



KOI TŪ:
THE CENTRE FOR
INFORMED FUTURES

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Conversation
Series

THE ENVIRONMENT IS NOW

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EXECUTIVE SUMMARY

The COVID-19 pandemic has created a potential inflection point for New Zealand. It is unlikely that many aspects of our society will revert to business as usual, even once the pandemic is brought under control globally. Many trends that were apparent before the virus struck have been amplified in our collective consciousness. The real question for New Zealand is whether we take this as an opportunity to pursue transformational changes that will enhance our resilience and sustainability as we look to recover and rebuild. This discussion paper is the result of preliminary dialogue on that question, and suggests that a more holistic and systematic approach is needed.

Addressing the post-COVID future with long-term goals that put greater emphasis on environmental sustainability requires a true national consensus. The reset has added a new dimension and urgency to the work already being undertaken in the environmental space by many separate players in parallel. Iwi, communities, NGOs, and others have shown enormous commitment and enthusiasm for a wide variety of environmental projects. There are many great ideas out there, and each, if implemented, may have some effect. How can we use the current situation to integrate these actions in a more cohesive way that reflects communally agreed priorities? Can we move faster and more effectively? Can we create a platform for doing things differently?

A FRAMEWORK FOR SUSTAINABILITY

There is a pressing need for a more overt and integrated framing of the challenges of sustainability, one that encompasses considerations of the environment with economic, social and cultural values in a holistic approach. For example, the United Nations Agenda 2030, which includes the Sustainable Development Goals (SDGs), can serve as a guide if put into the New Zealand context. Recent analyses have suggested core transformational paths that are necessary to make progress towards these goals. The integrated approach as reflected in the SDGs is virtually invisible in New Zealand outside some businesses, and should be given a much higher profile domestically. The Treasury's Living Standards Framework and the Wellbeing Budget are compatible with such framing, but are primarily operational rather than strategic approaches.

A commitment to a holistic sustainability approach could be enshrined in bipartisan legislation and monitored through an independent process as is the case with the Climate Change Commission. Such a high-level framing is essential to ensure both a national consensus and an understanding that discussions about environmental progress are not independent from other domains of endeavour. The Parliamentary Commissioner for the Environment has an important role in providing critical research-informed and independent commentary to address specific issues.

REMOVING ROADBLOCKS TO PROGRESS

Government must address issues that persist as roadblocks to progress. These include those associated with the Resource

Management Act, which both assists and confounds progress in environmental, economic and related domains. The lack of alignment between central and local government on many aspects of environmental regulation is problematic.

There remain gross inadequacies in our knowledge of the environment and the conservation estate, which require strategic investment in a variety of research modalities. This should be coordinated through a roadmapping process. The current arrangements for research fall well short of what is needed to ensure we have the necessary information to manage our resources for a sustainable future. As examples, we lack basic data on the marine environment, kauri dieback and the loss of biodiversity. A realignment of essential research according to an overarching mission is needed, supported by adequate investment in environmental research. Aggregating and assessing existing information on successful or failed interventions, including community knowledge and mātauranga Māori, and testing new practices in partnership between science and business, will be important to swiftly turn the best ideas into useful actions.

POST-COVID STRATEGY

The post-COVID stimulus strategy will need to ensure investments actively consider environmental and climate change effects, and do not lead us down an unsustainable path. Some unsustainable practices, such as high-volume tourism, have been halted by the border closures, and this sector in particular will need progressive but substantive transformation to have significantly lower impact. Reinvesting in or incentivising the return to environmentally compromising practices would be unwise. The loss of jobs and incomes in this sector must be addressed in innovative ways that promote sustainability. For example, there are many opportunities to support employment in the environmental and conservation domains, some of which have been launched in the last few weeks. These could have long-term value if linked to training and credentialing as part of growing an enduring conservation, environment and sustainability workforce. The stimulus spend needs to be planned to build infrastructure suitable for a more sustainable future.

Advancing sustainable business practices is a key activity. Going forward, this may involve adopting new business models, including those emerging in the Māori economy. Sustainable investment and pricing mechanisms are needed for better management of natural resources and disincentivizing pollution. There is scope within both public and private sectors to build new forms of accounting and reporting that include meaningful assessments of environmental capital. Similarly, there are significant opportunities to enhance the toolkit for sustainable financing, for example through Green bonds.

“Brand New Zealand” needs reconsideration. There is great potential for developing a united strategy, perhaps linked to principles-based environmental labelling and tracing of our products both for domestic and export markets, similar

to Ireland's "Origin Green". This could be linked to uniquely Aotearoa-New Zealand stories of place and culture. Enhancing Brand New Zealand labelling for all of our sectors, but particularly tourism and food, would offer significant returns and motivation to uphold these principles across a wide range of businesses.

PRIORITIES FOR ACTION

The paper briefly scopes issues and raises questions in a number of priority areas. All need attention, again raising the question of how to develop a coherent approach and strategy so that no key area is overlooked. The existential risk of climate change is undeniable, and may ultimately eclipse all other issues if not urgently addressed. Sadly, the global response remains inadequate, but this does not reduce New Zealand's obligation to play its role. Indeed, New Zealand has shown leadership in many ways, and can do so here. Other important issues to be addressed include regulation of land use, long-standing unresolved issues of fresh-water quality, rights and use; the need for radical changes in transport and tourism; renewable energy; biosecurity issues and predator control; waste management; and the circular economy. A companion paper considers at length the issues of food production, agriculture, horticulture and aquaculture. It is suggested that far more attention be given to our vast marine estate. Additionally, the failure to apply sound principles to urban design that will allow for healthier and sustainable living in urban areas has long-term echoes.

There is clearly both a need and a desire for change in all these areas, and the scale is such that it will require coordinated effort and collaboration across and between sectors, iwi, communities, NGOs and government, harnessing a growing network of change-makers. The greater the extent that this can be removed from partisan politics, the more likely it is to succeed. An effective mechanism would be to establish an independent Sustainability Commission or equivalent, and/or a standing Environmental Forum, to support the work of the Secretary for the Environment as kaitiaki of Aotearoa-New Zealand's natural world. Such a body would aim to ensure a wide range of voices are heard and innovative ideas are coordinated in pursuit of the long-term vision in a process that is removed from short-term political cycles. We will need new structures to move from aspirations to implementation and policies that will address the necessary game-changing shifts.

Koi Tū sees its primary role of progressing evidence-informed conversation on these issues.

INTRODUCTION

Koi Tū: The Centre for Informed Futures is a non-partisan, evidence-based, and transdisciplinary think tank. Its report, *The Future is Now: The Implications of COVID-19 for New Zealand*,¹ focused on the opportunity for significant reflection on the country's direction as a result of the economic and social consequences of the pandemic. At this unprecedented inflection point, we have an opportunity for a potentially transformational reset in the way New Zealand operates and develops over coming decades.

The Future is Now report and other commentaries have highlighted the opportunity to give greater consideration to how New Zealand moves towards becoming a more sustainable and resilient society. This paper focuses on environmental sustainability, while recognising its inseparable interactions with social and economic dimensions. In New Zealand, the interaction with agriculture, forestry and food production is the most obvious, and is considered in more detail in a companion report, *The Future of Food and the Primary Sector: Managing the transition to sustainability*. But tourism, regional development, energy and transport are all intimately linked to sustainability of the natural environment and are also tied to cultural and social considerations and values.

Koi Tū convened a conversation group of senior policy officials, business sector leaders, NGO leaders and academics to iteratively discuss these issues. The conversation members are listed in the Appendix. We particularly thank the Aotearoa Circle² for their partnership in this work. The group discussed ideas and provided comments over several online conversations. There was a general consensus around the need for an overarching, non-partisan vision for New Zealand, with clear goals set in legislation, to ensure effective alignment with business and NGOs and the many actions that communities, iwi and individual citizens as well as regional and local government can take. Ultimately, a fully integrated strategy will be effective only if it is accepted by society and driven from a collective, bottom-up and common set of goals for achieving environmental, social and economic sustainability. This report surveys the issues and highlights some priorities. A more in-depth and ongoing conversation with a broader range of stakeholders will be needed. The overriding issue is how to coordinate these efforts.

1 <https://informedfutures.org/wp-content/uploads/Koi-Tū-The-Future-is-Now.pdf>

2 The Aotearoa Circle is a partnership between Government agencies and businesses to create a more sustainable New Zealand, <https://www.theaotearoacircle.nz/>

PART A: TOWARDS A SUSTAINABLE FUTURE

Societies have to agree on their priorities – by definition, this involves trade-offs between different values. The actions taken to control the COVID-19 pandemic have been framed by some as involving trade-offs between public health and the economy, but when looked at over the longer term, it is clear one will not function without the other – health and wellbeing must be secured in order to secure economic functioning. There is also a growing awareness that wellbeing cannot be seen simply through economic and human lenses, but that planetary and environmental health are intimately linked to our human and economic wellbeing. Māori worldviews particularly recognise this essential interdependence, seeing the environment, land and people as a holistic interconnected system that must be safeguarded through kaitiakitanga (stewardship).

The global disruption being caused by the pandemic invites us to rethink our relationship with the environment. It has highlighted the need to build resilience to public health threats and deep social and economic shocks. We know preventing illness is better and costs less than trying to cure it; hence the early and concerted action New Zealand took to prevent extensive viral spread. The same is true for other foreseeable problems, such as the effects of climate change and environmental degradation, which are already proliferating and are causing significant damage. If we let them run unabated, the future will be even more tragic. We will do better if we address the causes, rather than having to deal with the consequences, which could ultimately overwhelm us.

It is clear that whatever ‘normal’ we ultimately return to will not be the same as before. As discussed in companion reports, the pandemic signals an inflection point for New Zealand and the world. It will give greater emphasis to trends that were already apparent before the crisis, including concern over growing inequality, a drive to address continued social disadvantage for many New Zealanders, an increasing shift to technology and digitisation, and a greater focus on environmental degradation, climate change and sustainability.

These issues are not new, but they have had new light shed on them because of the pandemic. For example, global lockdowns have raised awareness of poor air quality around major cities, cleared by the sudden massive reduction in emissions from transport and industrial activity. Native birds have come back to urban areas. These are good things, showing us how badly we were doing before. How can we use this enhanced awareness, as well as aspects of New Zealand’s collective and positive response to the crisis thus far, to capture these gains, and do much better in the environmental space as we reset the economy and move forward?

We are living with less, and we have a cleaner environment, but it is temporary; the negative trends will continue as many of us try to revert to business as usual. We have already begun evolving new ways of transacting business, and working and communicating remotely. These changes can also flow into new consumption patterns and ways of travelling and living sustainably.

The COVID-19 inflection point may be an opportunity for all New Zealanders to enter a critical conversation about our collective future. Will we now recognise that there is both a need and a chance for a substantive reset that puts the environment front of mind for the benefit of the whole country?

Taking up this opportunity will require broad strategic thinking – and a common vision about what kind of future we want. This will need to be underpinned by an agreed framing that is not led by government alone, but through a collaborative and coordinated effort that includes local communities, iwi/Māori, the private sector and NGOs working towards commonly accepted long-term goals.

WHAT IS AN APPROPRIATE FRAMING FOR THE DISCUSSION?

Too often discussions on sustainability have focused on a narrow framing of environmental issues in isolation from social and economic considerations. This has been inhibitory. A much broader, holistic framing is required. Globally, this has been detailed in the United Nations Agenda 2030 and its Sustainable Development Goals (SDGs). This set of goals is both holistic and visionary, although operationally it presents a number of difficulties. The interactions between the 17 goals and 169 targets create policy and operational complexity. The goals themselves are not a matter of contention, but the targets do not adequately reflect the priorities of individual countries. Increasingly, countries are looking to restate their approach to addressing the goals in terms of domestically-set priorities. International analysis has shown that the actions needed are often at the interfaces between interacting goals.³ In 2019, two reports (The World in 2050⁴ and the Global Sustainable Development Report 2019⁵) highlighted how this broad agenda can be reduced to a small number of multidimensional transformations that could help focus the policy community. Analytical tools to help policymakers and organisations work in this complex systems approach have been developed.⁶ Unlike many other liberal democracies that are also signatories to the Agenda 2030 and the SDGs, New Zealand has not promoted them domestically, although it reports against them to the UN.⁷ The business sector and even universities,⁸ rather than the Government, have been more willing to adopt the holistic framing

3 International Council for Science (2017) *A Guide to SDG Interactions: From Science to Implementation* <https://council.science/wp-content/uploads/2017/05/SDGs-Guide-to-Interactions.pdf>

4 <https://iiasa.ac.at/web/home/research/twi/Report2018.html>

5 <https://www.un.org/development/desa/publications/global-sustainable-development-report-2019.html>

6 <https://informedfutures.org/koi-tus-contributions-to-advancing-sustainable-development-goals/>

7 Voluntary declaration to the UN

8 University of Auckland. *The University's Sustainable Development Goals Report 2019* <https://council.science/wp-content/uploads/2017/05/SDGs-Guide-to-Interactions.pdf>

of the goals and report against them. It is essential these goals are taken out of hiding and given more prominence domestically. There would be significant merit in identifying desirable targets for New Zealand to adopt related to each of the 17 goals.

The planetary boundaries model,⁹ a related way of understanding environmental limits of sustainability, also has value in thinking through specific actions focused on resource management and the environment. It is a useful heuristic, but as discussed above, better progress would be made by integrating environmental considerations into a more holistic framing, such as the SDG framework.

The Treasury's Living Standards Framework and "Wellbeing Budget" might be seen to achieve similar framings. However, the Living Standards Framework has minimal metrics focused on the environment, and implies an interchangeability of different capitals (human, social, financial, physical and natural). This is problematic and could reinforce the concept that there is a viable trade-off between the environment and economic growth. Such a framing therefore has limited applicability for informing an action plan. The Wellbeing Budget is innovative, but again does not create a long-term strategic approach; rather, it is used to detail operational investments for the short term of a budgetary horizon. Nevertheless, these models both suggest the importance of holistic framing, and can be integrated into a future-facing strategy. But in the absence of clear articulation of national goals in these terms, it could be a missed opportunity.

TOWARDS A VISION FOR ALL OF NEW ZEALAND

Times of crisis and recovery inspire thinking about the future, and about ensuring our resilience. The existential threat and the instability created by COVID are leading many to rethink aspects of their existence. We have the chance now to develop a common vision for the New Zealand we want to see emerge from the crisis, and a strategy for how to thrive sustainably into the future.

The COVID-enforced pause of economic activity has highlighted the huge environmental effects of our usual way of life. Traditional business models and our focus on economic growth are coming up against, and in some cases have surpassed, environmental limits, and we know this is an unsustainable path. As we think about the required economic reset, we have both the obligation and the opportunity to achieve a greener, more sustainable future and reduce the burden that will fall on future generations.

To do this, we need to protect our critical asset and the lifeblood of both our economy and our wellbeing – the taiao – our natural world. This means that as the Government, businesses, organisations and individuals contemplate how they will operate in a post-COVID world, the environment needs to be a central concern, not on the margins. We have a unique opportunity to reorient our thinking more broadly towards valuing taiao and recognising its indivisible connection with our greatest asset – tangata – the people. A 'taiao framework' posits that "If the environment is well, so too are the people."

Can we embrace a uniquely Aotearoa vision that speaks to what New Zealanders value? Can we agree to unite under a values framework that places environmental stewardship at the heart

of decision making and emphasises intergenerational wellbeing? This would draw on our unique cultural identity reflected in Te Tiriti o Waitangi and biculturalism to redefine our relationship with the environment. Ultimately, the long-term vision is to hand over to the next generation a society in which both people and environment thrive.

TOWARDS AN ACTION PLAN

As we contemplate economic recovery, the entire New Zealand onshore and offshore environment should be considered as an integral part of a holistic reset. The scale of what is needed amounts to a paradigm shift, because existing goals and interventions do not sufficiently address the complexity of the challenge. Efforts to change are currently not well aligned, and the size of the required behaviour change is massive. We also confront a lack of effective policy settings to ensure long-term socio-ecological considerations are at the forefront of decision making. At a point when we may be making large-scale changes in many policy settings and actions, this is the chance to ensure the policies and rules we enact now realise the long-term vision of safeguarding our environment for future generations.

The potential for a reset has added a new dimension and urgency to the work already being done in the environmental space by many separate players in parallel. There are many great ideas out there, and if implemented, each may have some effect. We need an inclusive mechanism to agree on priorities – this cannot simply be top-down. How can we use the current situation to link these actions in a more cohesive and prioritised way? Can we create a platform for doing things differently?

We have seen what is possible when New Zealanders act in concert towards a common goal, and how innovative we can be. An aspirational plan would be to take meaningful action on problems that are perennially placed in the too-hard (often described as the "wicked environmental problem") basket. Among these are addressing issues of land use and fresh-water quality, rights and access, and taking seriously the imperative to rapidly reduce greenhouse gas emissions across all sectors. Are we fully evaluating the opportunity for new forms of agriculture (such as regenerative agriculture), which would move us towards a more sustainable and low-carbon future? And how do we reconcile the need/desire for housing and urban development with environmental concerns? Systems thinking is required, to analyse the interdependencies and understand the range of consequences of potential actions and of inaction.

Effective action will require inspired leadership, both within and outside government, and both bottom-up and top-down initiatives. This will require policy cohesion and a means to coordinate initiatives of communities, businesses and iwi that put greater emphasis on environmental stewardship. There may be goodwill, but if the vision is wholly captured by a single central entity, it may not achieve what was intended. Barriers to real action in the political system will need to be identified.

The remainder of this paper will consider first the actions that must be driven by the Government and then the actions of other actors: businesses, iwi, communities, NGOs and citizens.

⁹ <https://www.stockholmresilience.org/research/planetary-boundaries.html>

PART B: THE ROLE OF GOVERNMENT

Governments can set goals, regulate, fund and drive initiatives and create incentives and disincentives. Despite New Zealand's reputation as an environmentally conscious nation, successive governments have adopted relatively weak sustainability policies, focusing primarily on socioeconomic benefits while considering the environment only tangentially. For example, high-volume tourism has been promoted, despite its increasingly heavy environmental footprint. Concerns around land use (especially in agriculture), water rights, data collection and information sharing, and alignment of central and local government remain unresolved. The result has been transgression of acceptable limits on emissions, water quality, soil degradation and biodiversity decline. Confronting issues related to energy, transport, urban design and the use of technologies remain central to finding a more sustainable way forward.

SETTING GOALS

Ideally, to drive policies in the right direction, the Government should set some bipartisan agreed high-level goals in legislation. The passing of the Zero Carbon Bill into law in 2019 with near unanimous support indicates that New Zealand is, in theory, intending to tackle climate change seriously. But that approach should be extended to a broader set of sustainability goals.

To further this trajectory, we suggest raising the profile of the Sustainable Development Goals (SDGs)/Agenda 2030 and the more recent derivative transformational agenda and incorporating them in the context of New Zealand domestic framing and domestic reporting. This would require developing contextually relevant targets linked to national priorities and realities. Ideally, some independent mechanism such as a commission would remove partisan politics from its reporting role. This would allow integration of the environment with other domains of economic, social, human and cultural development. Explicit sustainability principles, which include consideration of these dimensions, need to be articulated to inform actions to meet the goals.

The environment also needs to be integrated more meaningfully into the Living Standards Framework and budget process. Currently, the framework is noticeable for its deficiencies in any useful metrics related to the environment, despite recognising that natural capital (land, minerals, fish stocks, water, and ecosystems) is a finite resource on which humans are reliant. It may be valuable to put effort into creating measures and metrics to value natural capital. This should not be seen as interchangeable with other capitals, but valuing it (which at best is only a proxy for many aspects that cannot be reduced to dollars) can help both the Government and other actors identify where priority actions might be the most beneficial. This would allow explicit goals to be set around sustainable investment, for example, around resilient infrastructure – supporting sustainable transport, travel, waste management, and so on.

Given the importance of metrics to management in any sector, specific objectives need to be set in a New Zealand specific context. National Policy Statements (NPSs) and National

Environmental Standards (NESS) need to be established where lacking, and reviewed where they exist, to support a national-level regulatory framework. The objectives should explicitly articulate sustainability principles by setting boundaries for key elements (e.g., environmental bottom lines) in order to inform and delineate a range of actions that ensure we can thrive within the carrying capacity of the Aotearoa ecosystem, and that of the Earth. As with the planetary boundaries, these key elements might be expected to evolve over time in the light of new knowledge, new stresses and emerging societal expectations.

SETTING AND ALIGNING REGULATIONS

Environmental regulation falls under the Resource Management Act 1991 (RMA). The RMA's purpose is to promote sustainable management of the natural environment. But it is widely viewed as having failed to do so, in that it does not effectively manage cumulative and long-term effects of development activities. It is riddled with regulatory inconsistency and uncertainty, and is not integrated with the Local Government Act (LGA) or the Land Transport Management Act 2003, that together are meant to govern planning and infrastructure investment by local government.

The RMA is meant to balance national direction with decentralised management, but this direction is lacking. Because of the uncertainty and differences in interpretation that result, council practices vary widely. Other issues include limited monitoring of environmental outcomes, a lack of accounting for indirect emissions or climate change, implementation issues, and limited opportunities for public participation. There is extraordinary frustration from businesses and individuals over its complexity, which results in unnecessary expense and creates an antagonistic mindset when progress will require a partnership model.

The RMA is under review, and therefore should be considering the broader implications of adopting a more adaptive approach to deal with our changing circumstances. However, an adaptive approach works best when the ultimate goals are clearly enunciated. The current reset is motivation to speed up this overdue reform so that the vision, goals, and objectives discussed here can be implemented in a coherent plan and set of actions, both by government and other stakeholders, including the public, the private sector, and iwi/Māori.

ALIGNMENT OF CENTRAL AND LOCAL GOVERNMENT

Despite tensions that may exist between national and local interests, central and local governments must be aligned on environmental regulation and strategy, yet this is not the case. This is a critical opportunity to jointly define a common set of goals, outcomes and priorities, and to work together to develop a legal framework that incentivises and better supports councils to work towards building more resilient communities. Local bodies understand their community and local issues in ways that central government cannot. That does not mean they should operate

in a manner that is disconnected from national goals, but local councils are currently not held accountable in this regard. For instance, central government does not exercise oversight to ensure councils meet the agreed targets for water quality and appropriate land use. Further, local politics has led to nonsensical decisions about coastal planning and valuations.

Addressing complex issues, such as climate change, that span boundaries of agencies and regions is not straightforward and requires multi-agency coordination, in terms of policy development and implementation. Currently, this is impeded by differences in operating models, information and data systems, and non-transferable, agency-specific capabilities.

TAXING EXTERNALITIES

In general, New Zealand does not take a committed approach to taxing externalities, with exceptions such as alcohol and tobacco excises and the fuel tax (which will have a limited lifetime given the likely advent of a fully electric fleet within about a decade). Yet the principle of pricing and taxing externalities is sound, and is seen as an important part of shifting the cost of environmental impacts to where they are incurred (as in a 'polluter pays' model). Taxes on waste, carbon and congestion are all forms of taxing externalities. Most notably we have not yet adopted a carbon tax, and the Emissions Trading Scheme remains less than effective for the goals that need to be achieved. The OECD has highlighted New Zealand's limited use of environmental taxes, which have been rejected to date despite the proposals from the Tax Working Group.¹⁰ Indeed, consumption taxes such as GST have elements of an externality tax. It has been argued that consumption taxes are more meaningful and less avoidable than income taxes in addressing the issues of planetary boundaries, provided that equity interventions are applied for those of lower income or on benefits. All forms of tax are controversial to some class of citizens, but a transparent and honest explanation of the challenges ahead and the rationale for taxing externalities should assist.

ENVIRONMENTAL EDUCATION

Transformational changes in behaviours and attitudes about the environment must start with our youngest citizens. To achieve goals for our future, environmental education must become a core subject in the compulsory school years. This is not the case now, despite strong arguments to do so. A 2015 report on environmental education indicated "*The New Zealand Curriculum (NZC) and its antecedents give mixed signals about the priority schools should give to [environmental education and environmental science] within and across their teaching programmes.*"¹¹

Environmental education can be embedded with many other parts of the core curriculum: reading, science, general studies, and mathematics. There are extraordinary materials and programmes used across the world to excite young people

about the environment,¹² and an increasing number of career possibilities for those educated in environmental matters. Environmental studies should be part of the range of options in secondary education; it is striking that virtually all our universities have strong environmental programmes reflecting the huge range of career possibilities. Young people are wanting education to have stronger options for environmental learning.

Many young New Zealanders are new migrants – they or their parents came here from very different societies and contexts. If we are to maintain and enhance a sense of cohesion as New Zealanders, we need a collective view of our environment, and education of the next generation in this regard is critical. However, that curriculum must be developed in a way that builds the other essential skills that will be needed in the future, in particular critical thinking. A strong, balanced educational curriculum for the environment that extends across the compulsory school years needs to be developed. Such a curriculum should recognise our unique human and biotic history and reflect on the close and essential interactions between the environment, economics, and food production. It would create a powerful way of reinvigorating science education and in particular the form of science education that every future citizen needs.¹³

SCIENCE AND INNOVATION STRATEGY

Looking at what is needed to protect New Zealand's future quickly leads to questions about research and innovation to support the national vision for sustainability. Most environmental research is non-appropriable and therefore its support is primarily a role for the state. Yet despite some outstanding individual research efforts, our coordination of environmental research is not optimal. The Government published an extensive and well-consulted *Conservation and Environment Science Roadmap* in 2017.¹⁴ It highlighted the need to focus on strategic science for long-term environmental gains. For example, detailing the effect of climate variability on our primary sector, or assisting in the development of a much-needed strategy for the sustainable management of our marine estate. Such a roadmap is needed to create a strategy for addressing the critical needs to manage our terrestrial, fresh-water and marine estates and should be a living document subject to regular and inclusive review.

Unfortunately, there is little connectivity between the roadmap and the major funding arms of New Zealand science, which commit a small fraction of available research funds to the environment. Furthermore, as the roadmap points out, much of the science needed is not at the technological cutting-edge favoured by the funding systems, but rather the essential science that provides the basic data on land-use impacts, soils, water and biodiversity, on which key environmental management decisions rely. As pointed out by the Parliamentary Commissioner for the Environment,¹⁵ scrutiny of the *Environment Aotearoa 2019*¹⁶ report reveals many critical data gaps in managing our natural capital.

10 Tax Working Group (2019). *Future of Tax: Final Report Volume 1: Recommendations* <https://taxworkinggroup.govt.nz/sites/default/files/2019-03/twg-final-report-voli-feb19-v1.pdf>

11 Bolstad, R. et al. (2015) *Environmental education in New Zealand schools: Research update* https://www.nzcer.org.nz/system/files/EE%20Update%20Report%20Final%202015_1.pdf

12 For example the GLOBE programme: <https://www.globe.gov>

13 <https://www.pmsca.org.nz/wp-content/uploads/Looking-ahead-Science-education-for-the-twenty-first-century.pdf>

14 <https://www.mfe.govt.nz/sites/default/files/media/About/conservation-and-environment-science-roadmap.pdf>

15 Parliamentary Commissioner for the Environment. *Focusing Aotearoa New Zealand's environmental reporting system*. November 2019

16 <https://www.mfe.govt.nz/publications/environmental-reporting/environment-aotearoa-2019>

The lack of sufficient science support for environmental monitoring is an especially critical and ongoing issue. New and improved tools are needed for gathering and reporting data on the condition of and trends for our land, fresh water, air and marine environments. In the future we should see much more disruptive technology tied into remote sensing and artificial Intelligence for real-time-based monitoring. This will require coordination and collaboration between Natural Resource Sector ministries (including the Department of Conservation [DOC], the Ministry for the Environment [MfE] and the Ministry for Primary Industries [MPI]), Crown Research Institutes (CRIs), National Science Challenges, universities and private-sector innovation, as well as traditional knowledge holders (matauranga Māori). Integration is needed to contend with the costliness and inefficiency of much of the current work, which is not coherent and not necessarily outcome focused on issues fundamental to a sustainable future. To be of optimal value to conservation and environmental managers, the farming sector, the fishing sector and other stakeholders, the data needs to be available in real-time.

Citizens acting through many community organisations and NGOs play a major role in enhancing our conservation and environment estate. Many involve young people, and the strengthening of environmental education would boost these efforts. These participants are often involved in gathering extra information to assist the science of conservation and environmental recovery, but this resource of bright and willing minds is insufficiently tapped. Citizen science can take many forms, but is best done when linked to formal scientific processes such as in the Participatory Science Platform.¹⁷ There is also a huge, untapped opportunity to bring young Māori into this space within the right institutional contexts. Overall, there would be great merit in expanding the range of scientifically robust citizen science activities.

A common theme running through this report and the companion report *The Future of Food* is the shortcomings of our research system in being forward-looking in areas where the returns are either indirect or well into the future. The research system has increasingly become a tool for short-term economic return rather than a core tool for national development. Both CRIs and universities are compromised by this environment. Whether or not a strategy exists, and even if the correct science is pursued, the issues with research not being appropriately included in policy will remain. As environmental policy affects more than the Natural Resource Sector agencies, issues of sustainability must be viewed in a holistic policymaking framework. This links back to the discussion of how successive governments frame the overall goals for New Zealand, and reflect these goals through their planning, budget processes and public-sector discussions, as well as implementing Te Tiriti o Waitangi in a manner that inspires new ways of being and doing.

POST-COVID STIMULUS PACKAGES

In response to the crisis, governments, including New Zealand's, are offering stimulus packages to aid recovery and boost

economies. Given that the COVID-19 pandemic is a crisis of almost unprecedented scale, these responses will also be unprecedented. They must focus on the immediate issues of employment, welfare and business support, but the core issue is whether such packages will also take the future into account. On one hand, Governments must move fast to limit social and economic damage, but on the other it would be desirable to deliberate towards a national consensus on the plan ahead. Can such packages be designed so that they are future-focused and in line with the principles of sustainability rather than short-term political expediency? As the Climate Change Commission recently stated:

An economic stimulus package can either speed up or stall our progress on climate change. Smart investment decisions in low-emissions practices, technologies and infrastructure can create jobs and will ensure people are better off both now and in the future.¹⁸

Investment in infrastructure is a central component of such stimulus packages. Major infrastructure projects typically incur large capital costs, and are associated with long expected lifespans (30–100+ years) and limited flexibility once built. Decisions on infrastructure design therefore have long-lasting implications that are hard to reverse, so the current opportunity to build environmental considerations into post-COVID stimulus spending should not be missed. In making such decisions, interactions and interdependencies with other systems or infrastructure must be carefully analysed to understand cascading impacts and avoid any inappropriate path dependencies.

These considerations of the long term come up against a desire for 'shovel-ready' projects that can quickly generate employment and boost the economy. In these cases, at minimum some level of expectations on the environmental, sustainability and climate change consequences need to be tagged to the investment. Evaluation of the social impacts needs to be more than just the number of jobs created. The groundwork for such analyses already exists in the Living Standards Framework, and this shouldn't be overlooked in the rush to pour concrete.

REDEPLOYMENT OF PEOPLE

Emergency stimulus funds are being directed to redeploying workers who have lost jobs and incomes. Many could be engaged in environmental and conservation work,¹⁹ and in related areas such as assisting the move to sustainable agriculture. Indeed, the Government's budget announcement on 14 May focused on jobs. Many of these are meant to promote environmental and conservation activities, but it is unclear how big an impact this will have in the long term. It would be an opportunity lost if such schemes were considered simply as temporary employment schemes. If they were combined with training and career development opportunities, they could help transition people who worked in unsustainable sectors to move to future-oriented,

¹⁷ Curious Minds; He Hihiri I Te Mahara, www.curiousminds.nz

¹⁸ Climate Change Commission submission to the Minister for Climate Change, 7 April 2020 <https://ccc-production-media.s3.ap-southeast-2.amazonaws.com/public/Climate-Commission-advice-re-stimulus.pdf>

¹⁹ e.g. DOC's proposal for *Revitalising New Zealand's communities through nature-based employment* – a \$1BN invested over 3 years to help businesses retain their staff and significantly progress the Government's environmental priorities.

sustainable industries. This could lead to establishment of a standing Conservation, Environment and Sustainability Corps, which would require parallel investment in education, training and micro-credentialling to prepare new cadres of workers for the transition to a low-emissions economy.

ENSURING SUSTAINABLE INVESTMENTS AND SUSTAINABLE FINANCE

The concept of ‘wellbeing’ as a broader and intergenerational notion of prosperity underpins the Government’s agenda, but is not yet well reflected in New Zealand’s financial market policy and regulatory framework, public finance system and public financial institutions (with some exceptions). There is also a lack of strategic coordination and some gaps in regulatory oversight (e.g., private markets and trustees). Ideally, the strategy and agenda should be framed in a holistic and non-partisan way if it is to be effective and endure for society’s long-term benefit.

Sustainable investment and pricing mechanisms are needed for better allocation of capital to protect our natural resources and disincentivize pollution. This requires developing mechanisms to appropriately price environmental and climate-change impacts and externalities when making investment decisions. Essentially, this requires an environmentally-inclusive balance sheet that defines both assets and liabilities in a meaningful scorecard as well as requiring a longer-term investment horizon and a more inclusive focus on the effects of financial decisions on people, emissions and the environment. The Aotearoa Circle has been key to driving strategic discussion of financial market regulation through the Sustainable Finance Forum,²⁰ recognising that New Zealanders’ economic wellbeing is inextricably tied to the future path of climate change and ecosystem health.

Environmental reporting is already advancing well in the private sector. Reporting against the Task Force on Climate-Related Financial Disclosures (TCFD) standards is steadily becoming essential for companies raising global capital, and a number of New Zealand companies are starting to follow suit. In addition, there are numerous other sustainability criteria being set by global fund managers before they will invest. Many of our listed companies produce a sustainability report with a range of disclosures driven by global sustainability measurement entities.

Green bonds, which can be used to finance or refinance projects with clear environmental benefits, are an integral part of a Sustainable Finance agenda. Entities making use of green and sustainable bonds (e.g., Kainga Ora,²¹ Auckland City) have found this helps embed permanent green principles throughout their business, as they are locked in for many years. This has the potential to fundamentally change conversations throughout a company.

²⁰ <https://www.theaotearoacircle.nz/sustainablefinance>

²¹ Kainga Ora – Homes and Communities (previously Housing New Zealand). *Sustainability Financing Impact Report 2019*
<https://kaingaora.govt.nz/assets/Investors-Centre/Documents/Sustainability-Impact-Report-2019.pdf>

PART C: INITIATIVES THAT EXTEND BEYOND GOVERNMENT

Government ultimately must set the overall framing and use its toolbox to move society in accord with that framing. In doing so, it can and should support initiatives to promote environmental stewardship and restoration, and often does so most effectively when in partnership with Māori, NGOs, philanthropy, communities, and the private sector. Decisions and actions that will ultimately change the environment are made by these multiple other actors in a bottom-up direction. The following sections highlight issues where the partnership between the Government and other actors could be boosted.

Membership of New Zealand corporate boards has been rather narrow, and there is growing acknowledgement that greater diversity is desirable. Several companies now have an external sustainability advisory council to help advance their environmental values. Some are sceptical that such activities are just greenwash, but in reality an increasing number of boards take these responsibilities seriously, recognising both their social responsibility and the market advantage that will come in time from genuine commitment to sustainability. A Productivity Commission report in August 2018²² recommended introducing mandatory, principles-based climate-related financial disclosures to encourage investment that supports the transition to a low-emissions economy. Accounting and audit organisations, academics, the NZ Stock Exchange and the Institute of Directors should examine how such environmental reporting is included in a standardised way.

PROMOTING BRAND AOTEAROA NEW ZEALAND

As discussed in *The Future of Food* paper, Aotearoa New Zealand's brand needs reconsideration and extension, and should take advantage of our current high global reputation and growing visibility. The accreditation of our products for low-carbon footprints and for good environmental impacts would add value, at least in some consumer markets. At the moment there is a wide range of uncoordinated eco-labelling schemes of relatively low impact.²³ It would be important to reach a unified approach that could be marketed alongside other aspects of New Zealand's brand (e.g., tourism).

There is ample evidence that consumers, especially in advanced markets, are increasingly environmentally conscious, and New Zealand should seek a brand, possibly along the lines of Ireland's Origin Green,²⁴ that is supported by monitoring, traceability and accreditation. Brand Aotearoa New Zealand could go further by harnessing the strength of our bicultural heritage, particularly drawing on Te ao Māori and the values such as kaitiakitanga, kotahitanga, and manaakitanga that set it apart and command respect both locally and internationally. We have an opportunity to create a brand that provokes emotion, reflecting the uniqueness of our land and people, and a holistic approach to sustainability.



22 New Zealand Productivity Commission. *Low Emissions Economy, Final Report*
https://www.productivity.govt.nz/assets/Documents/4e01d69a83/Productivity-Commission_Low-emissions-economy_Final-Report.pdf
23 <http://www.ecolabelindex.com/ecolabels/?st=country,nz>
24 www.origingreen.ie

PART D: AN OVERVIEW OF SELECTED ENVIRONMENTAL PRIORITIES

Many issues and trends need to be addressed for a sustainable future. The pandemic has directly influenced some of these, such as tourism, but all could, and should, be considered in any holistic reset. All require more in-depth analysis, but are listed here to give some idea of the scope of considerations necessary. Some will be discussed in more depth in subsequent papers.

Although the focus should be on seeking transformational and sustainable change, the complex nature of tightly linked systems is such that plans need to be well developed, and key actions prioritised. This must take into account spillover effects, whether positive or negative. As was emphasized at the beginning of this report, the environmental, economic, cultural and social domains are not independent from each other and must be transformed in a holistic manner. Systems thinking is needed rather than seeking individual silver bullets for different sectors and issues. The key is to identify those high-priority action areas to achieve a meaningful shift from the status quo toward the desired threshold of change.

CLIMATE CHANGE

Climate change is the biggest existential threat to future generations. The passing of the Zero Carbon Act and establishment of the Climate Change Commission,²⁵ the development of the first National Climate Change Risk Assessment²⁶ and the proposed National Adaptation Plan²⁷ all signal that New Zealand means to take climate change mitigation and adaptation seriously.

Globally, however, as governments rush to revitalise their economies, there is a risk that the urgency of addressing climate change will be downgraded as a policy priority. Ironically, as a result of this crisis, the world will probably achieve more progress towards reduced carbon emissions than was previously imaginable. The extent to which climate change is largely driven by human behaviour will from now on be largely undebatable.

We cannot afford to lose ground on the progress made thus far. As businesses plan for a new future, they will need clear direction and incentive to decarbonise. Investments in new infrastructure, urban development, transport, primary production, and other sectors all must be consistent with limiting atmospheric warming. Sadly, the goal of keeping the rise to less than 2°C below pre-industrial levels remains elusive.

New Zealand continues to improve its evidence base on the environmental impacts of its activities. This information must be put to use so that climate change mitigation (emissions reduction) can be mainstreamed into sectoral planning and investment processes. Similarly, tools need to be developed to support communities to mainstream the inclusion of climate change impact assessment into land-use planning and other key

decisions to avoid path dependencies that do not allow sufficient emissions reduction into the future.

Sustainable finance has an important role in achieving decarbonisation. The effectiveness of some suggested measures is uncertain, but the need for action requires a normative approach. We need to develop and implement tools such as climate change disclosures now, informed by the knowledge we have, and build in adaptive assessments as we continue to develop new and improved measures.

Actions in many other areas are possible, including environmental labelling of our export products, taxing or charging for externalities, providing access to technologies to allow farmers to sustain production while reducing their emissions, decarbonising our transport system and moving towards 100% renewable energy.

LAND USE

An action that would perhaps have the largest positive effect on the natural environment is to ensure land is used in ways that restore biodiversity and ecosystem services, rather than degrade them. From a Te ao Māori perspective, this means ensuring the mauri of the system is healthy. This is a complex topic that has generally been put into the too-hard basket because New Zealanders, and especially farmers, feel they have full rights over their use of land. But there are examples of inappropriate land use dating back to the Second World War; for example, the clearing of native forest for farming on hillsides that resulted in damaging erosion. More recently, the rapid conversion of Mackenzie Basin land to dairy farming is generally accepted as having been unwise on many grounds. Problems with the RMA, the lack of coordination between central and local government, and the lack of appropriate incentives discussed above are all factors that have led to less-than-desirable land-use patterns. There is no short-term, easy fix, particularly given the capital investments farmers have in their farms. But many sustainability experts globally²⁸ see land-use issues as perhaps the highest priority other than the move to a low-carbon economy (which is not a separate issue).

Promising initiatives are occurring through industry bodies, including Fonterra, Dairy NZ and Beef + Lamb NZ. Some farmer-owned community irrigation companies are requiring all farmers to have an approved and independently audited Farm Environment Plan. Working groups focusing on regenerative agriculture techniques are attracting broad farmer attention. Having farmers committing to the mauri of the land, valuing indigenous biodiversity, and demonstrating these things will hugely assist the Brand Aotearoa New Zealand idea promoted earlier.

Conversations about land use must also consider urban areas, where biodiversity and ecosystem services are often not

25 <https://www.climatecommission.govt.nz/>

26 <https://www.mfe.govt.nz/climate-change/assessing-climate-change-risk>

27 <https://www.mfe.govt.nz/climate-change/climate-change-and-government/adapting-climate-change/adaptation-and-central>

28 <http://www.fao.org/land-water/land/sustainable-land-management/en/>

sufficiently recognised as important. Reducing environmental inequality – that is, working to improve the natural features and provide indigenously-connected green spaces in areas where they are lacking (often these are less-affluent areas) can begin to restore ecosystems and bring back native biodiversity to cities. Predator-free and urban-enhancement initiatives can help achieve this. Such approaches can also be geared towards reducing urban traffic, allowing for active travel solutions and better living conditions for urban dwellers and workers – approaches that also reduce emissions.

To achieve the required gains, we need data, understanding and tools to guide policy and management approaches to improve conservation and environmental outcomes. These need to take into account the complex interactions between land, fresh water, coasts and oceans, and urban environments.

FRESH WATER

Water is our most valuable resource, but there are issues around allocation, rights, management, and quality. Agriculture's impact on water quality remains an ongoing and unresolved problem, and extraction for hydropower and irrigation are compounding issues. Inappropriate allocation and over-allocation have led to water not being available for best use in some situations. Further, climate change will significantly affect where, when and how much rainfall different regions receive, affecting primary production and increasing both drought and flood risk.

Degradation of our freshwater resource is not just an agricultural issue; urban areas also contribute to the problem and must be part of the conversation. This is a shared problem in need of shared solutions.

Yet many of these issues remain unresolved, despite many years of discussion, and because decision-making processes around fresh-water management are slow and complex. There are moves to change to a more collaborative process, whereby regional councils, iwi/Māori, local communities and stakeholders collectively set objectives and limits for water quantity and quality in a voluntary, consensus-driven approach, which creates buy-in for achieving objectives. A comprehensive strategy to look after this resource is critical. But some clear decisions must be made to frame such processes, or the status quo will likely persist. Māori are very frustrated that issues over water rights remain unresolved.

TRANSPORT

The transport sector has been on a slow journey towards sustainability, but has a long way to go. New Zealand has one of the highest rates globally of vehicle ownership per capita, and a habit of sole-occupancy driving that needs to shift. We also do not regulate vehicle emissions, although a Clean Car Standard is in progress, as is a Clean Car Discount.²⁹ Such policies aim to push both consumers and importers towards more fuel-efficient vehicles, but it could be argued that this won't go far enough, and does nothing to reduce the number on our roads.

It is likely that the vastly decreased travel during the lockdown period will not rebound to normal levels as people shift more

permanently to remote working. Can we harness these changing attitudes to make a faster transition to sustainability in this sector?

The geography of New Zealand and of our cities is such that personal transport by cars remains a dominant form of transport. But if Tiwai Point closes, and provided the grid is appropriately developed, the move towards electric vehicles could be accelerated. This requires not only an investment in infrastructure but also consideration of the future of the fuel tax. A broad list of issues need policy consideration before the potential solution of a move to GPS-based road-use charges is implemented for the civilian fleet. Congestion charging would then be easy to introduce with no further infrastructure. Issues of privacy and control of the data and oversight are required, as in other digital domains.

There is already an acceptance of the need to promote alternative forms of transport by investing in cycling and pedestrian routes and in public transport including rail, but the latter should be electric-based. In the longer term, newer technologies may emerge such as hydrogen vehicles and electric planes.

New Zealand's geography and location mean internal and external air travel will always be part of our transport mix. Air travel is clearly heavily compromised at the moment, and moves towards lower-carbon air transport are slow and speculative, and likely inhibited by the effect of the crisis on the industry. The extent to which long-distance travel at lower volumes even after COVID-19 is addressed remains uncertain. Nonetheless, New Zealand will rely on intercontinental travel to support tourism and business connectivity, and to meet expectations of New Zealanders to see the world. The externalities caused by air travel will either have to be absorbed or paid for in other ways, for example, via taxes or offsets.

TOURISM

Tourism is a huge industry, and one with significant effects on our most iconic landscapes. The sector also generates a huge amount of CO₂ emissions from long-haul and domestic air travel (including helicopters) and heavy domestic transport by road. The Parliamentary Commissioner for the Environment (PCE) issued a report in December 2019, assessing the likely environmental consequences of the projected growth in tourism, and noted a lack of both governmental and industry understanding of these effects. Also noted was that, despite the recommendations in a report on the subject by a previous PCE 20 years ago, New Zealand had not significantly diverted from an extractive path with regard to tourism.

While some in the tourism sector have made a commitment to sustainability, there is much more work to do. COVID-19 has changed the picture dramatically, with tourism being hit hard by restrictions on travel and social-distancing measures. Local, domestic, trans-Tasman and Pacific tourism will likely be the basis of this sector for the next couple of years at least. International mass tourism is unlikely to return to the same volume. Is there now an opportunity to pivot to higher-value, lower-volume tourism, as the tourism sector reinvents itself? And beyond this,

²⁹ <https://www.transport.govt.nz/multi-modal/climatechange/electric-vehicles/clean-cars/>

can tourism focus on Aotearoa values over volume? What would this mean? What would be the implications for employment and the range of offerings provided?

The concept of 'restorative tourism' – going beyond sustainability to contributing actively to help regenerate damaged landscapes and ecosystems – is gaining momentum internationally. To what extent could we expand on this in our tourism sector, offering more meaningful nature tourism experiences?

FOOD AND PRIMARY INDUSTRIES

Agriculture, food production and forestry have always been a staple of our economy. In this time of crisis, they are even more important. However, maintaining agriculture's central role in our export economy over the long term will require the sector to be increasingly sympathetic to the environment. But the issues that have impeded progress are among the hardest to solve – particularly water and land use (the latter significantly affecting greenhouse-gas emissions) – as they require major shifts in farming practice. Achieving meaningful change will be challenging and must be viewed in context of other complex objectives of the sector. These issues are the subject of a separate report, *The Future of Food*.

Ultimately, we need to ensure that primary sector resource use is sustainable, that is, within environmental limits that preserve intrinsic ecosystem values and services. The agricultural sector overall has been driving change and working towards sustainable systems, but needs to think more about long-term issues, including climate change impacts and anticipated changes in consumer preferences (away from ruminant products), as it does so. Discussion about 'regenerative agriculture' has attracted enthusiasm from the farming community, and receptivity to learning more.³⁰ But that term has mixed meanings, and evidence that it could be more than a niche activity would require research in the New Zealand context to understand its value proposition at scale and over time. This needs to be given a higher priority. Specific objectives are needed around reducing fertiliser use that leaches nitrates into waterways, increasing efficiency with technology, and diversifying land use and production to be sympathetic to environmental limits. Farm systems in some areas will have to change because of changing rainfall patterns. As also discussed in this paper, there are major issues over the inadequate and poorly directed state of primary production science. The companion paper also discussed the potential for advanced technologies to assist the environmental footprint by allowing sustainable production, but with a lower environmental footprint. However, issues of social consensus and consumer views remain unaddressed.

The complexities of expectations on farmers as they transition towards a new way of operating are such that traditional advisory services may not be sufficient. Indeed, given the many expectations on waste management, land use, nitrogen management, and methane production alongside the need to

maintain productivity and income, a new cadre of farm advisory services with expertise in farm plan development, accountability and advice is needed. If farm plans are used both by central and local government to monitor progress, then such advisory services will need new capabilities and training and certified graduates. Government commitment to funding the necessary training and upskilling of a greater number of farm advisors would enhance the speed of adoption across the country. This issue has been raised previously as potentially a particularly effective component of reducing agricultural greenhouse gas emissions, with many co-benefits.³¹

In general, horticulture has a lower environmental footprint and precision technologies can help greatly. Aquaculture is a relatively young industry in New Zealand, with much potential, and can be managed in a sustainable manner. Ocean and fresh-water aquaculture offer significant opportunities over time, especially as consumer demand shifts away from meat. Good environmental practices would support a sustainable aquaculture platform.

WASTE MANAGEMENT

Achieving progress towards a circular economy where waste is eliminated and resource use is sustainable is a long-term goal. But strategies here are disparate and varied, with little guidance from central government. This has many components, including tackling waste management and incentivising waste minimisation. Currently, waste disposal levies (Waste Minimisation Act 2008) cover only 30% of landfill waste, and indeed most waste is deposited in landfills. But there is a lack of data on waste generation, treatment and disposal. Unfortunately, recycling some forms of waste is economically difficult – witness the large tyre dumps on many farms. Electronic waste contains many valuable metals. The OECD has suggested that volume-based waste charges could be more extensively applied.³² Single-use products could be disincentivized by including the cost of waste disposal in their prices.

CONSERVATION, BIODIVERSITY AND BIOSECURITY

New Zealanders are generally proud of their native heritage. However, indigenous biodiversity has been in decline since the first humans, along with rats and dogs, arrived. With the move to pastoral agriculture in the 19th century, the decline increased dramatically. Public concern and awareness have increased as the effects of population growth and invasive predators become more obvious. Private landowners are important. Some of the largest kiwi densities are on private land, but generally biodiversity issues are likely to be greater on private land. Our farming systems with fences rather than hedgerows have led to our pastoral system being rather limited in even exotic diversity. Incentives are needed for landowners to maintain ecosystems and biodiversity – reserve schemes such as the Queen Elizabeth National Trust covenants³³ are important. Encouraging riparian planting of natives has many benefits, including to water quality.

30 Rural News. *Farmers excited by regenerative farming*, 6 December 2019

<https://www.ruralnewsgroup.co.nz/rural-news/rural-general-news/farmers-excited-by-regenerative-farming>

31 Office of the Prime Minister's Chief Science Advisor. *Mitigating agricultural greenhouse gas emissions: Strategies for meeting New Zealand's goals*, July 2018

<https://www.pmcasa.org.nz/wp-content/uploads/Mitigating-agricultural-GHG-emissions-Strategies-for-meeting-NZs-goals.pdf>

32 OECD Environmental Performance Reviews. New Zealand 2017

33 <https://qeinationaltrust.org.nz/protecting-your-land/>

Public-private partnerships such as Predator Free New Zealand have made major contributions as have many community groups and NGOs. New Zealanders understand the importance of being rid of predators such as stoats, rats and possums, but there remains debate as to how to do it. The role of poisons such as 1080 has been controversial and the use of advanced genetic technologies has not been explored, leaving us largely reliant on poisons, biological strategies (e.g., *myxomatosis* for rabbits), fencing and trapping. Issues of conservation in the non-terrestrial marine and fresh-water systems are even more complex. The New Zealand marine estate is large, poorly understood and poorly documented.

Conservation policies need to be built increasingly on science recognising that environmental change as a result of global warming is inevitable. The Conservation and Environmental Science Roadmap points to the many unknowns that need consideration. Importantly, we must address ecosystem protection, not simply headline species, as their survival is not independent of that of the ecosystems in which they live.

More can be done to mobilise communities to engage in biodiversity-enhancing projects. Both citizen science and promoting environmental education can contribute. And there is room to build beyond Taskforce Green – for example, by expanding on DOC’s proposed redeployment of workers from tourism and other industries to create a Conservation Corps to work on green infrastructure. This could focus, for example, on native tree planting, riparian regeneration, and predator elimination. Rather than see this as simply a “make work” scheme, it should be combined with skill development, education and micro-credentialling and seen as a permanent part of the employment ecosystem to build a cadre of New Zealanders focused on environmental protection.

Biosecurity extends well beyond protecting our commercial crops and animals – and protecting humans against COVID-19. *Phytophthora agathidicida* (kauri dieback) has had devastating effects as have possums, stoats and rats on our native birds and domestic animals (dogs and cats) on native bird and reptile populations. Wilding pines threaten much of our precious mountain estate. Both border protection and ongoing efforts such as Predator Free New Zealand are critical. If a Conservation Corps was established, it could play an important role in biosecurity surveillance.

RENEWABLE ENERGY

We are fortunate that the country could achieve close to 100% renewable energy over a relatively short time, particularly if the Tiwai Point smelter closes. Our base load issue is not like other countries’ because of our extensive hydroelectric capacities. Even if Tiwai Point continues, by further investment in large-scale wind, we could complement geothermal and hydro. There has been little incentive to move to community-based solar- or wind-powered micro-grids with batteries for storage, but this will come.

³⁴ http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf

³⁵ <https://niwa.co.nz/coasts-and-oceans/research-projects/oceans-2020>

OCEANS

As Sea Shepherd Captain Paul Watson has aptly stated, “If the oceans die, we die.” Oceans play a critical role in regulating the biosphere, but they are under threat. Marine ecosystems are critically threatened by climate change, yet healthy oceans are required to sequester carbon and mitigate effects elsewhere. Land-based impacts are also a major factor – poorly designed and aging urban infrastructure, along with continued underinvestment, lead to growing challenges with sewage and stormwater discharges to coastal areas. Additionally, plastics are a significant threat to ocean health. A World Economic Forum study suggested that by 2050, our oceans will contain more plastic than fish.³⁴ It is clear societies and individuals are not meeting the full cost of their effects on the oceans.

New Zealand is a maritime nation, with 96% of our territory being ocean, and yet we have no strategy for marine sustainability. With less diversity than land ecosystems, and a less-developed set of rights than on land, this should be an easier task that might serve as an example for developing sustainability strategies in other areas. Nonetheless, in some areas, such as the Hauraki Gulf, and Tasman and Golden Bay sea floors, we have failed to avoid the mistakes we have seen on land, in terms of overshooting ecosystem boundaries and reliance on reactive policy responses. There is a need for a paradigm shift in environmental management of the oceans that could serve as an example for broader change. Equally, there is opportunity to develop true partnership with Māori, given the strong iwi commercial and customary rights that exist in relation to the oceans.

While New Zealand fisheries are generally sustainable, there are a few stocks where rebuilding is underway. Yet a lack of common objectives across multiple statutes, a lack of information or willingness to set ecosystem limits, and the absence of a truly precautionary approach in decision making compound the ocean management conundrum.

There may be value in a Ministry for Oceans instead of oversight falling to multiple agencies, including the DOC, MfE, MPI and the Environmental Protection Authority (EPA). The large gap with regard to marine biosecurity may require a separate unit, because oversight is currently spread across two ministries.

Having a deliberate strategy to do more in the marine environment, especially filling in data gaps, and explicitly communicating the excellence that we have and will achieve, would be a huge boost to New Zealand’s national pride and world standing. We need renewed commitment to reimagine management of oceans where previous efforts foundered, including the early-mid 2000s Oceans Policy and the Ocean Survey 20/20 research programme.³⁵

URBAN DESIGN

Most New Zealanders live in cities, and numbers will continue to grow. Access to urban green spaces is variable, leaving some city dwellers potentially quite disconnected from the natural world. We are becoming increasingly aware of the extent to which the nature of the urban environment matters for our mental and

physical health, and much more attention needs to be given to this dimension of urban planning. Additionally, our housing stock is expensive, not energy- or materials-efficient and does not necessarily reflect the diverse ways many wish to live.

Cities have heavy impacts on the environment through pollution, their carbon-intensive build, transport needs, and displacement of habitats for native biodiversity. To meet the needs of a growing population, Auckland Council is committed to a strategy of urban intensification, increasing housing density to limit the negative impact of urban sprawl. However, past strategies (or lack thereof) have resulted in vast tracts of infill housing at the expense of any sense of space and nature. The RMA has failed to deliver benefits either for housing or the environment. For example, recent amendments lifting protection for trees allowed private landowners to significantly reduce the urban canopy.

Restoring the mauri of natural environments in urban areas will require a combination of 'marketing' for communities to change behaviours and building effective collaborations to take on the

multiple and complex challenges. Stormwater management, air-pollution control and water quality are critical issues that need to be addressed, both currently and in planning for further intensification. Careful planning of green infrastructure will be needed to reduce urban 'heat islands', and to re-establish ecological corridors to connect natural habitats and allow biodiversity to flourish.

Critically, if our cities are to accommodate a future high-value workforce, they will have to be designed around sustainable, affordable housing, and access to amenities, schools and transport, including connecting urban areas to regional hubs with carbon-neutral public transportation.

There are many issues here beyond the scope of this paper. The structure of our local bodies does not support development of green cities, as is the case in many places in Europe (e.g., Copenhagen). Local government reform may be needed. But given the size of our municipalities, some collective support function may be necessary to provide expertise.



PART E: MOVING AHEAD

The early part of this paper focused on the actions that the Government might undertake or lead on. But much of the paper reviews the many actions where partnership with business, NGOs, Māori and the wider citizenry is necessary. It is obvious that to make progress in this sector, as in the social sector,³⁶ the principles of co-determination and empowerment should be adopted.

Key to a non-partisan, cohesive view of the future will be giving iwi, communities, and other stakeholders not just a voice, but also choice and control. This applies as much to consideration of our environment as it does to other dimensions of our health. We need to mobilise New Zealand's cohesiveness and pride in acting collectively towards sustainable environment and social goals. As a society we have much to learn from the Māori focus on intergenerational connections and collective responsibility and commitment to kaitiakitanga – preserving and enhancing taonga for present and future generations. For example, Te Roroa is co-designing with DOC an integrated tourism programme in the Waipoua Forest, which places forest health and biosecurity front and centre. The Government needs to fulfil its constitutional commitment to Treaty partnership, but effective partnerships mean going further. Fostering co-determination of the path ahead will rebuild and enhance trust. It will require engaging communities in meaningful discussion, bringing in youth views and those of the marginalised and underprivileged.

Many want to see a reset happen, and recognise the value of a collective approach. It must be for the long term and engage the many and diverse voices who have a stake in our future. The Government, although it has a critical leadership and policy role, cannot alone resolve the many problems. Yet we should not squander the opportunity that now exists for addressing issues that have been left in the too-hard basket.

Much can be done with the existing institutes and initiatives, and by addressing gaps in current systems, in setting national objectives, and developing a collective vision and an intergenerational plan. There is also an opportunity to address a structural gap in oversight of the environment and sustainability for New Zealand's future. There are many actors beyond the Government and there would be value in greater coordination – citizens need to own the vision.

The Parliamentary Commissioner for the Environment, by virtue of their legislatively protected role, undertakes critical research-informed and independent commentary. The role of the Secretary for the Environment is one of kaitiaki – an independent stewardship role that is locked into legislation. But these positions need to be supplemented by processes that take this further beyond electoral cycles, thus ensuring collaborative support from outside of government in order to be optimally effective. One solution would be the establishment of an independent Sustainability Commission and/or an Environmental Forum, which would ensure that a long-term

vision is consistently pursued, and the many efforts coordinated, in a process that supports the Secretary for the Environment and is removed from short-term political cycles. The commission would help ensure a balanced commitment to sustainability, extending into domains beyond a narrow environmental scope to fully consider the social, economic and cultural domains as well. If supported by a forum, it could serve to listen, on an ongoing basis, to the diversity of voices across New Zealand, and allow their collective views and innovative ideas to be heard and acted upon for maximum benefit.

Protecting and enhancing our natural environment involves complex values-based decision making, consideration of potential tradeoffs and possible synergistic actions, and finding common ground for consensus building. The commission and forum would be vehicles to effect progress in a way that assists New Zealand and successive governments to move forward on complex long-term issues, by helping to integrate the many parallel efforts being made beyond government. An alternative solution would be a model such as the Welsh Commissioner for Future Generations, which has a role similar to our PCE, but with a wellbeing focus across environment, socio-cultural and economic domains.³⁷

There is a broad consensus that New Zealand needs an integrated strategy to achieve greater economic, social and environmental sustainability. This must be based on an agreed set of goals, and aligned activities between the Government, business, iwi, NGOs and communities. In turn, this requires processes to continuously evaluate our progress, address our knowledge gaps and seek innovative solutions. Done well and with a broad consensus, this can take Aotearoa New Zealand ahead on a positive and healthy path.

³⁶ Spoonley, P., et al. *He Oranga Hou: Social cohesion in a post-COVID world*
<https://informedfutures.org/wp-content/uploads/Social-Cohesion-in-a-Post-Covid-World.pdf>
³⁷ <https://futuregenerations.wales/about-us/future-generations-commissioner/>

APPENDIX

The views expressed in this paper are those of the individual authors and contributors, and do not necessarily reflect the views of the organisations they represent.

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