WHENUA FUTURES

UNDERSTANDING THE LONG TERM IMPACTS OF LAND USE DECISIONS IN TAIRĀWHITI

> **Te Weu Tairāwhiti** is a collective of local researchers focused on the future risks and opportunities for Tairāwhiti. We all have something to offer and invite you to join us.

Our region, like the rest of the world, faces some big challenges: climate change, biodiversity loss, erosion and soil conservation, sustainable employment and economic opportunities. We need to understand these issues, and what is currently helping or hurting our chances of leaving a healthy environment and economy for future generations.

Te Weu Tairāwhiti has been researching the impacts of carbon farming in the region, looking at climate change risk assessments and planning at the land block, village and neighbourhood level. We work with local authorities and central government but we can't rely on them to solve local or global problems - we all need to be involved.

We've developed some resources including an online dynamic dashboard for modelling various land use scenarios in Tairāwhiti and the impacts those would have on jobs, income for landowners and biodiversity in the region. We've identified six possible land use scenarios for the region and created lists of the pros, cons and risks associated with each. We've also created a set of short explainer videos on topics such as: the history of land use in Tairāwhiti; what the science says about climate change impacts in the region; an introduction to carbon farming and its impacts; and possible sustainable land use options for Tairāwhiti.

All the resources we've developed are available on the Te Weu website and we hope whānau, hapū, marae, iwi, schools, clubs, businesses, faith communities, public services and anyone in the region find them useful discussion starters to help us think through where we've come from, where are at and where we want to go as a region.

Please get in touch if you would like to help us or need help with something connected to our efforts.

www.teweu.nz

Te Weu Tairawhiti

THE DEEP SOUTH | Te Kōmata o Te Tonga | National SCIENCE Challenges

CURRENT SITUATION: MOSTLY FARMING & PRODUCTION FORESTRY

Pros

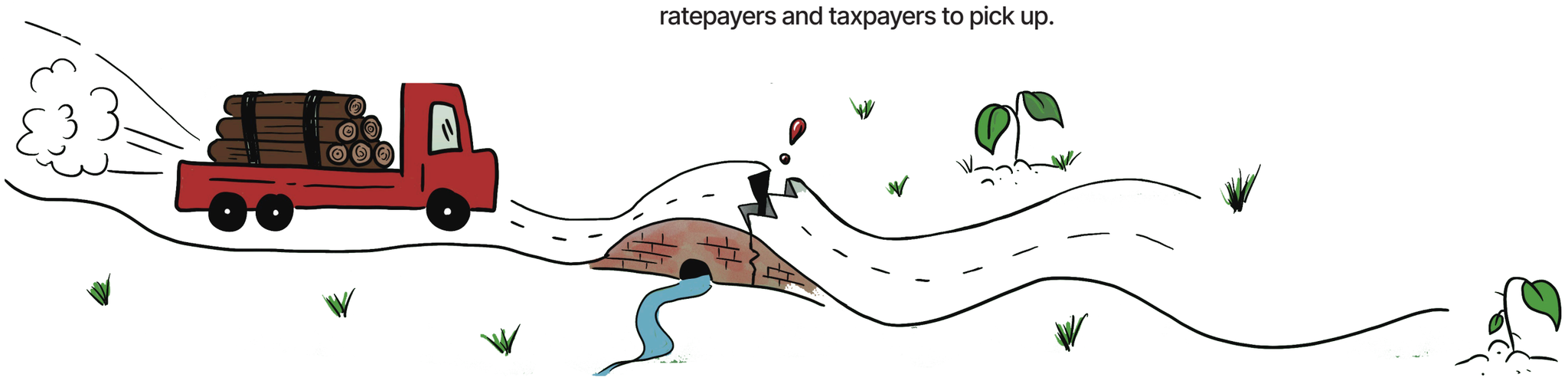
- **Farming and production forestry currently provides jobs** and income for rural communities, and significant tax dollars and export revenue.
- **Continuing with business-as-usual requires less effort**, political intervention and investment.

Cons

- **Intensive farming** is very damaging to the environment with ongoing impacts on biodiversity and soil conservation in Tairāwhiti - it is a major source of greenhouse gas emissions for New Zealand.
- **Industrial forestry with clearfell harvesting causing extreme ecological damage** - topsoil loss, loss of biodiversity, sediment and slash in waterways and harbours, increasing fire risk with climate change; social harm - forestry workers killed and injured, and locals in accidents with logging trucks; economic harm - damage to roads and bridges from logging trucks, profits often expatriated, costs left for local ratepayers and taxpayers to pick up.

Risks

- **Failing to change current land use practices** prevents the restoration and recovery of native ecosystems. It locks in the current large scale ecological collapse.
- **Current land-use practices** will not allow us to meet international climate change obligations.
- **Ignoring pressures** to change forestry and farming could put us in a position of disadvantage in the future.



DIVERSE MOSAIC OF LAND USES

Pros

- **Improved native biodiversity** and recovering natural ecosystems.
- **More tree cover** helps hold more water within the whenua when dry and slows water movement when there are heavy rain events.
- **Cleaner rivers, lakes and seas**.
- **Increased carbon sequestration** from both native and exotic forestry, helping Aotearoa to reach national net emission targets.
- **Pasture provides natural fire break** - fire risks likely to increase exponentially.
- **Diverse ecosystems more resilient.**
- **Creates a diverse range of jobs and industries**, leading to a robust economy and resilience to future market volatility.
- **Can be handled by evolutionary strategies** that optimise current land uses according to different land types, experiment with new options.

Cons

- **Will likely need increased investment** and funding.
- Includes the 'cons' listed for all the other land use options to whatever proportion those options are present in the mix.

Risks

- **The transition to a diverse mosaic of land uses is likely to be opposed** by those with vested interests in the status quo, possibly leading to large scale civil unrest and political instability.
- **Requires ambition, innovation and good planning** to maximise returns.
- **Lack of comprehensive ongoing pest control** would see failure of establishing diverse new native habitats and continued collapse of what remains.
- **Climate, biodiversity and freshwater goals may be undermined** if change is not significant enough.

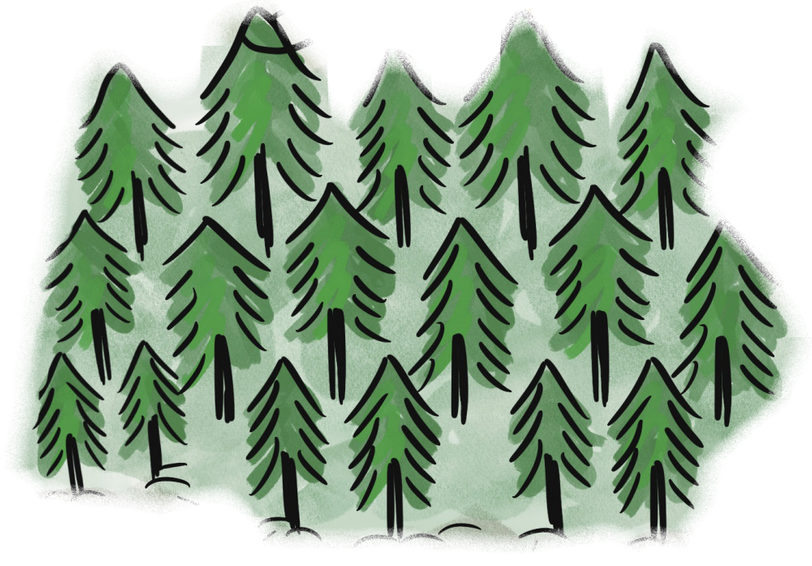
MAJOR EXPANSION IN PRODUCTION FORESTRY

Pros

- As a replacement for carbon-intensive building materials like steel and concrete, **timber is a relatively clean, sustainable, renewable resource**.
- **Log and timber sales can produce high landowner returns** and significant tax and export revenue for New Zealand.
- **Production forestry has the ability to employ as many people per hectare as farming** (though mostly at the planting and harvesting stages, requiring forestry crews to move around).
- **Forests of any kind on erosion-prone land are beneficial for filtering surface water** and holding the soil better while the trees and roots are intact compared to pasture; 6-7 year vulnerability of soils post harvest.

Cons

- **Clear-felling plantations can increase problems** with erosion and landslides.
- **Monoculture production plantations have much lower biodiversity benefits** than native or permanent exotic plantations and almost no biodiversity following each harvest cycle.
- **Pinus radiata in NZ is also monoclonal**, genetically engineered for rapid biomass gain, vulnerable to fire and diseases under changing climatic conditions.
- **Poorly zoned planting for harvest can negatively impact waterways**, river health, freshwater fish and coastal marine ecosystems.



Risks

- **An over-dependence on monoculture** production plantations leaves the forestry industry vulnerable to pests, diseases and international competition.
- **As transport costs increase, profit margins decrease** for getting logs to domestic processing facilities, let alone sending overseas.
- If standing forests become uneconomic and companies abandon them, **a large biological liability remains** for the ecosystem and communities to deal with.
- **Risk of stranded assets** for local forest owners.

MAJOR EXPANSION IN EXOTIC CARBON PLANTATIONS

Pros

- **Permanent exotic tree plantations can rapidly remove large amounts of carbon dioxide** from the air. A major expansion in carbon plantations could help Aotearoa reach net-zero emissions before the year 2050.
- With carbon prices trending upwards, **land owners and investors can earn substantial income** from carbon forestry.
- **Carbon forestry may have the potential to become a future export industry** for Aotearoa, assisting other countries to reach net-zero emissions.
- If mandated in regulations, these **plantations could provide local sustainable jobs** in pest control, native plant nurseries and planting selected transition areas in native tree species.
- If **bonds** were made compulsory, they **could fund ongoing initial management of pest, planting and native nursery work**.

Cons

- **Exotic carbon forestry without a proven plan for transitioning to natives does not create m/any sustainable jobs** in region, and replaces land use options which otherwise provide local job opportunities.
- **Forests are only able to draw down carbon dioxide while they are young and growing**. Once the forest matures it must be managed forever with no ongoing carbon revenue. Major risk of negative gearing.
- Monoculture plantations have much **lower biodiversity benefits** than native forests.
- **Pinus radiata in NZ is monoclonal**, very thirsty and specifically bred for rapid biomass gain, vulnerable to fire and diseases under changing climatic conditions.
- Recent research found **Radiata Pine is a** greater **threat to indigenous biodiversity** as an invasive species than previous thought.

Risks

- Under current Emissions Trading Scheme (ETS) settings, a future **over-supply of carbon removals could keep carbon prices low and remove the incentive for gross emissions reductions**.
- Transitioning radiata pine plantations into permanent native forests is **likely to be difficult and expensive** - becoming a major issue for future generations to deal with.
- Plant-and-leave exotic forests could create significant **future fire risks** and result in large **areas of non-productive land**.
- At present there is no clarity on what, if any, conditions will be imposed on permanent exotic plantations, while the evidence around transition to indigenous forest doesn't exist, this is a **major risk for biodiversity**.
- There is **a risk of 'greenwashing'** as markets and companies act with a 'goldrush mentality' which may see hype and promises about financial returns and transition to indigenous forests that can't be met.
- The carbon market depends far more on public policy and political priorities than most other commodities - the **risk of market collapse and stranded assets** through changes in domestic or international rules and/or competition is significant.
- There could be more significant **insurance issues due to the fire risk of a flammable monoculture** if more pines are planted at landscape-scale.

MAJOR EXPANSION IN FARMING

Pros

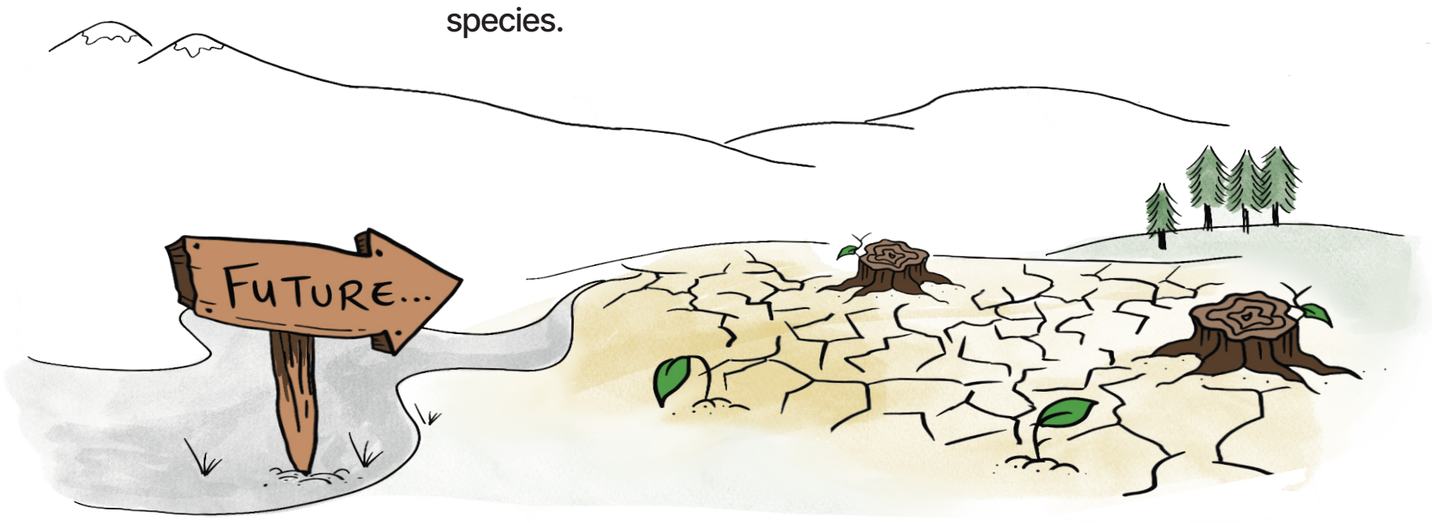
- **Farming provides jobs** for local communities and income for landowners.
- Farming **infrastructure and supply chains are well-established** in Aotearoa.
- Well managed farms can include plantations for timber/carbon and **protected permanent native forest stands for biodiversity**.

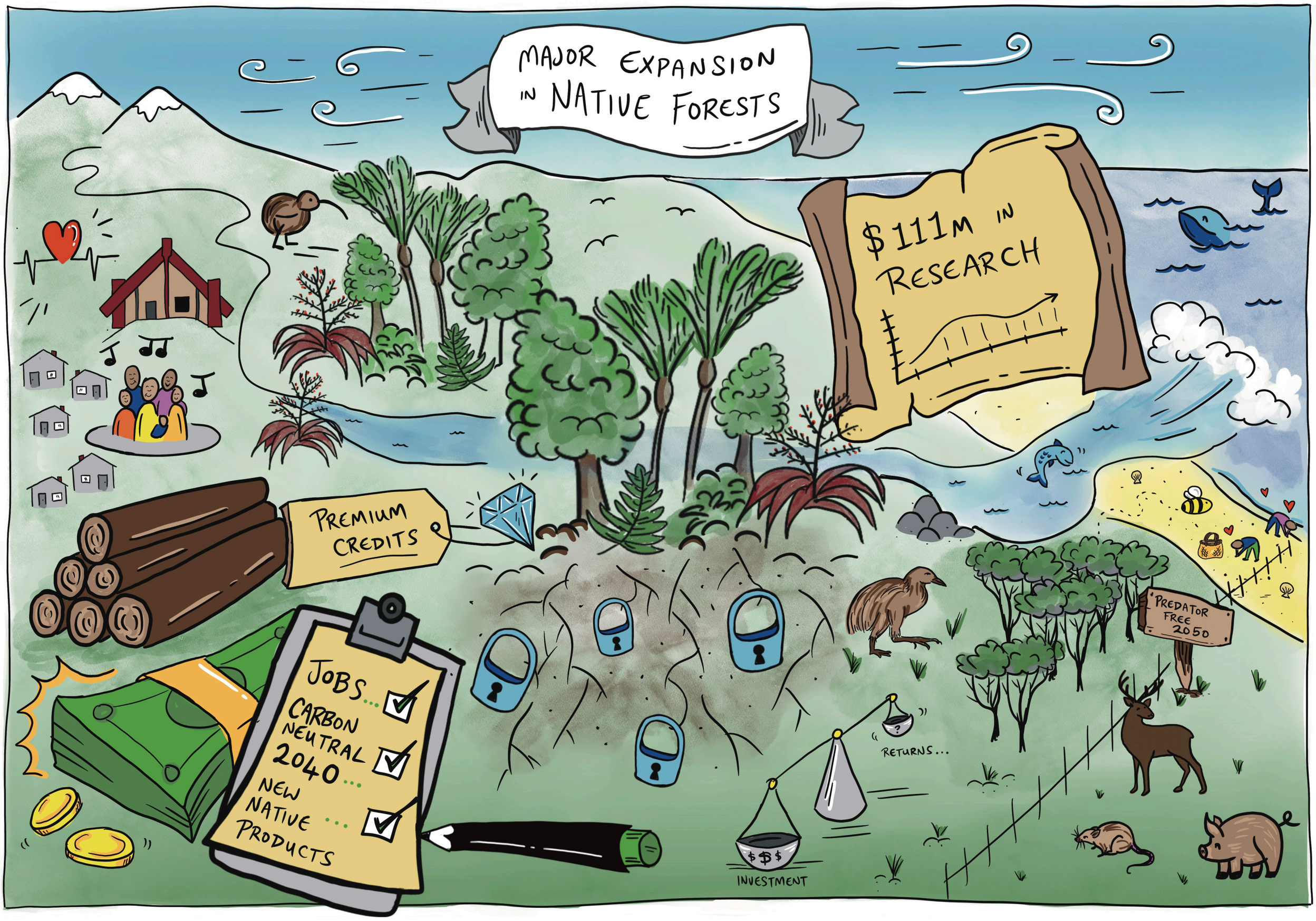
Cons

- **Beef, sheep and dairy farming create large amounts of biogenic methane,** which is a big problem for climate change. Currently farming accounts for almost half of all greenhouse gas emissions generated in Aotearoa.
- **Animal farming also creates many other environmental problems** - primarily run-off of sediment and fertilisers into water systems. Two-thirds of rivers across Aotearoa and many within Tairāwhiti are already unsafe to swim in for much of the year because of this.
- **Intensive farming is very damaging to soil conservation** in Tairāwhiti and large areas of pasture means less trees and forests for native species.

Risks

- With scientists and other experts advocating for plant-based diets and the rise of cellular protein production, in the interest of climate and the environment, long-term **markets for meat and dairy products as we know them are at significant risk**.
- **Succession in farming has been reported as becoming increasingly difficult** with future generations less willing to take up farming.
- **Likely continuation of erosion of Tairawhiti whenua** which may accelerate if we have more frequent Cyclone Bola-type events in a changed climate.





MAJOR EXPANSION IN NATIVE FORESTS

Pros

- **Permanent native forests support the greatest possible diversity of life** and provide many other environmental, social and cultural benefits.
- **Native forests help keep water in the whenua**, slow water movement down and help with localised rain cycles.
- **Native forests can sequester carbon indefinitely**, creating a good long term solution for tackling climate change.
- If recognised with 'premium credits' on carbon markets, **can be a profitable long-term enterprise**
- Native trees can produce **high value timber** and other natural products.
- **Most people in Aotearoa support** the idea of more native forestry.
- **Jobs connected to native forests include** nurseries, planting, pest control, eco-tourism and potentially selective timber harvesting, bioactive extracts and other industries.
- **Indigenous ngahere provide significant cultural benefits** for tangata whenua including whakapapa, rongoā and mauri values.
- **High quality management of indigenous forests requires intensive research**, likelihood of permanent, high skill employment (see nature based forestry in other countries for example - Switzerland, Germany, Nordic countries) and pest control targeting deer, possums, goats, pigs, rats, ferrets and stoats.
- Returning native forests could allow us to **return other taonga** like kiwi, kokako and titi to the rohe.
- Planting new native forests as carbon sinks, and looking after surviving native forests are the **'nature-based solutions' to climate change** the Government is looking to prioritise for Aotearoa to achieve carbon neutrality by 2040.

Cons

- **Native tree planting is currently very expensive** - typically costing many times more per hectare compared to pine plantations.
- Eco-sourcing native plants is important and **it will take time to build a network of local native nurseries**.
- **Natural regeneration** is dependent on nearby seed sources from native forests and ongoing quality pest management, which **can be expensive**.
- **Fire risk high for monocultures** of mānuka / kānuka; less for more biodiverse indigenous forests
- Under current ETS policy settings, **native forests of any kind are said to sequester carbon relatively slowly**, providing weak financial incentives for forest/land owners. The Government is currently reviewing these rules.
- **Until there is certainty** around rules for native forests in carbon credit regimes and regional investment in pest control is secured, **the jobs produced will be limited**.The 2022 Budget has $145 million (over four years) towards native plant nurseries across Aotearoa and $111 million for research (over four years) finding out how to measure carbon that is being locked in to native habitats so that carbon credits could be paid accurately.

Risks

- Large-scale **native restoration projects are currently difficult to finance** due to the combination of high establishment costs and poor carbon returns.
- **Success will hinge largely on keeping wild deer, cattle, possums, pigs and goats numbers as low as possible**. Their numbers would need to be reduced significantly before any re-planting and retiring of land to allow for the fastest growth to lock in the most carbon. There's a real risk that locals don't get on board and want higher levels of these animals and/or we can't get them low enough for decent forest recovery.
- If sufficient research and development funding is not invested, the **new potential industry and associated jobs will take much longer to create**.
- Currently there is **no provision in the ETS to include native forest over 35 years old for carbon credits**, but research and new rules are being developed to make sure the calculation of carbon locked in each year can be paid for.
- **Because deer and possums have been around for so long**, **there is a risk that tree species have become extinct or highly depleted in the region which would be needed for seed supply**. These areas need care as soon as possible to be healthy seed sources.