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‘Pure As’: Clean, Green and Covid-free!

Environmental Issues Associated with the Notion of ‘Self-sufficiency’ and Sustainability in Post-pandemic New Zealand

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Abstract New Zealand’s image as clean and green is potentially threatened by pressures to urgently restart the economy post the Covid-19 pandemic. Self-sufficiency, important to the early settlers of New Zealand, was threatened by loss of biodiversity due to overhunting and farming, leading to raised awareness of the importance of environmental conservation in economic development. Since that time, economic cycles show periods of government protectionism, which fostered industrial innovation, followed by efficiency driven policies, where a ‘free-market’ predominated. Over time, but to varying degrees with changes in governments, has been a nation-wide commitment to conservation, reflected in both policies and the every-day lifestyle of most Kiwis. More recently sustainable development plans have identified the need to ensure that social-well-being, as well as care of the physical and natural environment, are considered in economic decision-making. Pre-pandemic, comprehensive legislation, supported by a range of government and community bodies, was in place to address identified priorities such as sustainable agriculture, clean air, clean water, and biodiversity. As New Zealand emerges from a lockdown invoked to isolate New Zealand from the ravages of a virulent Covid-19 infection, pressures to restart the economy at any cost, to reduce business foreclosures and stave-off unemployment, threaten plans for a ‘green economy.’ Whilst world leaders could not put aside their differences to fight the pandemic, it seems unlikely that they will unite to redress the threats facing planet Earth. Given these difficulties, this article recommends that we adopt individual and local actions to progress towards a more sustainable world.

Keywords Self-sufficiency, COVID-19, Lockdown, New Zealand, Sustainability, Environmental Conservation, Green-economy

1. Introduction

The advent of the virulent Covid-19 pandemic of 2020 sheeted home the world’s economic dependence on complex global supply networks and vulnerability (Buheji, et al., 2020 (a)), especially in relation to food security. On the face of it, food security is not an issue for New Zealand’s relatively diversified economy because primary industries generate a surplus, providing export earnings that formed three-quarters of the overall value of its global shipments (US$38.2 billion) (Workman, 2020). Associated with this economic reliance, the key challenges facing New Zealand’s environment are sustainable agriculture, “reducing emissions from livestock and embedding best practice” (Price Waterhouse Coopers, 2018), clean air, clean water, and biodiversity. Pre-pandemic, comprehensive legislation, supported by a range of government and community bodies, was in place to address key issues identified as priorities in the management of the natural and physical environment.

An overview of the emergence of the conservation movement in New Zealand shows that the self-sufficiency of the early settlers was threatened by overhunting and farming. The frightening realization that some species faced extinction because of human activities developed global awareness of the importance of conservation and of sustainability in economic development.

A brief history of economic development indicates cycles of government protectionism, which fostered industrial innovation, followed by efficiency driven policies, where a ‘free-market’ predominated. Since the Treaty of Waitangi was signed almost two centuries ago (Hayward, 2012), there has been a nation-wide (but often debated) understanding of the importance of the land, the air and the water to the peoples of Aotearoa (New Zealand). Despite changes in governments, New Zealand has shown a longstanding (albeit fluctuating) commitment to conservation, reflected in both policies and the every-day lifestyle of most Kiwis (New

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Zealand nationals including Māori and peoples of European descent). As the nation emerges from a lockdown invoked to isolate New Zealand from the ravages of a coronavirus spreading worldwide, this commitment to a sustainable environment is now being sorely tested. As in many countries, pressures to restart the economy at any cost have shifted the focus from long-term sustainable development to meeting immediate demands to reduce business foreclosures and stave-off unemployment.

COVID-19 has also highlighted the dangers of high-levels of dependence on a few global trading partners, making self-reliance and self-sufficiency a priority for many countries and communities (Buheji, et al., 2020 (b)). And New Zealand is no exception. As we celebrate our first day as a Covid-free nation, able to go about our daily lives free from social distancing and the fear of community transmission, it is timely to reflect on the notions of self-sufficiency and sustainability because our borders are still shut and will remain so until the rest of the world is able to similarly get this highly contagious infection under control. It is also timely to reflect on our 'clean green' values and what is important to us as New Zealanders as we formulate strategies to survive in the 'new-normal' post-pandemic.

It is 20 years since the launch of the '100% Pure New Zealand' global marketing campaign. At that time, the world was emerging from a global economic crisis, whereas ironically, we are now just entering what appears to be an even more threatening recession. The '*Pure-As'* brand has proved to be successful in selling Aotearoa as a tourist destination, George Hickton, ex Chief Executive of Tourism New Zealand maintains, because the claim is authentic: New Zealand's "landscape- its culture and its people live the 100% pure values every day in their every-day lives" (2009). Tourism is currently on hold, but the world is watching to see whether New Zealand does adhere to its core values, or whether, in the face of adversity, it succumbs to the temptation to make quick money without a care for environmental consequences.

2. Literature Review

2.1. Self-sufficiency Versus Sustainability

2.1.1. Biocapacity

We are consuming more than the Earth can provide. In the 1970s the biocapacity of the Earth was reached, that is the Earth's ability to provide the resources that people consume: "We are prospering at present by using up nature's stored resources such as soil, freshwater, biodiversity, fossil fuels and metals and in many instances we have already reached the limits of what the Earth can provide" (Econation, 2020). Hence the urgent need to consider solutions such as self-sufficiency and sustainability.

2.1.2. Self-sufficiency

Confronted with shortages of food, medical safety equipment and general domestic supplies during the Covid-19 pandemic, many communities began to regret their dependence on global trading partners, and their lack of self-sufficiency (Buheji, et al., 2020 (a)). Self-sufficiency in general parlance is about being able to provide everything that you need, especially food, without the help of other people or countries (Cambridge University Press, 2020). In this conception, a self-sufficient economy is one that requires little or no trade with the outside world. With its population having just this month reached 5 million, and plentiful land rich in natural resources, New Zealand has certainly got the capacity to be self-sufficient, and indeed, at certain times in history this concept has been to the fore.

In the days of early settlement in the late 18th and early 19th centuries there was little choice to be other than self-sufficient, given New Zealand's geographic isolation and distance from 'mother' England. In response to the vast unemployment and poverty associated with the 'Great Depression' of the 1930s the ideology again gained prominence. New Zealand looked for ways to become more self-sufficient by manufacturing a wider range of products, using import licencing and tariffs to protect local businesses from competition. Slack argues that the protectionist economy, which aimed "to insulate the country from further economic harm" was relatively successful, with innovation leading to a diversification of the range of locally made goods, so that "by the end of the 1950s, the 5000-odd factories of 1930 had grown to nearly 9000, and put on nearly 100,000 more jobs" (Slack, 2020). Slack explains that whilst "New Zealand had the strongest export diversification of any OECD economy between 1965 and 1980 by product and destination" it remained primarily a primary producer (2020). And there was a downside, as Waugh describes: "We made our own cars. We purchased [television] parts from Japan imported them to NZ and then assembled them at twice the price of buying imported goods….the Government owned a lot of stuff it did not need, like a network of hotels, and an insurance company" (Waugh, 2015).

In the early 1970s, given surging oil prices and rising inflation, the government invested considerable public money in 'Think-Big' projects designed to assist regional development and promote energy-self-sufficiency (Gustafson, 2010), but unfortunately these came on stream "more or less in time to see world oil prices fall and make the projects look like a vast waste of money" (Slack, 2020). Public backlash saw a change of government in 1984, resulting in the implementation of radical, neo-liberal reforms with a focus on efficiency and improving consumers' access to cheaper goods sourced internationally. The 'free-market' created by removal of import licencing and tariff protection created competitive advantage for countries, such as China, with low labour costs (Smythe, 2014), reducing reliance on less cost-efficient local manufacturing. These changes in the economic model meant that New Zealand became less self-sufficient.

Over the ensuing thirty years New Zealand's economy has further diversified. Goods-producing industries

(manufacturing, construction and utilities) comprised only 18% of GDP (Gross Domestic Product) in 2018, whereas the service sector had grown, with industries such as tourism and hospitality generating 65% (Stats NZ, 2019). Despite contributing only 7% of GDP, primary industries remain the main forex earners for New Zealand (Workman, 2020), with meat and wool, forestry, horticulture and seafood all showing strong revenue growth over the year to June 2019 (Clark, 2019). However, this growth comes at a cost to the environment. Intensive dairy production has increased the nitrogen levels in water and soil; raised greenhouse gas emissions and caused significant fertilizer and pesticide run-off, so fresh-water pollution and water scarcity are now identified as urgent priorities amongst New Zealand's environmental problems. Deforestation has led to erosion and consequently soil degradation is also an issue, due to acidification, loss of organic matter and earthworm declines (Smith, 2015). Such concerns have prompted an increasing interest in more sustainable ways of living and of carrying out business. But what is sustainability and how does this concept translate to sustainable development?

2.1.3. Sustainable Development

In keeping with the United Nations Commission for Environment and Development's initial conceptualisation (UNCED, 1987), sustainable development is defined by Brunner as that which "satisfies the needs of the present without risking that future generations will not be able to meet their own needs" (2020). Put simply, whereas self-sufficiency is about looking after your own needs without relying on anyone else for support, sustainability requires an understanding of the economic, environmental, social and cultural impacts of decision-making. "Sustainability requires a long-term, multi-generational view and it requires the recognition that we're all part of a living system – everything we do impacts the world around us." (Green, 2016).

The main benefit of a sustainable approach is to ensure that the Earth lives within its resources as the quality of life is improved, a concept relevant to all levels of world-order, from individuals to collaborating countries within the United Nations. As Buheji explains, to bring about such a transformation requires leaders to have a good understanding of the issues, to be able to visualise the desired outcomes, identify the mechanisms for change and inspire productivity (2020).

That leaders within the business sector are gaining an understanding of sustainability's strategic worth is shown by the results of McKinsey's Global Survey, where an increasing number of company chief executives (CEOs) displayed an "intelligent approach to sustainability that is firmly rooted in day to day business operations" (cited by Harris, 2017). A CEO's commitment to sustainable business practices is an important factor in attracting millennial job seekers as well as investors. Companies that make sustainability a priority give investors confidence that they can manage risks associated with climate and energy regulation. Consequently, they are more likely to be able to recruit higher calibre staff and to be more financially secure. Other benefits of sustainable business practices include improved brand image and competitive advantage; increased productivity and cost savings by reduction of waste. The leaders of high-sustainability companies are successful because they have a clear vision, they understand how to inspire their employees to be more productive by involving them in the drive towards sustainability. These elements ensure what Buheji calls 'resilience', the ability to adapt and respond to changing circumstances without losing sight of the target (2020, p. 28). Unsurprisingly, high-sustainability companies pay higher dividends to stakeholders (Rogers, 2016).

To ensure sustainability, the United Nations Global Compact (2015) recommends that businesses:

- support a precautionary approach to environmental challenges
- undertake initiatives to promote greater environmental responsibility
- encourage the development and diffusion of environmentally friendly technologies.

But real change in grappling with the issues associated with how we live within the Earth's resources can only occur by the world's leaders putting aside their differences and working together for the greater good of humanity. There are positive signs that this is beginning to happen. Recognising their responsibilities to peace, equality, justice, and sustainability, the governments of all the 193 United Nations member countries made a commitment to sustainability for a better world in September 2015, encapsulated in the Sustainable Development Goals (SDGs) (Price Waterhouse Coopers, 2018).

2.1.4. Trends in the First SDG Report

The Sustainable Development Solutions Network (SDSN)[1] ranked New Zealand 11th out of 162 countries in terms of sustainable development in 2019, just below the Nordic countries that topped the index – Sweden, Denmark and Finland –with a total score of 79.5% (Sachs, Schmidt-Traub, Kroll, Lafortune, & Fuller, 2019).

Looking at the SDSN data it seems that New Zealand obtained its best results on SDG 1 (No Poverty), SGD 4 (Quality of Education) and SDG 7 (Affordable and Clean Energy), and is on track for SGD attainment in SGD 8 (Decent work and Economic growth); SGD 9 (Industry, Innovation and Infrastructure) and also SGD 5 (Gender Equality), although progress on reducing inequalities between different groups, for example the elderly, was not as strong as previously[2]. New Zealand obtained its worst results

1 The UN Sustainable Development Solutions Network (SDSN) was set up in 2012 under the auspices of the UN Secretary-General. SDSN mobilizes global scientific and technological expertise to promote practical solutions for sustainable development, including the implementation of the Sustainable Development Goals (SDGs) and the Paris Climate Agreement.

2 According to PWC (2018), New Zealand's history indicates that the country

on SDG 12 (Responsible Consumption and Production) and SDG 15 (Life on Land). It made less progress than previously towards SGD 13 (Climate Action). Whilst New Zealand can be seen to be making good progress overall, this more detailed analysis suggests that high levels of CO2 emissions and pollution and threats to biodiversity require ongoing effort to achieve the SDGs by 2030, the target year set by the United-Nations.

Indeed, trends across the 162 countries that furnished sustainable development updates indicate that progress in reducing the stress on the environment has been too slow:

> *The natural environment is deteriorating at an alarming rate: sea levels are rising; ocean acidification is accelerating; the last four years have been the warmest on record; one million plant and animal species are at risk of extinction, and land degradation continues unchecked.* United Nations' Secretary-General António Guterres (Sachs, Schmidt-Traub, Kroll, Lafortune, & Fuller, 2019).

Therefore, notwithstanding the importance of the social environment reflected in other goals covering gender equality, safety, and education, in the sections that follow discussion of sustainability is delimited to the biotic and abiotic environmental aspects.

Given these global trends, New Zealand's worries about the impact of economic activities on the environment (such as clean water, clean air, erosion of the landscape) and particularly concerns about preserving Aotearoa's unique biodiversity, warrant further investigation. New Zealand's awareness of the need for conservation emerged over time, so that today an appreciation of the natural environment is reflected in the every-day lifestyle of most Kiwis, and in government environmental sustainability policies, albeit to varying degrees with changing political regimes.

2.2. Historical Context and the Emergence of the Conservation Movement in New Zealand

2.2.1. The Disastrous Impact of Early Settlement

The indigenous Polynesian people of mainland New Zealand, the Māori, arrived in the land of the long white cloud, Aotearoa (New Zealand), in several waves of waka (canoe) voyages in the early fourteenth century. Bringing with them foods such as kumara and yam, these early settlers were self-sufficient, living in relative harmony with their new land as hunters, fishermen and farmers. Unfortunately, because New Zealand's ecology had developed in the absence of any large mammals, with human settlement came a loss of biodiversity that is still happening today. With New Zealand's experience came the alarming realisation that the elimination of species, such as the flightless moa and Haast's eagle, was not the result of climate changes as seen in other parts of the world. This loss of biodiversity was caused by the arrival of homo sapiens and kiore (Pacific rats), which also wiped out some smaller species of bird, as well as frogs and lizards (Holdaway, 2007).

The first European explorer, Abel Tasman, reached New Zealand in 1642, followed by James Cook in 1769 and then sealers and whalers arrived over the 1790's. Large-scale European (Pākehā) settlement begun in the 1840s saw deforestation for sheep and cattle farms that affected waterways, reducing the availability of indigenous habitats. Other animals introduced by early European settlers such as cats, pigs, possums, weasels, ferrets, and stoats quickly became pests. The startling revelation of copious moa bones and feather cloaks but no live species in areas where these giant birds had previously been abundant [3] challenged scientific thinking of the time, resulting in the development of a new concept, that of extinction, Holdaway explains (ibid.). Other species were also seen to have declining numbers, caused by fires, the introduction of weeds, and proliferation of new predators[4]. Out of concerns to prevent further extinctions grew the notion of conservation, of responsible land use and protection of biodiversity.

2.2.2. Management of Environmental Sustainability and Conservation Today

Established by the Conservation Act (1987), the lead agency for biodiversity conservation is the Department of Conservation (DOC), protecting and rehabilitating endangered indigenous species and habitats as well as managing the extensive tracts of Crown-owned conservation land. DOC works in tandem with the Ministry for the Environment, the Ministry for Primary Industries [5], the Ministry of Business, Innovation and Employment, and the Regional, District and City Councils (Environment Foundation, 2018). The Resource Management Act 1991 (RMA) governs the management of natural and physical resources.

A raft of community organisations support environment sustainability through awareness raising, advocacy, volunteer work and funding, including Greenpeace, which claims to have "turned the tide against commercial whale hunting and…protected biodiversity hotspots like Antarctica" (Young, 2020). In recognition of the complex issues associated with livestock methane gas production, a new Climate Change Commission has recently been established as an independent agency to provide the government with advice on achieving targets set in the Zero Carbon Act

"has led the charge with key equality landmarks including women's suffrage, and celebrating indigenous and global culture. However, New Zealand has above average income inequality compared with other OECD countries. National income inequality measures have been fairly stable for the past 20 years after worsening in the 1980s and 1990s".

3 Scientists have long argued about what caused the extinction of many species of megafauna—giant animals including mammoths, mastodons, and moas—beginning between 9000 and 13,000 years ago.

4 The Ministry of Environment details other affected species, and probable causes of decline or extinction in the two waves of settlement (1997). An estimated 2,788 species are identified as at risk of extinction according to Hutching & Walrond (2007).

5 Which has oversight of fisheries (salt and freshwater), agriculture, aquaculture, forestry, food safety.

(Radio New Zealand, 2019). Federated Farmers is another independent advocacy organisation, which works for farmers by presenting their views on issues such as the government's Essential Freshwater regulations (Federated Farmers, 2020) as well as providing practical support to the rural community [6]. Public-private collaborations also support conservation, such as commercial sponsorship of DOC's Threatened Species Trust Programme to save endangered Kiwis by the Bank of New Zealand.

Each governmental agency has its own plans and priorities linked to the United Nations' Sustainable Development Goals (SDGs) and the 2030 Agenda for Sustainable Development targets. A sustainable, 'green economy' is defined by the United Nations Environment Programme as low carbon, resource efficient and socially inclusive (Royal Society of New Zealand - Te Apārangi, 2014, p. 1). The 'circular economy' exemplifies the green concept, underpinned by three core principles (Ellen Macarthur Foundation, cited by the Ministry for the Environment (a), 2019):

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems.

2.2.3. Current Issues

Despite significant diversification, primary industries remain core to New Zealand's economy, so dealing with the environmental consequences is challenging. Many agricultural practices significantly disturb the ecological balance, impacting on aquatic and terrestrial life, as well as affecting the climate, cleanliness of water and sanitation[7]. An environmental stocktake synthesised from government department reports and independent evaluations produced by community agencies, detailed New Zealand's progress and the challenges facing the nation in dealing with a wide range of sustainability issues (New Zealand Ministry of Foreign Affairs and Trade, 2019). The Ministry of Environment evaluated the significance and urgency of the identified issues (2019[d]) using four criteria:

- Spatial extent and scale (how much of New Zealand is affected?),
- Magnitude of change (is the issue increasing in scale and/or distribution, or accelerating?)
- Irreversibility and lasting effects of change (how hard is it to fix?)
- Scale of effect on culture, recreation, health, and economy (how much does it affect the things we value?)

From this analysis, nine environmental issues under three themes were identified by the Ministry for the Environment as high priority (2019).

Theme 1: Our ecosystems and biodiversity

- Issue 1: Our native plants, animals, and ecosystems are under threat

Theme 2: How we use our land

- Issue 2: Changes to the vegetation on our land are degrading the soil and water
- Issue 3: Urban growth is reducing versatile land and native biodiversity

Theme 3: Pollution from our activities

- Issue 4: Our waterways are polluted in farming areas
- Issue 5: Our environment is polluted in urban areas

Theme 4: How we use our freshwater and marine resources

- Issue 6: Taking water changes flows which affects our freshwater ecosystems
- Issue 7: The way we fish is affecting the health of our ocean environment

Theme 5: Our changing climate

- Issue 8: New Zealand has high greenhouse gas emissions per person
- Issue 9: Climate change is already affecting Aotearoa New Zealand

Prior to the arrival of the coronavirus pandemic, New Zealand had in place comprehensive legislation and a myriad of government agencies and community bodies that had the potential to address these nine priority issues and make progress towards becoming a 'green economy.' But with Covid-19 came business closures, job losses and talk of recession.

By closing-down its borders in a frantic drive to eliminate the Covid-19 virus, New Zealand's 'team of 5 million'[8] now faces a new era that will pose further challenges to resolving the environmental issues and maintaining its 'clean, green' image. But with lockdown came some unanticipated benefits.

2.3. What We Learned in Lockdown

2.3.1. Lockdown Life

On 21 March 2020, with 52 confirmed cases of Covid-19 in New Zealand, Prime Minister Jacinda Ardern introduced a four-level alert system and we learned what we must do to combat the spread of infection: handwashing, social distancing, isolation for confirmed and probable cases. At 11:59pm on 25 March New Zealand moved to alert level four, meaning the entire nation was in self-isolation. "We have a window of opportunity to stay home, break the chain of transmission, and save lives," the Prime Minister explained. For five weeks we had to stay in our family bubbles, and schools and non-essential businesses were closed because of the risk of infection. Cut off from neighbours and support of voluntary social services, some elderly and vulnerable experienced food shortages. Panic buying and shortages of

6 For example, supporting farmers in drought-stricken Hawkes Bay where there is a shortage of animal feed.

7 New Zealand was ranked 12th in the world in 2018, at odds with the country's clean, green image according to Pawson (2010).

8 A term coined by NZ's Prime Minister and reported in One News (2020).

goods, particularly personal protective equipment (gloves, masks and face-shields), highlighted our reliance on supplies from international partners, our lack of self-sufficiency and our vulnerability.

On 27th April the country moved to level 3, where family bubbles could be extended, and some travel within regions was permitted as specified businesses could resume, but with rules about social distance and contact. Many companies adopted on-line ordering, with contactless delivery, which eased food distribution issues. In level 2, hospitality opened-up, but with customer limitations. Trade was down, people were afraid to go out, and reports of redundancies began to hit the news. With time on their hands, and increasingly worried about food provenance and their future employment, people's demand for seed to grow their own produce was unprecedented (Ockhuysen, 2020). At the time of writing, the Prime Minister has just announced a move to level 1, where day-to-day activities will return to normal, but with border controls remaining, hitting the tourism and hospitality sectors the hardest. As we resume a semblance of normality in level 1, there is huge pressure to restart the economy by reopening our borders, but decision-making must be balanced by consideration of health risks. In the meantime, New Zealand must of necessity, become more self-sufficient.

2.3.2. Positive and Negative Consequences

Over 10 weeks in various forms of lockdown, Gower estimates up to 40,000 people may have lost their jobs, despite Government wage subsidies and loans made available (2020). As we felt the financial impact of loss of income in an economy heavily reliant on tourism and travel, people struggled to meet rent payments and pay for food. We learned the harsh realities of what food security means in times of crisis, especially in our remote rural communities, and amongst our elderly unable to travel. Food security is typically defined as access to nutritionally adequate, safe, and personally acceptable foods and the ability to acquire them in a socially acceptable way (Christchurch Community and Public Health., 2012). Households with lower incomes are less likely to be food secure, but it was still a shock that the Ministry of Social Development found itself paying out 70,000 Special Needs Grants for food in the week ending April 10th. Volunteer agencies, such as Salvation Army, also reported unprecedented demand, with 5895 food parcels made available to needy people in that same period (a 346% increase from the week before Covid-19 lockdown) (Boyle, 2020). Increasing numbers of Kiwi households are becoming welfare beneficiaries (Davison, 2020). Emergency measures such as special grants from Work and Income or food parcels from food banks run by social services agencies should be a last resort. What can individuals do to reduce reliance on welfare agencies by becoming more self-sufficient?

New Zealand is well known for its beautiful landscape and biodiversity, natural features increasingly threatened by both industrial practices and climate change. Surprisingly, lockdown here, as in other countries, showed just how quickly the Earth recovers when given the chance. This article is being written in beautiful surroundings near Lake Taupo, where numerous, very large Rainbow Trout can be seen leaping from the glass-like surface of the water as rafts of ducks fly overhead, undisturbed by boats, fishermen or hunters. Native birds thrived under Covid-19 lockdown nation-wide (Doyle, 2020); levels of air pollution reduced by 75% (National Institute of Water and Atmospheric Research, cited by Newshub, 2020); and waste volumes decreased (Braae, 2020). Nature is on the rebound!

As countries open again, there is the danger, given pressure to restart economies, that these unanticipated gains will be lost. What is the way forward?

2.4. The Way Forward: A Sustainable Future Post Pandemic

2.4.1. Lockdown Habits We Need to Keep

"American economist Milton Friedman once famously said: 'Only a crisis - actual or perceived - produces real change'" (Mace, 2020). Given New Zealand's elimination strategy, borders will not be opening up again any time soon. Some of the strategies introduced to prevent the spread of infection, such as online-education and working from home, have proved beneficial in reducing pollution as well as giving better life balance, so might be continued, albeit in modified forms as blended learning and a four day working week. During the first seven weeks of lockdown hospitality services were curtailed, including fast-food outlets, so of necessity, many families rediscovered the joys of home-cooked meals and having more time together. At home, bereft of work, many turned to gardening, enjoying growing their own fresh produce (Wilkes, 2020). People rediscovered the benefits of walking and cycling, and so too did planet Earth, with the quality of air improved by reductions in vehicle use in major cities (Newshub, 2020). These changes in our behaviour hold the secret to how greater environmental sustainability can be achieved by the actions of individuals.

2.4.2. An Environment-based Rebuild Package

The 'new normal' envisioned post-coronavirus provides an opportunity to break with the unsustainable, growth-based economic models. It allows New Zealand to make the changes which the Royal Society advised a decade ago, reducing biodiversity loss, improving the quality of fresh and sea water, and mitigating the effects of climate change. (2014). These ideas are congruent with the notion of a 'Green New Deal' promulgated in USA and UK, which identifies growth opportunities within the areas required to tackle climate change (energy efficiency, renewable energy and the built environment), using these as mechanism for creating jobs and infrastructure, whilst simultaneously promoting greater equality by guaranteeing work (Brunner, 2020). For New Zealand, the results of an analysis of green

growth opportunities by Vivid Economics and Energy Centre, University of Auckland Business School (2012) suggested Aotearoa's priorities should be improving water allocation and management; raising the average share of Research and Development in GDP [9], especially in sustainable and low-carbon agricultural technologies; and improving the energy efficiency of land transport and buildings.

That many of these elements have already been considered by New Zealand's Government is shown by recent announcements of funding to redeploy those made redundant by Covid-19 lockdown. Eleven thousand new jobs will be created, whilst supporting environmental conservation (Parliamentary spokesperson, 2020 (b)):

- $433 million for new jobs in regional environmental projects
- $315 million biosecurity, including weed and pest control.
- $200 million for Department of Conservation (DOC) "Jobs for Nature" Fund
- $154 million for new jobs enhancing biodiversity on public and private land

Conservation Minister Eugenie Sage says "this investment in nature will not only support thousands of people with jobs but pay dividends for generations to come by giving nature a helping hand," (Parliamentary Spokesperson, 2020 (a)).

DOC is working collaboratively with regional and city councils, leaders of Maori tribes (iwi) and community organisations, such as the Forest and Bird Society and Federated Farmers, to identify further opportunities to ramp up conservation, while helping communities recover from the economic blow of COVID-19 lockdown. DOC projects will provide new jobs maintaining wilderness tracks, planting trees, and controlling pests and weeds, giving "native plants, birds, and wildlife a chance to thrive" (ibid.). For example, redundant forestry workers will be redeployed to tackle New Zealand's number one pest, the invasive weed wilding pines, which poses a threat to farmland, waterways, and ecosystems. These self-seeded pines spread aggressively, annihilating indigenous landscapes by destroying native plants and forcing out native animals: "Without national intervention wilding pines will spread to 7.5 million hectares of vulnerable land within 30 years" (Parliamentary spokesperson, 2020 (b)), threatening biodiversity.

As well as government funding, regional economic development funding will also be used to create new jobs through environment-based projects. A private-public partnership (PPP) with local iwi Ngāti Waewae, has seen the West Coast receive funding to eliminate possums from 3,700 hectares of mixed podocarp forests at Mt Te Kinga. This project, will use trapping to prevent re-infestation of these predators, reducing the need for repeated 1080 poisoning and enabling healthy forest growth to allow the area's threatened birds to flourish.

9 A point also reiterated by Xavier Leflaive (Eco-Innovation Policies in New Zealand, 2008).

The United Nations reported that the pandemic has derailed progress being made towards sustainable development and "shifted the focus from long-term planning to immediate demands," (United Nations, 2020), but with its focus on environment-based projects in recovery efforts, can New Zealand be the exception? Given the volatility of the post-lockdown situation indicated by reports from the Treasury, the Reserve Bank and Government, it is difficult for Governments to forecast trends and plan. As the Maxim Institute explains, the only thing that is clear at the moment is that "economic uncertainty, negative sentiment and downside risks abound" (2020). Given this very dynamic context, the next section discusses some of the issues affecting the management of natural and physical resources post-pandemic, questioning some of the underlying assumptions in using New Zealand's 'clean, green' vision to drive economic recovery.

3. Discussion

3.1. Barriers

3.1.1. Introducing the Critical Issues

In 2019, New Zealand appeared to be well on the way to achieving most of the targets set within the United Nations' sustainable development goals by 2030. Fast-forward to mid-2020, funding has been allocated for projects that can support New Zealand's 'green' economic recovery post-pandemic. How effective will these projects be in creating a more sustainable future? How well do they align with the key issues? To address these questions, firstly we must review what was learned from the past, then consider some of the assumptions and issues raised by the pandemic, and finally identify recommendations to enhance the recovery response, taking into account the impact on sustainability and for our self-sufficiency.

In the year prior to Covid-19's disruptive spread, the SDSN ranked New Zealand 11th out of 162 participating countries in terms of sustainable development. The nation's own review had identified nine conservation and environmental issues as priorities to be incorporated in future planning for the management of natural and physical resources. A range of government and community bodies, supported by comprehensive legislation, appeared to be well-placed to make progress on these issues. But then Covid-19 struck with a vengeance.

3.1.2. Planning

Building on New Zealand's 'clean, green' values, 'shovel-ready' environmental sustainability and conservation projects are being identified to create jobs and build the infrastructure needed to re-boot the economy post-Covid-19. Substantial finance has been released to fund a range of projects, but while the broad areas of expenditure had been announced, no national strategy details had been released at the time of writing. This lack of a detailed, long

term plan is one of several critical factors that may impede the effectiveness of the post-pandemic economic recovery being 'green.'

The lack of details accompanying the announcement of economic recovery funding is understandable, given the volatility of the situation as the pandemic continues to rage across the world. However, a long-term economic recovery plan does need to be agreed across all parties, so that there is continuity of the 'green' focus and guarantee of adequate resourcing for an economic rebuild based on sustainable development principles. Although substantive post-Covid-19 recovery funding is approved, it seems that there is pressure to adopt projects that will quickly generate employment, perhaps at the expense of more urgently needed conservation and sustainability schemes. Currently the funding is being allocated on a project-by-project basis and does not seem to be specifically targeted to the nine previously identified priority issues. This suggests that before too much more of the funding is committed, that a high-level review of project funding applications be conducted to ensure money is not wasted through duplication, overlap, or lack of co-ordination. This review also needs to check for oversight of critically important sectors in environmental management: Is funding being made available to investigate innovative solutions to environmental problems? Are support and seeding monies available for business start-ups associated with 'clean-tech', and for the development and diffusion of other environmentally friendly technologies? As well as potentially restraining the effective implementation of conservation and environmental sustainability projects, the lack of transparency in public expenditure in the absence of a published long-term recovery plan potentially also affects public confidence.

3.1.3. Time

Another factor potentially inhibiting the roll-out of a 'green' recovery is time. It takes time for any industrial project to be planned, approved, resourced and the appropriately skilled labour secured, but 'green' projects require additional time for assessment and mitigation of any environmental risks. Given the current economic situation, there might be a temptation to move ahead on major projects without due diligence of environmental impact. Already exemptions to the Building Act have been announced for small structures and low-risk buildings (such as decks and sleep-outs) (Auckland Council, 2020). This change aims to reduce regulatory oversight of small projects, thereby freeing up local authorities to focus on bigger builds, speeding up approvals for major infrastructure projects needed to restart the economy, but perhaps also exposing the environment to abuse by DIY (do -it-yourself) enthusiasts.

3.1.4. Labour Availability

Whilst approvals can hold up project commencement, resource limitations and timely availability of skilled labour can also cause delays. The Government expects that unemployed people will be willing and able to take up the new work opportunities created by sustainability projects, but this assumption has yet to be tested. In the case of afforestation, the supply of New Zealanders willing to do the highly demanding physical work in remote areas at award pay rates may prove, as it has in the past, a limiting factor on the scale of the proposed forestry sector projects (Chalmers, 2019). The lack of a published 'green' recovery plan may also affect the timely roll out of essential, but currently deferred infrastructure projects, some of which are reliant on specialised labour that without the certainty of a longer-term plan might move offshore.

3.1.5. Public-Private-Partnerships

The most successful sustainable development projects will probably be those where local authorities are partnering with iwi because many of these were already in the pipeline, so implementation can be accelerated by government top-up funding. Such projects are typified by Horizons Regional Council recovery proposals that range from enhancing native fish populations through fish passage remediation, riparian planting and stream fencing, post plant and animal control, to biodiversity enhancement and accelerating the Council's Sustainable Land Use initiative (NZ Herald, 2020). But there are potential disadvantages in reliance on such collaborations. Firstly, corporate social responsibility expenditures, such as the Bank of New Zealand's sponsorship of DOC's Threatened Species Trust Programme, are difficult to justify to shareholders in the face of redundancies, potentially putting conservation projects on hold. Secondly, public-private-partnerships (PPP) potentially pose greater challenges in accounting for use of public funding, especially given pressure to get them up and running with great speed.

3.1.6. Have We Got the Right Structure in Place?

Factors such as lack of a co-ordinated plan, lack of resources or skilled labour availability might detract from recovery-initiated conservation-based projects being used to support New Zealand's progress towards the United Nation's SDGs. As well, the effectiveness of management and consultation structures and New Zealand's three yearly election cycle require consideration in any discussion of potential barriers to delivering on the 2030 targets.

Pre-pandemic, comprehensive legislation, supported by a myriad of government and community bodies, was in place to address identified priorities such as sustainable agriculture, clean air, clean water, and biodiversity. As already indicated, the proliferation of organisations involved in managing conservation and environmental sustainability and the large number of projects may pose accountability issues for the sector, especially given the magnitude of post-pandemic recovery funding suddenly available for environmental-based projects. It appears that the complexity of consultation with the innumerable stakeholder groups is a factor delaying development of standards and monitoring mechanisms required to progress critical SDG targets.

For example, government has spent almost three years developing new freshwater legislation that will establish limits for nitrogen, phosphorus and sediment consistent with achieving ecological health, but it is unlikely that these urgently required reforms will be passed before elections for a new government in three months. The complexity of stakeholder consultation has been exacerbated by lockdown, slowing the work of the newly constituted Climate Change Commission [10] in considering the multiplicity of issues associated with agricultural methane gas production, and so putting back the timetable for achieving targets set in the Zero Carbon Act (Radio New Zealand, 2019).

3.1.7. Discontinuities

Lack of continuity due to New Zealand's three-yearly election schedule is a factor that tends to favour short term quick-fix projects over longitudinal strategies that are needed to ensure sustainability. The current coalition government has in its time of office already made substantive progress on some sustainability issues: waste minimisation and the banning of single-use plastic shopping bags; improving conservation resourcing ($500 million budget for DOC); and publication of a provisional emissions budget, with a cap and price controls for the New Zealand Emissions Trading Scheme. The opposition party (National) is critical of lack of progress in marine management, but is against light-rail transit (LRT) investment in Auckland, which promised to reduce air-pollution, so if there is a change of government, there may also be a change of environmental priorities.

3.1.8. Data Issues

How New Zealand's ongoing commitment to sustainable development stacks up against that of other countries has been crudely assessed by SDSN's comparison using several different international and local data sets (Sachs, Schmidt-Traub, Kroll, Lafortune, & Fuller, 2019). However, these comparisons were limited by differing data definitions and the availability and quality of data. Only 84% of the signatories provided progress updates for the 2019 report, and in participating countries data was incomplete, including for New Zealand in relation to SGD 10 (reduced inequalities). New Zealand recently established a government statistics dashboard that collates 'live' data which can be used by a range of audiences to make better informed decisions. This is already proving invaluable in monitoring the social and economic effects of the pandemic and of the effectiveness of recovery strategies, using key indicators such as number of active cases of infections and unemployment rates. The issues facing the Earth can only be solved by a whole-of-nations commitment, so other countries need to make the gathering of valid and reliable information a priority to enable more accurate monitoring of progress towards the United Nations SDGs and targets.

10 Established under the Climate Change Response (Zero Carbon) Amendment Act 2019.

3.2. The Way Forward

3.2.1. Bottom-up Change

We have exceeded the biocapacity of the Earth. We are consuming more than the Earth can provide. To redress this situation requires urgent and transformational changes in how we live and work. It requires world-leaders to have a practical understanding of sustainable development, of the issues that pose barriers in implementation, and a willingness to cooperate across nations to solve these problems. Significantly, Buheji explains, transformative leaders can visualise the desired outcomes and inspire the community to pull together to achieve these (2020). World-leaders showed disappointing levels of international co-operation in combating the recent pandemic. Despite the unanimous adoption by United Nations' members of the 17 SDG, it seems sadly unrealistic to expect that we can achieve a global approach towards sustainable development in the immediate future.

Three of these sustainable development goals directly concern the physical and natural environment, and these are critical in solving other pressing problems, such as hunger and poverty. In the absence of inspiring leadership and collaboration at global level, the way forward is to progress these goals within countries, promoting environmental responsibility at community and individual level. Brunner argues that "if we reduce our collective consumption by just ten percent…that would already have a major impact on many of the most polluting activities of our economy" (2020). He suggests that each of us can make an effective contribution to the protection of the environment and climate by adopting the following five strategies:

1. Demand radical reforms from politics. Vote for politicians who are committed to an effective, sustainable climate and environmental protection.
2. Consume less.
3. Less time sitting in the car and on the plane.
4. Eat less meat and dairy products.
5. Plant a tree (Or support one of the many projects that plant trees worldwide).

3.2.2. Self-sufficiency and Food Security

As increasing numbers of Kiwi households become welfare beneficiaries (Davison, 2020), food-sustainability issues come to the fore. What can be done to increase self-sufficiency? Research conducted by Christchurch health authorities after earthquakes devastated their city, showed that food security for poorer families was compromised because of transportation, which limits access to fresh produce (Christchurch Community and Public Health., 2012). In the 'new normal' post-Covid-19, issues with food security can be reduced by encouraging individuals to grow more of their own vegetables and fruits, whether on rooftops, on balconies, in pots or borders. As well as providing easy access to food that supports a healthy lifestyle, planting fruit and nut trees also protects the soil from erosion and improves

air quality.

3.2.3. Applying Circular Economic Principles

By applying knowledge gained in the earthquakes with circular economic principles (Ministry for the Environment (a), 2019), we can add to Brunner's list of strategies to develop a more sustainable lifestyle.

1. Keep a garden: Grow your own fruit and vegetables in tubs, on rooftops or in a border; waste less food and compost more. Collect seeds and save for next season's planting.
2. Buy wisely: Select items with the least packaging; buy in bulk, take your own containers to fill, or where this is not possible, select those products with recyclable packaging. Buy products that are made from recycled materials and are recyclable; avoid single use plastics such as straws and disposable cutlery. Consider carefully before you buy new (is it something that you could rent or borrow?).
3. Reuse, repair and repurpose, if possible, as these strategies use less energy and materials than buying new or dismantling to recycle. Can items no longer needed be used by someone else?
4. Reduce waste: Recycle plastics, paper, glass, and metal: Glass jars, for example, can be re-used for pantry storage; plastic containers can be cut down to make bird feeders, paper-storage containers, or self-watering seed pots; old towels can be cut up for dusters. Compact non-recyclable waste to take up less room in landfills.
5. Conserve energy; Switch off lights and appliances not in use; buy energy efficient appliances; draw curtains at dusk; hang clothes outside rather than drying on an inside rack; reduce shower time and use cold water for washing clothes.

3.2.4. A Caveat

While these local actions will build a more self-sufficient society, sustainable development requires a commitment at country-level and a more collaborative approach by signatories to the sustainable development accord. The United Nations reminds us that the challenges countries are facing with Covid-19 underscore "the need to think long term, build resilience and limit the impact of future crises." To this end New Zealand needs to remain focused on the 17 SDG, working to ensure continued progress in the achievement of environmental and conservation targets, whilst responding to the immediate needs of the burgeoning numbers of unemployed for housing and food. By closing-down its borders in a frantic drive to eliminate the virus, New Zealand now faces a new era that will pose further challenges to achieving its 'clean, green' ideal. Further research to explore the impact of the pandemic on the implementation of government's conservation and environment policies, and on progress towards the United Nation's sustainable development goals is therefore warranted.

4. Conclusions and Recommendations

4.1. The Call to Action for a Sustainable Future

Confronted with shortages of food, medical safety equipment and general domestic supplies, Covid-19 has forced many communities to re-evaluate the importance of self-sufficiency, (Buheji, et al., 2020 (a)), at least in the short-term. But to ensure a sustainable future requires a massive change in priorities. In the longer term, we need to focus on the quality of life by giving attention firstly to the environment, then to people, and lastly on the nature of the economy needed to support these.

New Zealand's team of 5 million has been successful in curtailing the impact of Covid-19 at least in the meantime[11], so when borders reopen New Zealand needs to be able to leverage on its clean, green and sustainable image to reinvigorate the much needed forex-earning travel, tourism and hospitality sectors.

It can be seen that the substantial recovery funding has the potential to accelerate New Zealand's progress towards the 2030 targets underpinning the United Nation's SDGs, if the call for projects is carefully monitored and integrated into a longer-term well-resourced plan that takes account the nine issues of priority concern. There are other factors, only some of which are associated with the pandemic, that might get in the way of progress, including the organisational structures to manage conservation and environmental sustainability and New Zealand's three yearly election cycle.

However, our values as New Zealanders are key to a sustainable future. As the Ministry of Environment explains, "nature is part of our everyday lives as we enjoy the great outdoors of Aotearoa New Zealand with our families. Our native trees, plants, birds, animals, insects, and the places they inhabit are all part of who we are" (2019 [b]).

Now is the time for all people, not just New Zealanders, to reflect on what we value and to build on what we have learned during the lockdowns to make our lifestyles more sustainable and to rejuvenate our planet. As Greenpeace advocates, "Together, we can protect the climate, oceans, forests and other vital ecosystems that sustain life on Earth….Together we can do great things…. To protect the planet … it's going take each and every one of us standing up for what is right." (Young, 2020).

We need to become more politically active, Bronner has suggested, by supporting governments that are committed to environmental protection, though it is recognized that such a recommendation is more tailored to people living in Western democracies. But let us not leave it all to governments and local authorities. We can make a difference within our local

11 At the time of writing, it was announced by Prime Minister Jacinda Ardern that New Zealand had been successful in eliminating Covid-19 and Kiwis were no longer required to social distance themselves after 17 days of no cases and the first day of no active cases (NZ Herald, 2020).

communities by committing to some simple strategies.

What can you do to make a difference?

4.2. Recommendations

Notwithstanding our different circumstances, collectively we can make a big impact on environmental sustainability by small changes in our behaviors, both in personal lifestyle choices and in the way we do things in the workplace.

It is therefore recommended that:

1) Individuals adopt strategies for a more self-sufficient and sustainable lifestyle, focusing particularly on sourcing more of their nutritional requirements from plants, which will lead not only to better health outcomes, but also reduce carbon-dioxide levels.
2) Businesses, already required to have a sustainable development policy if they are contracted to government or local authorities, take steps to more fully integrate a '3-R' (reduce, recycle and reuse) approach into standard operating procedures, with links to employees' performance management and reward systems.

New Zealand's current coalition government came to power on the back of cross-party agreements that were linked to a greener economy, but it is clear, as a new election looms and the economic-outfall of the Covid-19 lockdown impacts, that these are increasingly tenuous. To promote accountability for more effective environmental protection and biotic conservation within a sustainable development framework, it is further recommended that the government:

3) Publish a long-term economic recovery plan, based on 'green' principles. As part of developing a national plan, garner wider cross-party agreements on conservation and sustainability priorities and direction, so that government departments can plan more strategically with the knowledge that long-term funding is assured. This greater certainty would enable businesses to better anticipate, and plan for, more effective responses to environmental challenges, such as reducing the level of greenhouse gases by changes in the agriculture sector and reductions in the levels of waste, by changes in the tourism industry.
4) Implement an integrated environment and conservation management strategy as part of this recovery plan, to ensure co-ordination, avoid duplication and support effective project delivery, monitoring of associated sustainability outcomes and transparency in accounting for use of public funding.
5) Report more regularly on progress towards all SDG goals, with greater transparency in presenting both achievements and challenges to heighten community awareness of the urgency for action. In particular, better promotion of the scale and significance of environmental issues, so that the level of business compliance required to reduce environmental challenges is achieved with less resort to legislation and individuals are able to make informed decisions to fulfil their environmental responsibilities(SGD Principle 8). This is especially important in those areas where little progress has been made, notably agriculture emissions and ocean management.
6) Broaden the funding available to investigate innovative solutions to environmental problems and to provide support and seeding monies for business start-ups associated with 'clean-tech', and for the development and diffusion of other environmentally friendly technologies' (SDG Principle 9).

Last, but not least, it is recommended that research be conducted to:

7) Explore further some of the environmental issues associated with the notion of self-sufficiency and sustainable development for New Zealand in the context of the Covid-19 pandemic.

The United Nations is concerned that the pandemic will derail progress being made towards sustainable development. As countries open again there is the danger, given urgent pressure to restart economies, that the gains reported by SDSN in 2019 will be lost. What is the way forward? If New Zealand follows the aforementioned recommendations these fears will be allayed. Through these recommendations a better alignment of long-term planning with economic recovery projects can be achieved in a 'green' way; individual, business and government activities can be geared towards greater self-sufficiency, and the achievement of national priorities for conservation and environmental sustainability can be accelerated.

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