and rural communities to achieve and maintain a resilient future. To do this, we needed to identify and understand the drivers, challenges and opportunities they face.

What matters the most to New Zealand sheep and beef farmers?

After we evaluated and analysed all the conversations, we identified the key issues for our farmers and their vision for the future:

- Barriers and opportunities for on-farm environmental action
- Economic diversification and resilience
- The next generation of farmers: succession
- Perspectives on regenerative agriculture
- The Future of Hill Country Farming: a vision 2030?

This work became known as the Farmer Perspective Series.

Ultimately, farmers told us that people are at the centre of their vision for the future of sheep and beef farming in hill country.

Keen to know more?

Podcast - Farmer interviews

Farmer perspective series

Acknowledgements

A big thank you to Katherine Dixon (Nature Positive) and Ange McFetridge (Beef + Lamb New Zealand) for taking the lead on this project for New Zealand's sheep and beef farming community. Special thanks to the farmers who actively supported this work.

PROJECT SUMMARY

FarmSalus

A resource package and assessment tool was designed with our farmers to support resilience

Helping future-proof hill country farms and farmers

Supporting the wellbeing of farmers is central to future-proofing their farm and rural communities.

This project identified a need for resources that enable rural professionals to support individual farmers' well-being. In response to this need, the Hill Country Futures team designed an evaluation tool for farm system resilience that focuses on the health and wellbeing of the farmers themselves. This tool is known as FarmSalus.

A resource package created to support farmer resilience

The name FarmSalus was inspired by the Roman goddess of safety and well-being, Salus.

FarmSalus was produced using a co-design approach with farmers and other stakeholders to meet farmer needs. The well-being focus of FarmSalus makes it unique; it fills a gap in evaluation tools that are used in hill country farming. FarmSalus supports a whole farm system approach to resilience and well-being and prompts farmers to have discussions about their own specific farming context.

The FarmSalus tools and resources emphasise four pillars of a resilient farm system. These are:

- Healthy farmer
- Healthy farm business
- Healthy environment
- Healthy connections to support networks

These four pillars were identified by New Zealand hill country farmers to be the foundations of a resilient farm system. Rural professionals can work through the FarmSalus assessment with a farmer to support them with their decision making. FarmSalus encourages farmers to make healthy decisions for their farm management and farm business that align with their own needs and values.

Keen to know more?

Podcast (FarmSalus)

FarmSalus: Creation of a farmer wellbeing tool

FarmSalus: Notes for facilitators

FarmSalus: Resources for rural professionals & farmers

FarmSalus guides conversations with farmers about issues important to them and their farming resilience

Collaboration with other organisations, such as Agri-Women's Development Trust, The Rural Support Trust, Ministry for Primary Industries and FarmStrong, puts FarmSalus in a strong position to be more widely adopted to help support our farmers and their communities.

Acknowledgements

A big thank you to Katherine Dixon (Nature Positive) and Ange McFetridge (Beef + Lamb New Zealand) for taking the lead on this project for New Zealand's sheep and beef farming community. Special thanks to the farmers who actively supported this work. We give special thanks to the Agri-Womens Development Trust (AWDT), B+LNZ extension team, LandPro and the Rural Support Trust who contributed their time to support the development of FarmSalus.

PROJECT SUMMARY

Telling the stories of our farmers

Stories about our farmers were told to showcase their stewardship of the hill country

Stories from across New Zealand showcased the positive social and environmental outcomes in our farming communities

Hill country farmers play an integral role as producers of high-quality food and stewards of our iconic hill country landscapes. It is important that we don't lose sight of this.

One way to value hill country farmers is to celebrate those who are demonstrating continual improvement for the environment, livestock, and communities.

Hill Country Futures was an opportunity to share the story of hill country farmers with New Zealanders and the rest of the world.

To do this, a series of farmer stories were created that highlighted the positive social and/or environmental outcomes that are happening on-farm.

These farmers were not only willing to tell us their story, they were also involved in the research that was happening as part of the Hill Country Futures programme.

37 articles were published in media in total, including Countrywide, Rural News, Wairarapa Times-Age, Stuff.co.nz and New Zealand Farmers Weekly.

Through these stories, the programme was able to showcase several hill country farmers, including:

- Matt Iremonger, general manager of Willesden Farm on the Banks Peninsula, who has increased production efficiencies and reduced nitrogen use by growing lucerne.
- Trevor Johnson, owner of Paparata Station, who has made changes to their farming system based on sustainability.
- John Chapman showed the importance of on-farm pasture measurements to change his summer safe high country farm system.

Read their stories and others here.

Acknowledgements

A big thank you to Katherine Dixon (Nature Positive) and Ange McFetridge (Beef + Lamb New Zealand) for taking the lead on this project for New Zealand's sheep and beef farming community. Special thanks to the farmers who actively supported this work.

PROJECT SUMMARY

Forage growth trials and study sites

Data from forage growth trials will help farmers match their property's different land management units with the appropriate legume

Data was collected from forage trials on a number of research and farm locations around the country

New Zealand's diverse landscapes, climatic conditions and farm systems can make it difficult to decide which legume to grow where, including when to consider nitrogen-fixing properties.

These trials evaluated a number of different forage combinations with a focus on legumes as they require less chemical inputs than rye grass.

Farmers need evidence to give them confidence to utilise different forage and farm system options

Hill country farmers farm diverse hill country landscapes across New Zealand. Selecting plants that meet several criteria from ease of establishment to achieving animal productivity goals and tackling environmental challenges is crucial.

Data collected from field trials, case studies and modelling can inform decisions about what to plant and how to manage it to create a resilient hill country farming future.

Data on the growth profiles of a range of forages (such as red, white, and subterranean clover, lucerne, plantain and chicory) were collected from 12 research and commercial farms across New Zealand (Our study sites), including monocultures, mixtures and resident pastures.

Data gained from these trials, plus historic data sets, were used to inform the development of two lucerne yield models and contributed to the AgYields national forage database.

Keen to know more?

Podcast (Study sites used to collect data)

Our study sites

Smith et al. 2022

Acknowledgements

A big thank you to Professor Derrick Moot (Lincoln University) for taking the lead on this project for New Zealand's sheep and beef farming community. Special thanks to the farmers who actively supported this work; in particular, we would like to thank C. & K. Croft (Waipara; Stockgrove), Wongan Hills Ltd. and manager M. Iremonger (Willesden Farm) and J.& A. Chapman (Inverary Station) for allowing us to monitor production differences on their properties.

PROJECT SUMMARY

Modelling lucerne yields across New Zealand

Modelling legume yield drew on 20 years of lucerne, soil and water data from Lincoln University, along with on-farm experiments.

Two models, with contrasting complexity, were developed to simulate lucerne (Medicago sativa) yields

The **TGM** (Thermal-Time-Based-Model) model was designed to target a farmer or farm-consultancy end-user interested in estimating local lucerne yields.

- The **TGM** is based on mean air temperatures and can be used to predict forage yield.

The **APSIM** (Agricultural Production Systems sIMulator) — a process-based model — was designed to target researchers as end-users to develop a mechanistic tool that can be used to explain climate and land use changes on forage production and environmental impacts.

- The APSIM-NextGen lucerne model is available via APSIM initiative repository in GitHub. It can be used with lucerne / red clover to look at climate change scenarios, catchment run-off, and water quality issues.

Acknowledgements

A big thank you to Professor Derrick Moot (Lincoln University) and Dr. Edmar Teixeira (Plant and Food Research) for taking the lead on this project for New Zealand's sheep and beef farming community. They are among a range of new tools to support farmers and consultants that will be among the outcomes of the Hill Country Futures Partnership.

Keen to know more?

- Podcast (The thermal time-based (TGM) model
- Podcast (Development of the Agricultural Production Systems sIMulator model (APSIM for short))
- Moot et al. 2022: Simplified methods for on-farm prediction of yield potential of grazed lucerne crops in New Zealand
- Keenan et al. 2023: Predicting yield of irrigated red clover (Trifolium pratense L.) pastures in response to temperature
- Yang et al. 2021: Development of a lucerne model in APSIM next generation: 1 phenology and morphology of genotypes with different fall dormancies
- Yang et al. 2022: Development of a lucerne model in APSIM next generation: 2 canopy expansion and light interception of genotypes with different fall dormancy ratings
- Yang et al. 2023: Development of a lucerne model in APSIM next generation: 3 Biomass accumulation and partitioning for different fall dormancy ratings

PROJECT SUMMARY

AgYields

AgYields enables farmers to see which pastures and crops have been grown in their districts, how much they grew, and when, so they can select more resilient pastures and crops to suit their farm systems

AgYields is a central repository for all pasture and crop yield data and growth rate information collected in New Zealand

- The AgYields national forage database is an open access central repository, for all past, present, and future pasture and crop yield and growth rate data collected in New Zealand.
- It is a publicly accessible resource.
- Its creation has led to the recovery of paper-based datasets that were in danger of being lost forever.
- It is easily accessed, managed and updated.
- It is suitable for farmers, rural professionals, students and scientists.

AgYields supports decision making around pasture planning

AgYields was developed to provide farmers and rural professionals with ready access to localised yield data that can be used to inform decisions around pasture planning.

AgYields allows farmers to see which pastures and crops have been grown in their districts and how much they grew. This knowledge increases the likelihood of more resilient pasture and crop systems being selected.

Accessing data about a range of species will help farmers select appropriate species to address climate change challenges and work within environmental regulations.

Keen to know more?

Visit the AgYields website

Learn how to use AgYields from these tutorial videos

Read more about AgYields here (Fact sheet)

Podcast (AgYields National Database)

The development of AgYields

Acknowledgements

A big thank you to Professor Derrick Moot and Dr. Carmen Teixeira (Lincoln University) for taking the lead on this project for New Zealand's sheep and beef farming community. Also, special thanks to Dr. David Chapman and Dr. Wendy Griffiths of DairyNZ and Dr. Mike Dodd of AgResearch who also assisted in the development of AgYields. It is among a range of new tools to support farmers and consultants that will be among the outcomes of the Hill Country Futures Partnership.

PROJECT SUMMARY

Mapping hill country soil temperature and moisture

Establishment of a wireless sensor network enabled some of the first daily farm scale mapping of soil properties in New Zealand hill country

Farm scale mapping of key soil properties provides robust information to inform decision making tools

Tools are needed to estimate pasture yields and determine the suitability of forage legumes in diverse landscapes. To make these tools more robust, data needs to be collected at the farm scale, particularly when considering New Zealand's diverse hill country landscapes.

Data on soil temperature and moisture dynamics are particularly important as these micro-indicators are key drivers of many soil and plant processes.

Wireless sensor networks (WSN) accommodating hill country topography challenges were installed at six sites across New Zealand

Previously the best available source of climate information in New Zealand was NIWA's Virtual Climate Station Network (VCSN). The VCSN provides daily estimates of a range of climate variables, including soil temperature and soil moisture, on a 5,000 m square grid.

New Zealand's hill country landscapes are diverse and soil conditions can vary markedly with topography over distances much shorter than 5,000 m. Existing climate variable estimates do not account for the influence of topography (especially effects related to the direction a slope faces). This makes them unsatisfactory for hill country pasture management. Farm-scale mapping of soil properties is better suited to a grid resolution of 100 m square or smaller.

Each WSN had twenty sensor nodes that were designed to make hourly measurements of soil temperature and moisture at 30 cm depth and transmit the data to a cloud database. At each site, the sensors were distributed in order to account for the variation in important topographic variables including elevation and aspect.

The sensor nodes were famously constructed by Jagath Ekanayake in his living room during New Zealand's first COVID-19 lockdown in April 2020, a feat which was noticed by the Smithsonian Institution.

Farm-scale maps for soil temperature and moisture are now available to drive yield models and help inform decision-making on pasture management

Daily maps of soil properties were produced at a grid resolution of 30 m, showing that soil temperature and moisture can be mapped at the farm scale in New Zealand hill country.

Keen to know more?

Podcast - Setting up the sensor network

Podcast - How can knowing soil temperature and moisture levels help farmers

Final report

Acknowledgements

A big thank you to Dr. Nathan Odgers (Manaaki Whenua - Landcare Research) for taking the lead on this project for New Zealand's sheep and beef farming community. Special thanks to the farmers who actively supported this work.

PROJECT SUMMARY

Animal production from legumes

In dryland areas, lucerne provides high quality feed for grazing

Selecting forages that meet a number of criteria — ease of establishment, animal productivity, environmental enhancement — is important.

In the 'Lucerne at Willesden' video series, Tyler Good (Finishing Manager, Willesden Farm, Banks Peninsula) and Professor Derrick Moot (Dryland Pastures Research Group, Lincoln University) talk about how lucerne is used successfully on Willesden farm.

Keen to know more?

Video series (Lucerne at Willesden)

Fact sheet: Animal production from lucerne based pastures

Fact sheet: Animal production from annual clover/plantain based pastures

Acknowledgements

A big thank you to Professor Derrick Moot (Lincoln University) for taking the lead on this project for New Zealand's sheep and beef farming community. Special thanks to the farmers who actively supported this work.

PROJECT SUMMARY

Legumes

Legumes have the potential to transform hill country farming businesses while protecting vulnerable landscapes

Legumes are the powerhouse of pastoral farming systems

With the correct management, legumes have the potential to transform farm businesses while protecting fragile hill country landscapes.

Key considerations when using legumes in your farm system are:

- Address nutrient deficiencies to allow legumes to photosynthesize and fix nitrogen.
- Correct management of sub clover is critical to maximise its productive potential in early spring.
- Talk to seed agents about the cultivars most suited to individual farm environments and systems.
- Satellite areas within hill country farms can have significant production and environmental advantages.
- Rotationally graze as soon as possible after lambing to help drive pre-weaning growth rates.
- Legumes can efficiently and sustainably minimise environmental impact.

Optimising resources and utilising them sustainably will generate long term on farm resilience

An important aspect is to understand nitrogen levels in your farm system to how nitrogen deficiency can be addressed. Instead of using imported nitrogen fertiliser, legumes can do this efficiently, sustainably and minimise environmental impact.

In dryland areas, lucerne provides high quality feed for grazing

In the 'Lucerne at Willesden' video series, Tyler Good (Finishing Manager, Willesden Farm, Banks Peninsula) and Professor Derrick Moot (Dryland Pastures Research Group, Lincoln University) talk about how lucerne is used successfully on Willesden farm.

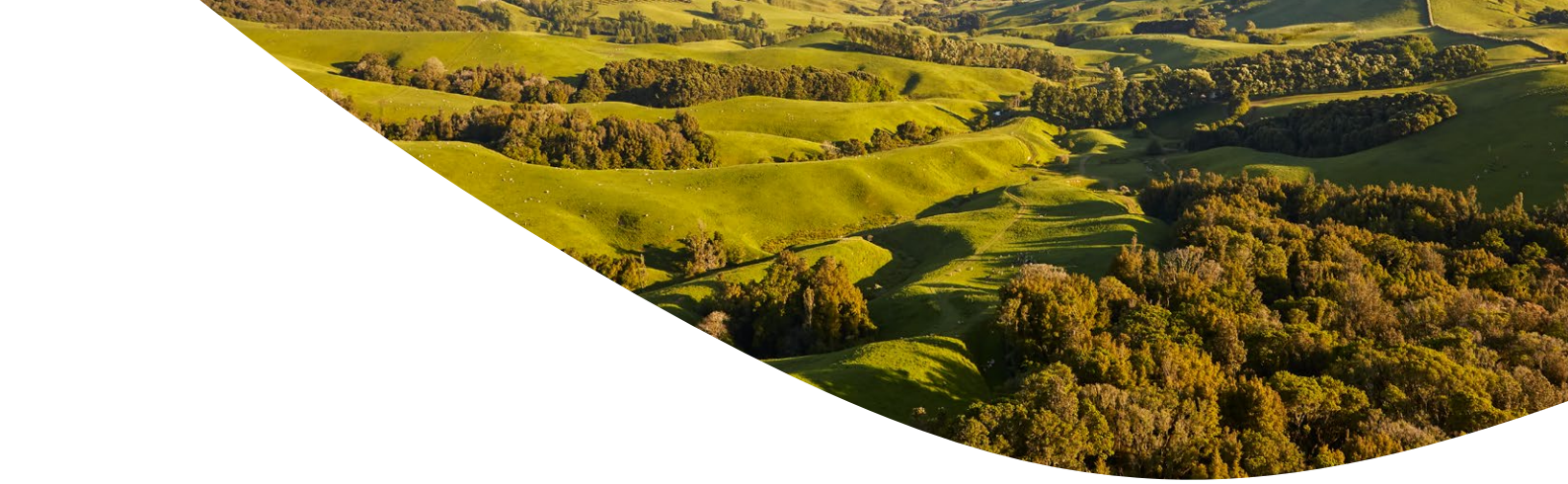
- Lambing hoggets
- The effect of altitude on seasonal production
- Successful establishment of new stands
- Productivity compared with grass-based pastures
- Autumn and winter management
- Grazing management post-weaning with lambed hoggets
- Rotationally grazing ewe hoggets with lambs at foot

Keen to know more?

Podcast (Legumes)

Acknowledgements

A big thank you to Professor Derrick Moot (Lincoln University) for taking the lead on this project for New Zealand's sheep and beef farming community. Special thanks to the farmers who actively supported this work.



PROJECT SUMMARY

Native shrubs as alternative forages

An increased understanding of the potential for native shrubs as an alternative forage

Programme has provided data to inform decision making about planting native shrubs on hill country

Many farmers with steep erosion-prone hill country are interested in revegetation with native species. Planting natives can offer increased native biodiversity and provide erosion control.

Farmers also want to know if native shrubs can be used as an alternative forage for livestock in hill country.

Trials were established in Manawatu and Mahia to assess the establishment, growth and forage value of native shrubs

Pilot studies evaluated several different aspects of native shrubs including:

- Establishment
- Growth and forage value
- Metabolisable energy content and digestibility analysis of the foliage
- Feed preference in sheep
- Economics of planting natives based on modelling and mātauranga applications of native species.

Native species that were studied included: *Hoheria populnea* (Houhere), *Pittosporum crassifolium* (Karo), *Griselinia littoralis* (Pāpāuma), *Coprosma robusta* (Karamū), *Coprosma repens* (Taupata), *Melicytus ramiflorus* (Māhoe), *Pseudopanax arboreus* (Whauwhaupaku) and a shrub willow *Salix kinuyanagi*.

Farmers wanting to plant natives on steep hill country are faced with a number of opportunities and challenges

Some key findings from this research included:

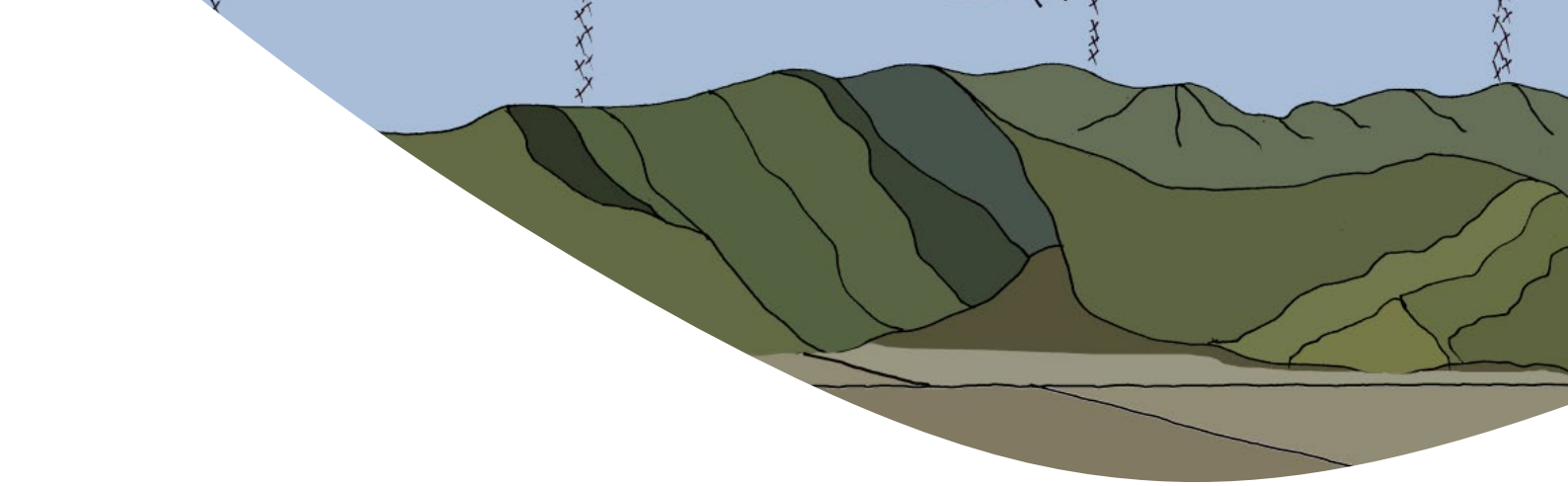
- Establishment rates of native shrubs can be very high (>90%) in favourable environments but where conditions are not favourable, survival over the first summer can be low.
- For hill country farmers wanting to browse native shrubs once established, foliage and fine stems appear to be palatable to livestock, such as sheep. Their metabolisable energy content is reasonably good (range 10-12 MJ ME/kg DM) but protein content of both leaves and small stems is low.
- Modelling of whole farm production and profitability using discounted cashflow analysis indicated that the economic viability of planting native shrubs is mostly dependent on the value of carbon credits.

Keen to know more?

Podcast (Native plants as alternative forages)

Acknowledgements

A big thank you to Associate Professor James Millner (Massey University) for taking the lead on this project for New Zealand's sheep and beef farming community.



PROJECT SUMMARY

Mātauranga knowledge of native shrubs

Insights were gained through kanohi-ki-te-kanohi (face -to-face) wānanga and interviews

Native plants are important for the kaitiakitanga and guardianship of the hill country

Many farmers with steep erosion-prone hill country are interested in revegetation with native species. To support farmers exploring the option of planting native vegetation on their farms, this programme evaluated several aspects related to growing native shrubs on hill country.

Over 70% of Māori titled land is in hill country farming, therefore, understanding the mātauranga applications of native shrub species was also vital to evaluating native plants in our hill country.

To fully evaluate the potential of native shrubs as an alternative forage and for kaitiakitanga and stewardship of the hill country, a holistic approach was needed.

Developing an understanding of the mātauranga of native shrubs

Three native shrub species – Māhoe (*Melicytus ramiflorus*), Pāpāuma (*Griselinia littoralis*) and Taupata (*Coprosma repens*) were assessed in steep erosion-prone hill country in the Wairoa District.

Understanding the mātauranga of these species and related tikanga associated with their use was achieved by engaging with a Māori community of interest in kanohi-ki-te-kanohi (face -to-face) wānanga and interviews.

Initial investigation of mātauranga indicates that traditional knowledge of native plants is localised and reflected in names given to plant species by Māori as hapū and iwi in different areas.

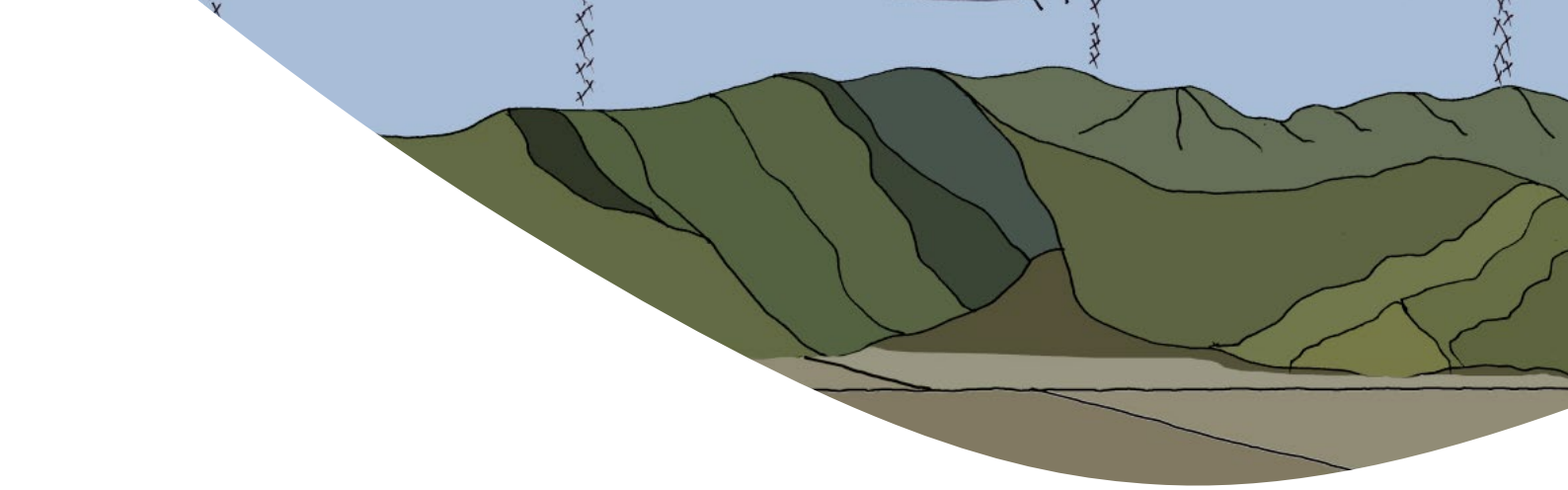
For example, the names used for Māhoe include hinahina, moeahu, inaina, inihina, and kaiwētā and reflect different perspectives of the plant species.

Keen to know more?

Podcast (Understanding the Mātauranga Māori of native shrubs)

Acknowledgements

A big thank you to Joan Ropiha (Massey University) for taking the lead on this project for New Zealand's sheep and beef farming community.



TUHINGA WHAKARĀPOPOTO

Te mātauranga e pā ana ki ngā mauwha taketake

Te whai-māramatanga mā te wānanga kanohi-ki-te-kanohi me ngā uiuinga

He mea hira ngā tipu taketake mō te kaitiakitanga o ngā whenua pukepuke

He tokomaha ngā kaipāmu, nō rātou ngā whenua pukepuke tūpoupou e whakamōreatia ana e te ngāhorohoro, ka hiahia ki te whakaora anō i te whenua ki ngā momo tipu taketake. Hei tautoko i ngā kaipāmu e whakaaro ana ki te whakatipu i ngā momo tipu taketake ki ō rātou pāmu, i arotake ai tēnei kaupapa ki ētahi o ngā āhuatanga e pā ana ki te whakatipu i ngā mauwha taketake i runga i ngā whenua pukepuke.

Neke atu i te 70% o ngā whenua i raro i ngā taitara Māori, he whenua pāmu pukepuke, nā reira he mea hira te kimi mātauranga e pā ana ki ngā momo mauwha ki te arotake i ngā tipu taketake kei ō tātou whenua pukepuke.

Kia arotake rawa i te pitomata o ngā mauwha taketake hei momo hamukai kē, hei tautoko i te kaitiakitanga o ngā whenua pukepuke anō hoki, e tika ana kia kaupapa Māori te aronga.

Te whakawhanake i te mōhiotanga e pā ana ki te mātauranga mauwha taketake

E toru ngā momo mauwha taketake – arā ko te Māhoe (Melicytus ramiflorus), te Pāpāuma (Griselinia littoralis) me te Taupata (Coprosma repens) i arotakengia mō ngā whenua pukepuke kua whakamōreatia e te ngāhorohoro kei te rohe o Te Wairoa.

Kua whai mātauranga mō ēnei momo me ngā tikanga e pā ana ki te whakamahi mā te toro atu ki te hapori Māori e hāngai ana ki tēnei kaupapa, kei ngā wānanga kanohi-ki-te-kanohi me ngā uiuinga.

I ngā tūhuratanga tīmatanga, kua tūtohu ai, ka noho te mōhiotanga ki ngā tipu taketake kei tēnā rohe, kei tēnā rohe, ā, ka kitea tēnei ki ngā ingoa kua tapaina ki iā momo tipu e ngā hapū me ngā iwi Māori o tēnā rohe, o tēnā rohe.

Hei tauira, ko ētahi o ngā ingoa e whakamahia mō te Māhoe, ko te hinahina, te moeahu, te inaina, te inihina me te kaiwētā, e whakaata ana i te āhua o te tirohanga atu ki tēnei momo tipu.

Ako tonu mō tēnei kaupapa

Pāhorangi (Te whai-māramatanga ki te Mātauranga Māori e pā ana ki ngā mauwha taketake)

Acknowledgements

A big thank you to Joan Ropiha (Massey University) for taking the lead on this project for New Zealand's sheep and beef farming community.

PROJECT SUMMARY

Tools and resources

Numerous tools and resources have been created to support farming resilience

Resources include user-friendly extension materials and tools

A large part of this programme was focused on providing knowledge and tools to help farmers and their advisors decide which forages to grow and where to grow them.

This knowledge and tools will enable hill country farmers to become more resilient, especially considering the ever-changing regulatory landscape, climate change and changing expectations from consumers and government.

These tools include:

- **FarmSalus** – a resource package designed with our farmers to support resilience. FarmSalus guides conversations with farmers about issues important to them and their farming resilience.
- **Two models**, differing in complexity, developed to model legume yield across New Zealand.
  - The **APSIM** (Agricultural Production Systems sIMulator) was developed for rural professionals and policy makers. It produces a yield map of lucerne production potential across New Zealand based on long term weather datasets.
  - The **TGM** (Thermal-Time-Based-Model) is based on mean air temperatures and can be used to predict forage yield.
- **AgYields** – a central repository for all pasture and crop yield data collected in New Zealand – is now live on the internet. Yield and growth rate forage data have been extracted from publications and available (historical and current) datasets and incorporated into this database.
- The **'Soil and Fertiliser'** factsheet series. These factsheets provide guidelines on soil assessment and recommendations on fertiliser use — what to use, when and why.
- The **'Molybdenum in pastures'** factsheet series. These factsheets provide guidelines on how to test and apply Molybdenum in pastures.
- The **'Lucerne at Willesden'** video series. In these videos, Tyler Good (Finishing Manager, Willesden Farm, Banks Peninsula) and Professor Derrick Moot (Dryland Pastures Research Group, Lincoln University) talk about how lucerne is used successfully on Willesden farm.
- **ForageMaster v2**. The original ForageMaster programme has been updated and revamped. ForageMaster allows rural professionals / farmers to explore the types of forages best suited to their needs, given their location, pest issues and grazing requirements.

Search the Beef + Lamb New Zealand Knowledge Hub to find more information about all these tools and resources.
www.knowledgehub.co.nz

Keen to know more?

- Podcast (FarmSalus)
- Podcast (The APSIM model)
- Podcast (The TGM model)
- Podcast (AgYields national database)
- Podcast (Soil and fertiliser series)

Acknowledgements

A big thank you to the Hill Country Futures project team for helping create all these tools and resources for New Zealand's sheep and beef farming community. They are among a range of new tools developed to support farmers and consultants.

PROJECT SUMMARY

The benefits of Hill Country Futures

Hill Country Futures outputs will deliver substantial benefits to the sector

A programme designed to assist in future-proofing hill country farmers and farms

To achieve this, the Hill Country Futures (HCF) Partnership programme created various tools and resources to enable farmers to make impactful and enduring changes on-farm.

It was not enough to create these tools and resources, we also wanted to understand the value of these outputs for the hill country sector.

Impact of the HCF outputs and accompanying interventions were estimated

The QUICK (Quantifying and Understanding the Impact of Capability and Knowledge) framework was used to estimate the impact of the HCF outputs. QUICK combines intervention logic models with benefit-cost analysis using an agent-based approach informed by choice modelling.

Full adoption of all outputs is unlikely, so we assumed that each of the outputs developed by the HCF programme would have a 30% chance of successful uptake, and from this, the expected value of the HCF programme's benefits were estimated.

Benefits of the HCF programme will outweigh the costs by a factor of 13.5.

The modelling showed that profitability gains would account for 53% of the value created from the resources, followed by improvement in farmers' physical and mental health (18%), the health of their land (13%) and their resilience to adverse weather (9%).

Keen to know more?

Podcast (Value of the Hill Country Futures programme to farmers)

An Agent-Based Approach to QUICKly Valuing the Benefits of Agricultural Research and Extension

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