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The Te Kāhui Kuhukura wellbeing index

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ABSTRACT

Place-based, Indigenous ways of knowing have real relevance in a context of urban system change. Indigenous approaches have developed over time in places that are understood as ecological entities and venerated kin, not geological resource. Such socio-ecological and nature-responsive models are evidenced to offer the adaptive, ecologically ethical and responsive strategies needed at this time of complex ecological crisis. The research discussed here is founded in a complex Indigenous wellbeing concept – mauri ora - that links social and ecological wellbeing together as an indissoluble whole. Earlier research developed an urban mauri-centered "compass" that oriented users towards nature-based and socio-ecological approaches to urban wellbeing. An urban wellbeing data display was also developed that measured and visualised current states of social, cultural and ecological wellbeing. This mauri-centered research methodology was then tested out in place, in Waitaha/Canterbury, in the South Island of Aotearoa, New Zealand. Working with Te Kāhui Kahukura, a group of Māori Iwi kin authorities, a wellbeing index was developed. In this paper we describe the research context, the place-based index and its key domains and measures that assess socio-ecological wellbeing as a complex whole in the context of urban environments.

1. Introduction

Urban systems are socio-cultural-ecological living constructs that have local and global dimensions linked to urban energy and material metabolisms. In this time of converging and complex crises – including in extinction emergencies, climate chaos, cost of living challenges, and globalised epidemics [1–4] – it is now widely recognised that urban systems need to transition to become more ecologically and culturally attuned and just. A key question now is how change processes might be supported and accelerated.

This urban wellbeing research argues for a simple and cohering urban theory of change focused to social, cultural and ecological vitality or mauri ora. The emphasis here is on cultural or ontological change at an urban level for living systems vitality and care, rather than a socio-technical instrumental approach. Transition-enabling tools were developed and tested within the research to support or catalyse place-based cultural change. These tools were developed with a view to supporting diverse urban actors – mana whenua, neighbourhood groups, urban designers, planners, architects, or developers – to analyse, define and action the complex change required at this time of converging socio-ecological crises [5].

We begin this paper with an outline of an earlier stage of this urban wellbeing research focused on the development of a mauri ora urban wellbeing conceptual model and associated urban wellbeing tools – a compass and data display. We then discuss the development of a place-based, Indigenous-partnered wellbeing data that is intended to support the holistic understanding and assessment of Indigenous socio-ecological wellbeing. We conclude with a projection on the potential of the research to better enable Tiriti-led partnerships for urban mauri ora or holistic wellbeing.

1.1. A mauri ora model, compass, and data display

The urban wellbeing programme, Huritanga, funded by Aotearoa/New Zealand's National Science Challenge, was developed to explore transitions for urban social, cultural and ecological wellbeing. Ngā Tohu Mauri Ora was one of the projects delivered within this large research programme. The purpose of this mauri-centered urban project was to

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develop a set of transition tools that emphasised nature-based and socio-ecological strategies for urban resilience and regeneration.

In the first phase of the project a mauri ora model of urban wellbeing was developed which identified and wove together social, cultural, and ecological directions or indicators to guide future-focused urban action for system transitions. The mauri ora model for urban wellbeing was communicated in two key ways – via a future-focused, wellbeing oriented compass and a current wellbeing status data display.

Mauri is an Indigenous Māori concept that speaks to the inherent interconnectivity of life. Mauri is life-force or life-field composed of an indissoluble interactive relational network [6]. Mauri meshes together all things – environmental entities such as sky, sea, earth, rain, and other life, such as trees, birds, *and* humans [7,8]. Thinking with mauri enables more relational and socio-ecological approaches that synchronise well with the reality of living systems connectivity. Mauri *ora* is the vitality, the health, of the life-field or integrated living system [8,9]. Designing, planning and developing cities with mauri ora disrupts settler-colonial norms as it re-orients attention to human and more-than-human wellbeing [10,11] and emphasises kin connection with the living world. Such shifts are imperative at this time of socio-ecological crises.

The mauri ora model emphasises five key urban systems transitions. These are in key urban domains, in ecology, energy, and economic systems, in urban communities, and in regenerative buildings. The framework emphasizes the need for just transitions towards ecological regeneration, carbon-zero energy, a circular and regenerative economy, socially, culturally and ecologically connected urban communities, and regenerative buildings achieved through a range of strategic and pragmatic actions. The compass visualises complex urban systems connectivity and future-focused regenerative urban transitions. This integrative visualisation supported thinking with mauri by nesting urban infrastructures *within* ecological or natural systems and emphasising socio-ecological connectivity. The transitional action compass defined a direction for urban systems transition for ecological and social vitality achieved via a range of wellbeing-oriented actions (Fig. 1).

A mauri-focused data display was developed as a means of measuring current status and to assist the future-focused orientation of action compass. The display visualises an array of urban data across the five key compass domains of regenerative ecology, zero-carbon energy,

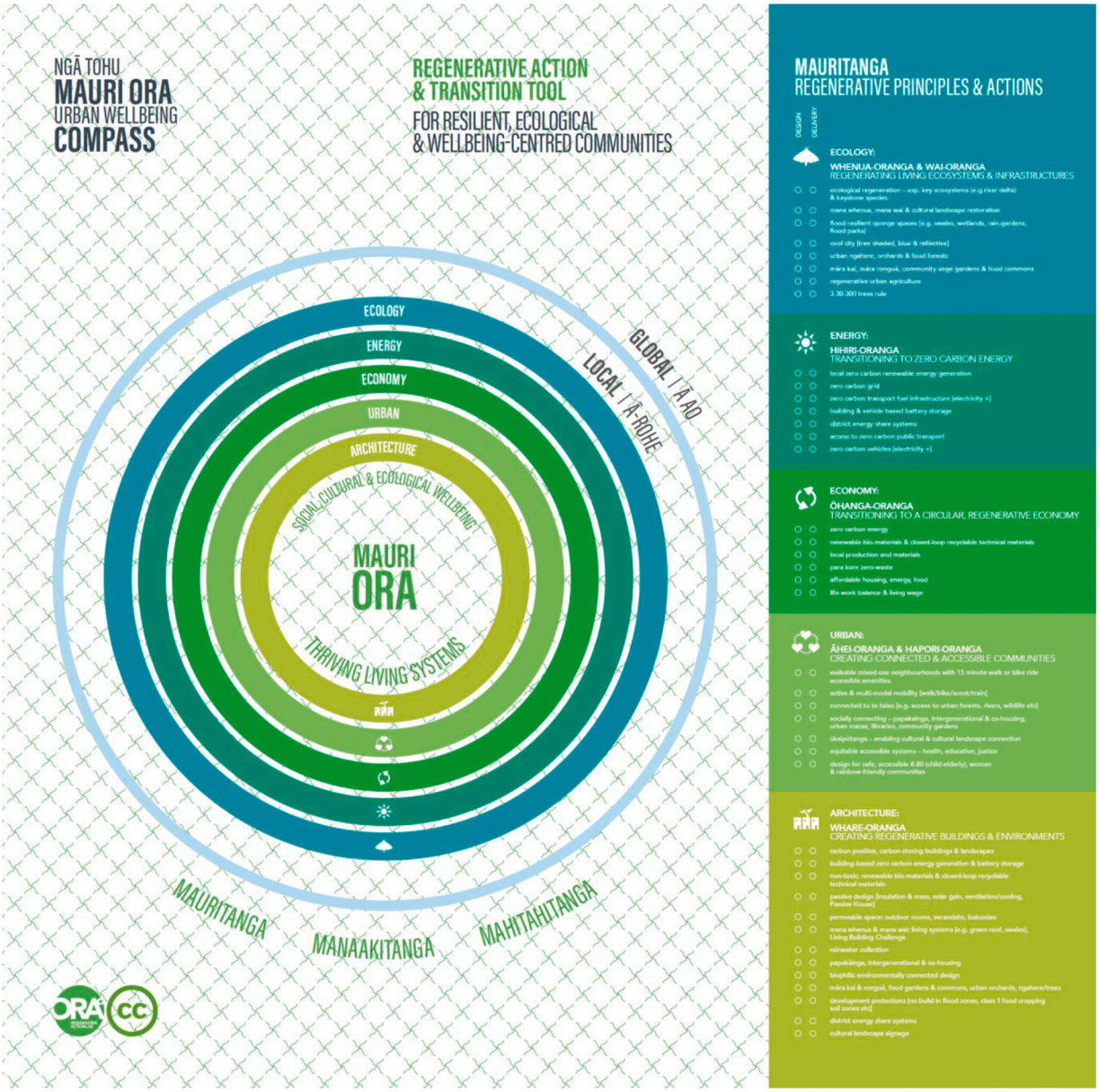

Fig. 1. Yates, A., Powley, C. (Clarke, K., Grieve, F.), 2024. Ngā Tohu Mauri ora urban wellbeing action compass.

regenerative circular economy, connected community and regenerative buildings. Wellbeing status is represented in the mauri-centered data tool via a traffic light data display where green shows mauri ora, wellbeing; orange, mauri noho or stasis; while red represents mauri mate, languishing. The display visually communicates local mauri as a complex continuum.

The data display has value for the way it brings a broad range of kinds of urban data into relation, but also for the way that it draws attention to the lack of readily available and consistent urban data. As such the data display also aims to catalyse research to generate new methods and approaches to garnering urban data. As part of this research new urban data on solar panels and urban green spaces was generated using innovative techniques to generate data from satellite imagery, and live place-based data sensor information was also incorporated.

When viewed together the current status data display and future-focused action compass provide a means to holistically assess mauri ora and to take action to enhance socio-ecological wellbeing through specific urban transitions and actions. The socio-ecological wellbeing emphasis of both the compass and data display is an active critique of the universalising neoliberal nature of many indicator-based indexes [5]. Pacific studies academic Stephen Ratuva argues that many indexes are colonising as they are structured around and actively in turn enable neoliberal socially and ecologically extractive values [12]. Māori scholar Krushil Watene and economist Mandy Yap critique the lack of place-based Indigenous knowledge and cultural foundations in indicator-based development frameworks [13]. Responding to this need for localised Indigenous-led frameworks, the second stage of the project involved working with Iwi (kin-ship) groups in place to meet their collective intentions for mauri ora for their people, and ancestral land, rivers and sea.

1.2. The Te Kāhui Kahukura wellbeing index

Phase Two of the Ngā Tohu Mauri Ora project involved developing a methodology for co-creating place-based urban wellbeing tools with Indigenous community partners, expanding upon the models or tools developed in the first phase of the project. The research was informed by Kaupapa Māori research principles that emphasise the importance of whanaungatanga or ethical research relationships, in research led by, partnered with, and delivering value for, Māori. A pre-existing Memorandum of Understanding between Ngai Tahu and Canterbury University's Ngai Tahu Research Center was an important precursor to the research relationships. The place-based index research lead John Reid is a Centre researcher and the research relationships established during this time enabled this co-partnered research to occur.

This paper outlines the wellbeing indicator framework developed with the representatives of six rūnanga (democratically elected tribal authorities) with territories in Waitaha/Canterbury, which is in the South Island of A/NZ. The six rūnanga established Te Kāhui Kahukura (TKK), a committee to enable the chairs of the rūnanga to collaborate on matters of mutual interest and benefit. The collaboration was driven, in-part, by the need for rūnanga to establish common positions for engaging with the Christchurch City Council (CCC), and Environment Canterbury (EC), the regional council. Collective positions were needed given that the rūnanga territories reside, either in-part or in whole, within the boundaries of these councils. Under resource management legislation in A/NZ local and regional governments are required to consult with rūnanga in the development of their district and regional plans, and in the issuing of resource consents for various activities. District plans establish a framework for sustainable residential and urban development, while regional plans are concerned with environmental issues such as soil conservation, water quality and quantity, biodiversity, and contaminant discharges. Resource consents are official permissions for entities to carry out operations that will have an environmental impact. Through establishing commonly agreed upon positions of interest, and mobilizing collective resources, the rūnanga could avoid establishing contrary positions, and concentrate effort in directly impacting the design of district plans and regional plans, and the permissions given for, or conditions placed upon, resource consents.

However, this is not to say that rūnanga do not have contrary positions on some issues that are pursued separately when required. It is within this context that this wellbeing indicator framework for Te Kāhui Kahukura was co-developed through collective workshops, with the specific intent of establishing a future-oriented and pathfinding index to inform and support urban planning and development decision-making, from an indigenous position, within Christchurch, other towns within the district and region, and importantly the nohoanga kainga, or the traditional village areas of each rūnanga.

The index is an information tool that Te Kāhui Kahukura has co-developed for assessing and measuring progress toward rūnanga aspirations and goals. It does not represent the official positions and policies of each rūnanga, given that such authority resides with respective rūnanga, but may be more considered a mechanism for determining whether such policies are being given effect. The index will likely be a 'continual work in progress', given that it must iteratively change based on new circumstances, and through deeper development iterations with each rūnanga beyond the Te Kāhui Kahukura committee. The method for developing the index is outlined below.

2. Method

The Te Kāhui Kahukura wellbeing index research was led by the Ngāi Tahu Centre at the University of Canterbury, an institute dedicated to undertaking research to support the development of Ngāi Tahu, the iwi (broad tribal grouping represented by Te Rūnanga o Ngāi Tahu) to which the six rūnanga belong. The first phase of the research involved a desktop literature review of all publicly available policies and strategy reports concerning wellbeing and urban development relevant to the rūnanga. Through the review a range of wellbeing indicators and associated metrics were identified and formatted into a document. A very influential document in the identification of indicators was the Iwi Management Plan. The Iwi Management Plan (IMP) was written by Mahaanui Kurataiao Limited (MKT) which is the company owned by the six rūnanga to manage all Resource Management Act (RMA) matters on their behalf. The IMP is a statement of policy objectives for environmental management in the takiwā (tribal territory) of the six papatipu rūnanga. MKT are the guardian of the IMP and use the policy objectives contained therein to shape all mātauranga Māori (Māori knowledge) advice to council and private clients. This includes the CCC district plan and EC regional plan.

Following the desktop work a preliminary meeting with Te Kāhui Kahukura took place where the Ngā Tohu Kāinga-Ora research programme was explained. Several wellbeing indexes were shared via presentation to Te Kāhui Kahukura including A/NZ Treasury's Living Standards Framework [15] (LSF) (The Treasury, 2024), the OECD's wellbeing framework [16] (OECD, 2024), and the Canterbury Wellbeing Index [17] (Canterbury District Health Board, 2024) - established by the Canterbury District Health Board. This was to orientate TKK to what conventional wellbeing indexes look like and how the indicators and data underpinning them may be formatted and displayed. The mauri ora model, index and compass, with its transformative focus on regenerative ecological, energy and economic systems, communities and built environments, was then shared. This was to provide Te Kāhui Kahukura with insights into how urban wellbeing indexes were evolving, and what was possible. Finally, the indicators and metrics pulled from the desktop review of rūnanga policies and strategies was presented in an index format to illustrate how a TKKWI might look for Te Kāhui Kahukura. From this initial meeting Te Kāhui Kahukura approved the development of the index for the six rūnanga.

2.1. Developing the Te Kāhui Kahukura wellbeing index in place

The second stage of the research process involved the formation of a working group. Each rūnanga chair present at the meeting nominated a representative to the working group, of which three of the chairs joined personally. Each member of the working group had different areas of passion and interest including health, environment, education, law, urban development, and governance. Interviews were undertaken with each representative to ascertain what wellbeing was to them, what the key constraints on Ngāi Tahu and non Ngāi Tahu Māori wellbeing in urban areas were currently, and how they imagined future urban areas might look in the future that embraced and encompassed indigenous insights and life ways. From the interviews common wellbeing themes were identified and corresponding indicators identified that could measure or assess levels of wellbeing related to the theme. Furthermore, metrics for measuring progress toward aspirations as identified by indicators were identified, and a scoping undertaken to determine whether data to inform metrics was accessible, stored by an institution by not readily available, or whether research was required to procure data. A document, using sheets of A3 paper, was then developed that placed themes and indicators into a Te Kāhui Kahukura index table, with pictures illustrating each theme to create a vision for future urban development. Table 1 in the appendix outlines the final table produced through the research process.

Stage three of the research process involved presenting the table document back to the working group for feedback. Based on this feedback some indicators were removed and others added, however the key themes and metrics largely remained. The Te Kāhui Kahukura index table was then edited to reflect the changes made by the working group. At this stage the table contained 28 wellbeing themes with 111 indicators associated with themes. Some themes had very few indicators associated with them, for example one theme had one, while at the other end of the scale on theme had 21 indicators associated with it. However, it was determined that 28 wellbeing themes would make for a complicated index display, consequently, wellbeing themes were grouped into 11 dimensions. Furthermore, the interconnections between different dimensions were explored and mapped (see Fig. 2).

The fourth stage of the research involved taking the index back to Te Kāhui Kahukura. This was presented to Te Kāhui Kahukura. There was very positive feedback on the index and recognition of the importance of the tool for rūnanga and how it could be used to shape future urban, rural towns, and nohoanga kainga development, and measure progress toward rūnanga aspirations. A table outlining the full index can be found in the appendix of this paper.

3. Results

Drawing upon the mauri ora model the Te Kāhui Kahukura wellbeing index is future focused. It is built around ‘two-generation thinking’ or a 50-year timeframe, with 2070 be set as a target date for the aspirations of rūnanga articulated in the model to be achieved. The indicators and metrics in the framework are designed to measure progress toward these aspirations. A detailed outline of dimensions, indicators, and associated metrics can be found in Appendix One.[1] The results are grouped under the 11 dimensions mentioned in the methods sections. Each dimension is outlined below, followed by a description of themes and associated aspirations that fit under each dimension.

3.1. Tino rangatiratanga

The dimension of Tino Rangatiratanga encompasses the desire of rūnanga for greater self-determination. The rūnanga expressed an aspiration to establish areas of independent jurisdictional authority, like that of district councils, over their own nohoanga kainga and within specific residential developments, so that they may control their own urban planning and designs. Furthermore, they also outlined a desire to have jurisdictional authority over their own commercial districts within towns and cities to facilitate economic development. There was also an ambition to have a strong treaty-based relationship with councils based on the principle of partnership. The ways the rūnanga thought to measure the level of partnership was through monitoring the extent to which their policies and interests were being given effect within council regulations and funding decisions, and through the development of co-governing arrangements concerning specific places and resources. Furthermore, there was a desire for the establishment of an office of treaty settlements with local government that included monitoring functions to determine whether the principles of the Treaty of Waitangi[2] were being upheld. Rūnanga further wished to have a percentage of local and central government procurement expenditure flow to rūnanga business entities to support economic development. Finally, increased rūnanga representation and influence in key political, financial, media and bureaucratic entities were seen as integral to the expression of self-determination.

3.2. Wai Tipuna

The term Wai Tipuna translates into English as ‘water ancestors’ and refers to rivers, streams, and wetlands. Under this dimension rūnanga expressed an aspiration to restore the mauri (health and vibrancy) of rivers and streams in urban areas to a minimum of a swimmable standard. They considered that this may be achieved through the ecological restoration of margins along watersheds from catchments from mountains to the sea, treatment of stormwater, naturalisation of drainage systems, maintenance of minimum flows and the limitation of nutrient and contaminant discharges. Wai Tipuna would also involve the restoration of wetland areas to a minimum of 25 % of their original extent to provide ‘cleaning functions’ to waterways. Rūnanga sought to measure progress toward these aspirations through remote spatial mapping to gauge implementation of blue-green infrastructure and water testing.

[1] It needs to be noted that within the table in the appendix, manawhenua and Māori distinguished from each other across many indicators. Manawhenua are Māori that are from a tribe that has tribal authority in CCC district and EC region, whereas Māori refers to Māori in general that live in the district and the region but do not have tribal authority. Manawhenua often see themselves as the hosts of other Māori living in their territory and as such feel a degree of responsibility for supporting their wellbeing, and so wish to know their current wellbeing status – hence their inclusion in the UWI. However, they also have aspirations (e.g. self-determined government) that may be considered distinct from Māori in general. Furthermore, within the table there are X symbols. These symbols are in places where a current state, or target metric is yet to be set. This is because more research is required to set the target.

[2] The Treaty of Waitangi was a written agreement made in 1840 between the British Crown and >500 Māori chiefs, including Ngāi Tahu chiefs. It guaranteed a number of rights to Ngāi Tahu.

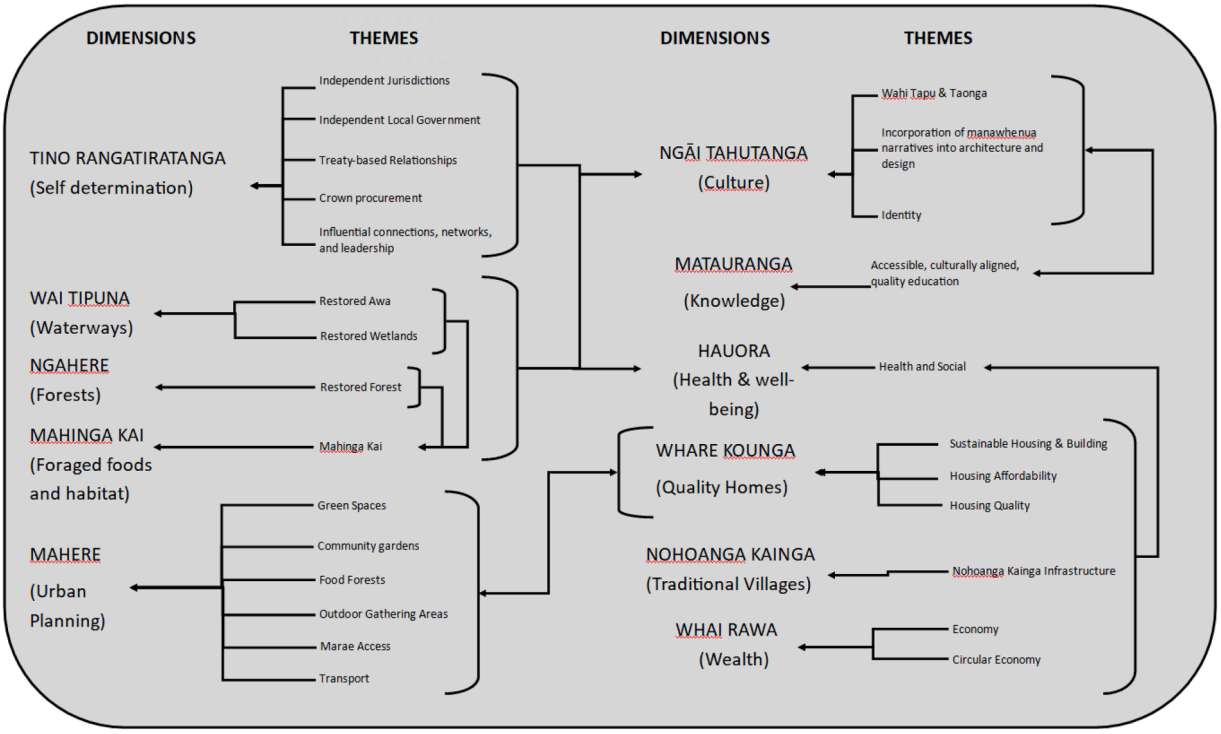

Fig. 2. Interconnections between themes and dimensions.

3.3. Mahinga Kai and Ngahere

Mahinga Kai, is placed here as a separate dimension, however it is strongly related to Wai Tipuna. Mahinga kai refers to the traditional wild foods foraged by Ngāi Tahu, and the areas from which it is sourced. The Otautahi/Christchurch area was once a river delta system, prior to being extensively drained, that produced an abundance of fish and birds that were the traditional foods of local hapū (bands). The Ngāi Tahu culture is intimately intertwined with mahinga kai, and as such maintaining mahinga kai harvesting practices is essential to the maintenance of culture. Under the mahinga kai dimension the rūnanga expressed a strong aspiration to protect existing foraging and harvesting sites as well as their access ways from further intrusion. Furthermore, with the ecological restoration envisioned in the Wai Tipuna dimensions, it was anticipated that mahinga kai sites and practices, would expand commensurate with the expansion of wetlands and river-stream delta systems. In terms of measuring progress toward these aspirations, the emphasis was placed on measuring the quantity and quality of Mahinga Kai available.

In addition to the mahinga kai, the dimension of ngahere expressed the vision of restoring native forest areas. Once again, this ambition links back to the Wai Tipuna dimension, where the ecological restoration of watersheds would involve the reestablishment of native forest ecosystems. However, the rūnanga considered it important to have interconnectivity and continuity of native forest ecosystem, and that in total the forest landcover should be restored to a minimum of 25 % of the original extent. The mahinga kai and ngahere dimensions are interconnected given that forests were also traditional areas of food and rongoa (traditional medicine) harvesting. In terms of measuring progress toward the aspiration of forest restoration, remote sensing of forest ecosystem extent was proposed.

3.4. Mahere

Mahere means to plan, chart, or map. The Mahere dimension concerns urban planning. There were several aspirations falling under this dimension. Firstly, the rūnanga, consistent with its aspirations for forest rejuvenation visioned the expansion of native specimen trees and areas of native landcover across urban parks, streets, and outdoor recreation areas. Like above, the use of remote sensing was considered the most effective way to measure these changes. The rūnanga also envisioned the presence of interpretative works (e.g., information panels) and artworks (e.g., pou (totems)) as visible symbols of manawhenua (indigenous people associated with the area) presence in green spaces for the public to observe. Furthermore, they aspired for the development of infrastructure for cultural activities within open spaces, such as waka ama (canoe racing) and kapahaka (Māori performing art). They considered that monitoring the implementation of this vision could occur through councils recording the percentage of green spaces with cultural presence and infrastructure.

Secondly, improved accessibility was identified as a theme, and in particular, the presence and accessibility (i.e., walking distance) to food forests, community gardens and sports grounds. It was highlighted that all whanau should have the ability to access a Marae – a traditional gathering house. In urban areas, it was considered that marae should either be within walking distance or easily accessible through efficient public transport. Monitoring the level of accessibility to these services was considered possible through GIS mapping of where populations are located relative to services.

Thirdly, the aspiration for improved transport options were conveyed. It was outlined that all transport options should, in time, be carbon neutral. Additionally, it was considered important that all work and services in rural towns and city neighbourhoods be accessible by using active transport, such as walking or cycling, or easily accessible by time-efficient public transport. Monitoring the improvement in transport options could occur through measuring the percentage of the city's vehicle and public transport fleet using renewable energy options, while accessibility of transport options via GIS mapping of populations relative to transport routes.

3.5. Whare Kounga

This dimension interconnects with mahere and encompasses sustainable housing and building, household affordability and housing quality. Rūnanga outlined their aspiration to have all housing and commercial buildings sustainability certified in terms of construction materials, operating systems (e.g., energy and water), cost, and habitability. Monitoring the percentage of sustainability certified builds overtime was considered a key metric of whare kounga. Furthermore, all urban and rural town developments should ideally have varied housing options to support multi-generational living, which could be implemented and monitored through district plans and resource consents. Finally, a key vision under the whare kounga dimension was that all whanau had access to affordable, uncrowded, and healthy homes, while homelessness and rough sleeping would be eliminated. Multiple mechanisms for measuring progress toward this dimension were identified, including various measures of housing affordability, census data of individuals per household relative to the size of house, sustainability certification status of homes, and surveys of homelessness.

3.6. Nohoanga Kainga

The nohanga kainga, or traditional Ngāi Tahu villages found in Māori reserve areas, have been historically deficient in infrastructure. This dimension reflected the aspiration of rūnanga to ensure that all nohoanga kainga have sufficient modern infrastructure. This included the presence of sealed roads, stormwater services, town water supplies, high speed internet access and cellular network access. The progress in the development of this infrastructure could be easily monitored based on the provision of surveys in the villages.

3.7. Whai Rawa

Whai Rawa encompasses the economy and the circular economy. Under this dimension rūnanga expressed the aspiration to address the significant wealth and income inequality between Māori and other ethnicities, and across society in general. It was considered, that at a minimum, all whanau and households should have a living income. Furthermore, there was a desire to expand Māori-driven economic activity across the economy, with the growth of rūnanga and Māori-owned enterprises. Various measures were proposed to determine progress toward these economic aspirations, including using Statistics New Zealand data to determine levels of income and wealth disparity and growth in Māori-driven economic activity.

In terms of circular economy, the rūnanga outlined their aspiration to have all material inputs into economic activities be derived from sustainable sources, and that all waste, where possible be recycled to support economic activity. Furthermore, linking with the whare kounga and mahere dimensions, energy systems in the economy should be driven by renewables, with an optimal mix of onsite and offsite generation. Measures for determining progress toward a circular economy could be derived from current data concerning waste to landfill, the sustainability certification of material inputs, and data concerning the mix of renewable energy sources.

3.8. Ngāi Tahutanga

This dimension highlights the aspiration of rūnanga to protect all wāhi tapu and wāhi taonga (sacred and valued sites) from inappropriate land use and development. Furthermore, it seeks the incorporation of manawhenua narratives into urban architecture and design starting with all civic buildings reflecting indigenous cultural design attributes, and all urban and town areas have dual signage (Māori and English). All manawhenua and Māori should have easy access to cultural institutions including Marae, cultural practices, kaumatua and te reo Māori. Monitoring progress toward these aspirations would most likely involve surveys of rūnanga communities regarding access to cultural institutions and council monitoring of Māori urban and architectural design uptake within construction projects.

3.9. Mātauranga

The dimension of Mātauranga involves accessible, culturally aligned, quality education. It focuses on increased levels of participation and higher completion rates of Māori across all levels of education; higher enrolment rates in early childhood education, 100 % primary school completion, high levels of secondary school completion and university graduation as well as completion of trade or industry training. Rūnanga expressed their desire that all manawhenua and Māori should have free access to tertiary education. Teachers should be better resourced, have fewer students, Masters level degrees and be paid significantly more than the median income. All manawhenua and Māori should have access to bilingual, immersion and culturally congruent education options. Furthermore, professional remedial education support should be free and simple to access. It was considered that progress toward meeting these aspirations could be ascertained through accessing and interpreting Ministry of Education data.

3.10. Hauora

The Hauora dimension encompasses health and social wellbeing, including physical and mental health. According to this dimension, rūnanga envisioned that in the future all manawhenua and Māori would have access to mental health services in well maintained facilities, as soon as they require it, for as long as it is required. The preferred treatment option should be chosen by the individual, whether it be psychotherapy, Māori therapeutic approaches or medication. There must also be effective transition services for those in-patient care back to the whānau and community. Furthermore, all manawhenua and Māori should have easy and ready access to health care and health screening services in general. There should not be wait times for surgeries or various treatments. Hauora also highlights the importance of all Māori and manawhenua having the ability to meet fruit and vegetable intake guidelines. Furthermore, it stresses the importance of social wellbeing and connection with whānau and community support networks - no one should be isolated. Rūnanga also expressed their aim for disparities in health service access, life expectancy, and infant mortality between Māori and other ethnicities to decline and eventually disappear, alongside rates of disease and physical and mental disabilities. Finally, there was an aspiration that rates of imprisonment, child abuse, and hospitalisations due to violence would decline significantly. Overall, however, the rūnanga imagined a ‘one stop shop’ for health and social services from government agencies to address the underlying interconnected constraints on wellbeing. The data for measuring progress toward these aspirations was considered available, and could be retrieved from a combination of district health boards, Corrections, and Statistics New Zealand.

4. Discussion

4.1. Wellbeing and the interconnectivity of index dimensions

The dimensions of the index and their corresponding themes, as visualised in Fig. 2, are interdependent and interrelated through their focus towards mauri ora, or interconnected social, cultural and ecological wellbeing. Tino Rangatiratanga affects all the dimensions discussed in the results section. Independent jurisdictions, local government, treaty-based relationships, a share of Crown procurement and influential connections allow Māori to put their desires into effect to fulfil their needs. From the ability to encourage the restoration of awa, wetlands, forests and mahinga kai to Māori designs in architecture and the presence of Māori cultural institutions.

The dimensions of Wai Tipuna, Ngahere, and Mahinga Kai all relate to the restoration of the natural environment. The health of awa, wetlands and forests are prerequisites for the maintenance of Mahinga Kai and restoration of foraging sites, and in turn the maintenance and restoration of Ngāi Tahu culture. While the protection of wahi tapu and taonga, or the protection of important and sacred sites, also leads to environmental protection of Mahinga Kai sites, forests, wetlands, and rivers. Furthermore, the improved natural environment has positive flow on effects for Hauora - the physical and mental health of Māori. Furthermore, the incorporation of manawhenua narratives into architecture and design is made easier when it reflects the surrounding natural environment and sits comfortable within it. The theme of identity, which expresses Māori individuals' knowledge and access to cultural institutions, can only be fully met when there is access to Mahinga Kai and institutions important to the Māori way of life.

Mahere or urban planning necessarily includes Whare Kounga or quality homes. Sustainable housing and buildings, household affordability and housing quality all have big impacts on the quality of the urban environment. Alongside Nohoanga Kainga and Whai Rawa, Mahere has effects on Hauora. As presented by the dimension of Whai Rawa, a successful and efficient Māori economy that brings higher incomes and wealth to Māori will have positive effects on health and social wellbeing. Furthermore, healthy homes and vibrant, culturally diverse cities (under Whare Kounga) can also contribute to Ngāi Tahu wellbeing. The ability to walk or bike to community spaces and outdoor gathering areas, easy access to sport facilities, food forests that provide healthy food, can all have positive health effects. It also can create a sense of community and place, overcoming feelings of isolation that effects mental health. Finally, Hauora and Ngāi Tahutanga are interrelated too – the strength of Māori identity promotes and leads to better Māori health and wellbeing.

Due to constraints of time and resource no new data was generated during this research, instead data was gathered from publicly available wellbeing and urban development reporting relevant to the rūnanga. In further iterations of this research we would aim to expand the quantitative data provision significantly, including more live data sensing, and more data sourced from novel or experimental methods to help to bolster the acquisition of new data. We would also include more qualitative data in line with an aim to enhance the context and cultural sensitivity of the data visualised [14–16].

4.1. *Supporting indigenous aims for mauri ora*

Key findings from the research are that place-based, Indigenous ways of knowing have real relevance in a context of urban system change as they emphasise nature-based systems and kaitiakitanga, socio-ecological care. The Indigenous rōpu (group) discussed in this paper have highly developed understandings of the value of nature-based systems, and the ecological capacities and conditions of the living environments they live within and understand themselves to be related to. Engaging with such Indigenous communities to support their aspirations for cultural and built environment change is an ethical and pragmatic means of supporting transformative actions such as increasing the provision of nature-based systems and enhancing the wellbeing of local ecosystems more broadly. Tools like the ones discussed in this paper are important cultural communication methods that signal Indigenous norms, expectations and aims to settler-colonial cultures. Further, assisting Indigenous communities to collect and display key socio-ecological wellbeing measures, including of nature-based systems, both enables assessment of current ecological wellbeing but also can evidence the need for change in practice to further increase ecological wellbeing in a way that meets fundamental Iwi (kinship group) aims and values.

The phase 1 mauri ora compass and index with data visualisation, and the phase 2 place-based Te Kāhui Kahukura wellbeing index break with settler-colonial urban planning and assessment models as they set human and wider ecological wellbeing as a fundamental focus. From here, researchers are keen to explore how these tools might support the partnership between the Te Kāhui Kahukura and the Christchurch City Council. The Te Kāhui Kahukura has an urban governance role as part of the Te Hononga Council Papatipu Rūnanga Committee which includes CCC and Te Kāhui Kahukura members. The aim of this Committee is to build mutual understanding and to coordinate leadership around matters of shared interest and to inform Council decision-making. In addition to the Te Kāhui Kahukura wellbeing index, the Ngā Tohu Mauri Ora research has developed a phase 2, for Christchurch city, urban wellbeing data index and live web-based data display. This display shows data on urban functioning across the five key directions of the action compass, comprising of ecological, energy and economic systems, and urban community and built environment infrastructures. This data display of socio-ecological wellbeing for the city can support urban decision makers to see city systems in a context of socio-ecological wellbeing, and emphasise the vitality of nature-based systems. We ask here whether an integrative city-wide data display might help to better align the Christchurch City Council with Te Kāhui Kahukura's aspirations for mauri for their people and region? Researchers aim to bring the Te Kāhui Kahukura wellbeing index and the Christchurch focused data display together to explore this potential.

5. Conclusion

The Te Kāhui Kahukura wellbeing indicator framework was developed with the specific intent of establishing a future-oriented and pathfinding index to inform and support urban design, planning and development decision-making, from an indigenous position, within Christchurch, other towns within the district and region, and importantly the nohoanga kainga, or the traditional village areas of each rūnanga. It does not represent the official positions and policies of each rūnanga, given that such authority resides with respective rūnanga, but may be considered a mechanism for determining whether such policies are being given effect. The Te Kāhui Kahukura wellbeing index will likely be a 'continual work in progress', given that it must iteratively change based on new circumstances, and through deeper development iterations with each rūnanga beyond the Te Kāhui Kahukura committee. A participatory research process was used to build the index and involved several phases: desktop review of existing literature; the development of a working group; interviews and working group co-development of Te Kāhui Kahukura wellbeing index framework; identification of metrics; and a final workshop with Te Kāhui Kahukura to finalise the framework.

The research process delivered a comprehensive framework that had a strong focus on self-determination through both rūnanga independent and partnership-oriented decision-making authority. Tino rangatiratanga effected all dimensions across the framework given that it provides the capacity for meeting all aspirations. The index has a strong focus on the ecological restoration of watersheds and river-stream-wetland delta systems. These were considered to provide a platform for the strengthening of Mahinga Kai culture. This emphasis on the environment flowed into Mahere, or urban planning, with a focus on green spaces, community gardens, food forests, and sustainable transport. Mahere in-turn linked to Whare Kounga, which emphasized sustainable, affordable, and quality housing, and to Nohoanga Kainga, which focused on the development of modern infrastructure into the traditional Ngāi Tahu villages. The Matauranga and Hauora dimensions focused on the delivery of quality of education and health services. Together all of these dimensions were interconnected, and in aggregate aim to support urban wellbeing through strong Ngai Tahu culture and identity.

From here, the research will turn to exploring whether the Te Kāhui Kahukura wellbeing index and an in development Christchurch focused urban wellbeing data display might support the existing collaboration between Te Kāhui Kahukura and the Christchurch City Council. In so

doing we're aiming to explore whether urban systems change might be better enabled if those involved in city governance have a clearly communicated shared focus on social and ecological wellbeing and a culturally-appropriate, place-based approach to its assessment. In linking the broader urban mauri ora research, represented in the urban compass and data display, with the place-based and indigenous-partnered Te Kāhui Kahukura wellbeing index we're hoping to give better effect to the capacity of Indigenous knowing to lead the regenerative urban transitions so necessary at this time.

NBS impacts and implications

- Place-based, Indigenous ways of knowing have real relevance in a context of urban system change as they emphasise nature-based systems and ecological care
- Indigenous groups such as those discussed in this paper have highly developed understanding of the value of nature-based systems, and the ecological capacities and conditions of the living environments they live within and understand themselves to be related to
- Engaging with such Indigenous communities to support their aspirations for cultural and built environment change is an ethical and pragmatic means of supporting transformative actions such as increasing the provision of nature-based systems and enhancing the wellbeing of local ecosystems more broadly.
- Assisting Indigenous communities to collect and display key socio-ecological wellbeing measures, including of nature-based systems, both enables assessment of current ecological wellbeing but also can be used to argue for change in practice to further increase ecological wellbeing
- Tools like the ones discussed in this paper are important cultural communication methods that signal Indigenous norms, expectations and aims to settler-colonial cultures

CRediT authorship contribution statement

John Reid: Methodology, Data curation, Writing – review & editing, Investigation, Conceptualization, Writing – original draft, Formal analysis. **Amanda Yates:** Writing – original draft, Methodology, Conceptualization, Visualization, Investigation, Writing – review & editing, Project administration, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix One – Te Kahui Kahukura Urban Wellbeing Index (UWI)

THEME	CURRENT STATE INDICATORS	Unit	TARGET STATE INDICATORS 2070	Data Available Now?	Data Stored but not available	FUTURE RESEARCH AND METHODS REQUIRED TO GATHER DATA IF NOT AVAILABLE
Independent Jurisdictions Independent Local Government	Presence/absence of independent manawhenua jurisdictions within nohoanga kainga (equivalent to council powers)	#	Full independent jurisdiction within nohoanga kaiaka	Yes		
	Presence/absence of city residential zones under manawhenua independent jurisdiction	#	Full independent jurisdictions over X designated residential zones	Yes		
	Presence/absence of commercial districts under independent manawhenua jurisdiction	#	Independent jurisdictions within X manawhenua commercial districts	Yes		
Treaty-based Relationships	% of manawhenua policies and regulatory demands supported and enacted by council	%	100 % of manawhenua policies and regulatory demands supported and enacted by council	No	Yes	Develop methods for automating the collection and analysis of data for determining % of manawhenua policies and regulatory demands supported and enacted by council
	Presence/absence of co-governing arrangements with Crown over areas and resources of shared interest	%	100 % of areas and resources of shared interest are co-governed	No	No	Determine priority areas and resources of shared interest for which co-governing arrangements are needed (e.g. taonga, wahi taonga etc.,) and monitor for compliance
	Presence/absence of office of treaty settlements with local government with monitoring functions	Yes	Presence of office of treaty settlements with local government with monitoring functions	Yes	Yes	
Crown procurement	% of Crown procurement expenditure flowing to manawhenua and Māori entities	%	15 % of Crown procurement expenditure flowing to manawhenua and Māori entities	Yes		

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THEME	CURRENT STATE INDICATORS	Unit	TARGET STATE INDICATORS 2070	Data Available Now?	Data Stored but not available	FUTURE RESEARCH AND METHODS REQUIRED TO GATHER DATA IF NOT AVAILABLE
Influential connections, networks, and leadership	Presence/absence of Ngāi Tahu representation & influence in key political, financial, media, & bureaucratic entities	%	Representation and influence is present across 100 % of key political, financial, media, & bureaucratic entities.	No	Yes	Ascertain key political, financial, media, & bureaucratic entities where representation and influence is required Develop automated methods for measuring the presence/absence of manawhenua presence within entities
Restored Awa	Number of incidents of sewerage overflow into waterways	#	0 incidences of sewerage overflow into waterways	?	Yes	Analysis of existing council records and automation of processes for gathering and representing
	% of urban areas where untreated stormwater discharges directly into waterways and lakes	%	0 % of urban areas discharge stormwater directly into waterways and lakes	No	Yes	Develop methods for automating the collection of consent and planning data to determine % of urban areas where stormwater discharges directly into waterways and lakes
	% of tested river sites that are safe to swim in under normal conditions	%	100 % of tested river sites are safe to swim in under normal conditions	Yes		Utilizing websites where data on river health is stored to develop aggregate index
	% of waterway margins in vegetation	%	100 % of waterway margins in vegetation	?	?	Utilize council records, or develop remote sensing detectors for ascertaining vegetative cover adjacent to waterways
	% of waterway margins with set-back areas and in natural vegetation: In urban areas: 10 m or more. In rural areas: 20 m for first order streams; 50 m for second order streams; and 100 m for third order streams	%	100 % of waterway margins have set-back areas in natural vegetation cover: In urban areas: 10 m or more. In rural areas: 20 m for first order streams; 50 m for second order streams; and 100 m for third order streams	?	?	Develop remote sensing detectors for ascertaining % area of waterway margins in vegetative cover by type
	% of drainage systems naturalised	%	100 % of drainage system have been naturalised	?	?	Develop remote sensing detectors for ascertaining % drainage systems naturalised
	% of waipuna with setbacks and protection from intrusion	%	100 % of waipuna have setbacks and are protected from intrusion	?	?	Analysis of existing council records and automation of processes for gathering and representing data
	% of waipuna ecologically restored	%	100 % of waipuna are ecologically restored	?	?	Analysis of existing council records and automation of processes for gathering and representing data
	% of streams at poor, fair, good, or very good in the Water Quality Index (WQI)	WQI	100 % of streams at 'very good' according to the WQI	Yes	Yes	Utilizing websites where data on water health is stored to develop aggregate index
	% of proposed manawhenua water emission (N, P, Sediment) limits enacted by council	%	100 % of manawhenua water emission limits enacted by councils	No	No	Do manawhenua have water emissions limits? Develop remote sensing detectors for ascertaining emissions to water. Use in-situ remote sensing data from councils to ascertain emissions to water
Restored Wetlands	% of remnant wetlands with setbacks and in natural vegetation and protectection from intrusion	%	100 % of remnant wetlands with setbacks in natural vegetation and protection from intrusion	?	?	Access data from council records, or develop remote sensing detectors for ascertaining protection status
	% of wetlands fully ecologically restored relative to 1840 natural extent	%	25 % of wetlands fully ecologically restored relative to 1840 natural extent	No	No	Determine original wetland ecosystems extent and identify optimal location for wetland reestablishment
Forest	% of native forest landcover in area relative to 1840 extent.	%	25 % of native forest landcover ecologically restored relative to 1840 extent	No	No	Develop remote sensing detectors for ascertaining % area of native vegetation
	Level of fragmentation/continuity of native forest landcover corridors from areas of elevation to sea long watersheds (measured as longest unbroken length of	%	100 % continuity of native forest corridors from areas of elevation to sea long watersheds (measured as	?	?	Use GIS methods and algorithms to locate and calculate required native landcover corridors

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THEME	CURRENT STATE INDICATORS	Unit	TARGET STATE INDICATORS 2070	Data Available Now?	Data Stored but not available	FUTURE RESEARCH AND METHODS REQUIRED TO GATHER DATA IF NOT AVAILABLE
	native landcover relative to total length of planned corridor)		longest unbroken length of native landcover relative to total length of planned corridor)			
	Number of food forests in urban areas	#	X food forests present in urban areas	Yes	Yes	
Mahinga Kai	% of traditional foraging and harvest sites and access ways protected	%	100 % of traditional foraging and harvest sites and access ways protected	?	?	Generate GIS map of traditional foraging and harvest sites and develop remote sensing detectors to determine access
	Utilize cultural health index measures to determine quality and quantity of mahinga kai available	CHI	Mahinga kai recording highest possible score on CHI	Yes	Yes	
Wahi Tapu & Taonga	% of wāhi tapu and wāhi taonga protected from inappropriate land use and development	%	100 % of wāhi tapu and wāhi taonga protected from inappropriate land use and development	?	?	Generate GIS map of wahi tapu and wahi taonga and develop remote sensing detectors to determine protection levels
Green Spaces	% of native landcover and large native specimen trees in urban park/recreation spaces relative to non-natives	%	50 % of native landcover and large native specimen trees in urban park/recreation spaces relative to non-natives	?	?	Develop remote sensing detectors for ascertaining % area of native vegetation in relation to non-native in urban parks and recreation areas
	Presence/absence of interpretation, artwork, and plantings as visible symbols of manawhenua association with green spaces	P/A	All green spaces have interpretation, artwork, and plantings as visible symbols of manawhenua association with green spaces	?	?	Develop machine learning algorithms to scope council data to ascertain levels of cultural presence/absence in green spaces
	Provision of cultural infrastructure in open spaces to support culturally aligned activities including mahinga kai harvest and waka ama	P/A	Cultural infrastructure in open spaces is in place	?	?	Develop machine learning algorithms to scope council data to ascertain levels of cultural presence/absence of cultural infrastructure in open urban spaces
Sustainable Housing & Building	% of manawhenua & matawaka living in a 5 Homestar sustainability rated home or more	%	100 % of manawhenua and matawaka living in a 6-star Homestar sustainability rated home or more	?	?	Access data from Homestar?
	% of commercial buildings Grade A green builds	%	100 % of commercial buildings Grade A green builds	?	?	Access industry data on green builds?
	% urban and rural town developments with varied housing options to support multi-generation living	%	100 % of urban and rural town developments have varied housing options to support multi-generational living	?	?	Develop machine learning algorithms to scope council resource consent and planning data to ascertain housing types, costs, and section sizes in a given area. Utilise remote sensing to ascertain housing types, costs, and section sizes in a given area
Circular Economies	% of waste recycled	%	100 % of waste recycled	Yes	Yes	Council data
	% of waste entering landfill relative to population groxxxxxxxxxxxxxxxxxxwth	%	0 % of waste going to landfill	Yes	Yes	Council data
	% of energy generated by onsite renewables	%	70 % of energy generation from onsite renewables	?	?	Establish automated data feed from energy retailers or develop remote sensing capability to detect roof-top solar panels
	% loss of water through water infrastructure leaks in comparison to total water use	%	0 % water loss through infrastructure leaks	Yes	Yes	Council data
	Trends in water use relative to population growth (decline or increase?)	#	#? for urban water use relative to population	Yes	Yes	Council data
	Current % of grid energy from renewables	%	100 % of grid energy from renewables	Yes	Yes	Stats NZ
Transport	% of Māori and manawhenua using low-carbon public transport	%	30 % of Māori and manawhenua population using low-carbon public transport	Yes	Yes	Council data on bus, walking, and cycling prevalence
	% of work and services that can be accessed by walking in rural towns and city neighbourhoods	%	60 % of work and services can be accessed by walking in rural towns and city neighbourhoods	?	?	
	% of population using active forms of transport (e.g. cycling)	%	50 % of population is using active forms of transport	Yes	Yes	Council data on bus, walking, and cycling prevalence

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THEME	CURRENT STATE INDICATORS	Unit	TARGET STATE INDICATORS 2070	Data Available Now?	Data Stored but not available	FUTURE RESEARCH AND METHODS REQUIRED TO GATHER DATA IF NOT AVAILABLE
Green Spaces	% of city and rural town-based manawhenua and Māori with walking access to green spaces	%	100 % of city and rural town-based manawhenua and Māori with walking access to green spaces	?	?	Analysis of council data, or GIS analysis of manawhenua and Māori locations (based on IDI and CRM data) relative to natural areas
Forests	% of population with walking, or public transport, access to forests, wetlands, and other wild areas	%	% of population with walking, or public transport, access to forests, wetlands, and other wild areas	?	?	Analysis of council data, or GIS analysis of manawhenua and Māori locations (based on IDI and CRM data) relative to natural areas
Community gardens	% of population with easy walking access, or green vehicle (rural) to a community garden site	%	100 % of population with easy walking access, or green vehicle (rural) to X community garden sitex	?	?	Analysis of council data, or GIS analysis of manawhenua and Māori locations (based on IDI and CRM data) relative to community gardens
Food Forests	% of population with walking, public transport, or green vehicle (rural) access to a food forest	%	100 % of population with walking, public transport, or green vehicle (rural) access to X food forests	?	?	Analysis of council data, or GIS analysis of manawhenua and Māori locations (based on IDI and CRM data) relative to food forests
Outdoor Gathering Areas	% of population with access to outdoor community gathering areas	%	% of population with access to outdoor gathering areas	?	?	Analysis of council data, or GIS analysis of manawhenua and Māori locations (based on IDI and CRM data) relative to outdoor gathering areas
Nohoanga Kainga Infrastructure	% of nohoanga kainga with stormwater services	%	100 % of nohoanga kainga with stormwater services	?	?	Analysis of council data
	% of nohoanga kainga with broadband access	%	100 % of nohoanga kainga with broadband access	?	?	Analysis of council data
	% of nohoanga kainga with a town water supply	%	100 % of nohoanga kainga with a town water supply	?	?	Analysis of council data
	% of nohoanga kainga with sealed roads	%	100 % of nohoanga kainga with sealed roads	?	?	Analysis of council data
	% of nohoanga kainga with high-speed cellular coverage	%	100 % of nohoanga kainga with high-speed cellular coverage	?	?	Analysis of council data
	% of Māori in urban areas with broadband access	%	100 % of Māori in urban areas with broadband access	?	?	Analysis of census data
	% of Māori in urban areas with access to high-speed cellular coverage	%	100 % of Māori in urban areas with access to high-speed cellular coverage	?	?	Analysis of census data
Incorporation of manawhenua narratives into architecture and design	% of Civic buildings that reflect cultural design attributes	%	100 % of Civic buildings that reflect cultural design attributes	?	?	Develop through machine learning algorithms to scope council resource consent and planning data to ascertain % of civic buildings that reflect cultural design
	% of city with dual signage	%	100 % of city with dual signage	?	?	Develop machine learning algorithms to scope council resource data to ascertain levels of dual signage
Marae access	% of population that have walking, or public transport, or vehicle (rural) access to marae	%	100 % of Māori and manawhenua populations have walking, public transport, or green vehicle (rural)access to marae	?	?	Analysis of council data, or GIS analysis of manawhenua and Māori locations (based on IDI and CRM data) relative to marae
Housing Affordability	Median Māori and manawhenua household income in relation to average home cost	#	Average home cost is below 4X median Māori and manawhenua household incomes.	Yes	Yes	Analyse existing stats data
	% of Māori and manawhenua household income spent on home renting, or home ownership cost	%	Home renting, or home ownership cost, below 20 % of average household income	Yes	Yes	Analyse existing stats data
	Māori and manawhenua homeless population	#	0 Māori and manawhenua homeless	Partial	Partial	Homeless data from various surveys
	Māori and manawhenua population sleeping rough	#	0 Māori and manawhenua population sleeping rough	?	?	Homeless shelters?
Housing Quality	% of Māori and manawhenua population living in overcrowded conditions	%	0 % of Māori and manawhenua population living in overcrowded conditions	Partial	Partial	StatsNZ census data
	% of Māori and manawhenua households living damp and mouldy homes	%	0 % of Māori and manawhenua households living damp and mouldy homes	Partial	Partial	StatsNZ census data

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THEME	CURRENT STATE INDICATORS	Unit	TARGET STATE INDICATORS 2070	Data Available Now?	Data Stored but not available	FUTURE RESEARCH AND METHODS REQUIRED TO GATHER DATA IF NOT AVAILABLE
	% of Māori and manawhenua households experiencing high crime in their areas	%	0 % of Māori and manawhenua households experiencing high crime in their areas	Yes	Yes	Develop and layer GIS maps of manawhenua and Māori locations (based on IDI and CRM data) with crime maps to determine exposure to crime
	% of kaumatua unable to access housing	%	100 % of kaumatua have access to quality housing	?	?	?
	% of Māori and manawhenua with easy access (bus or walking) to sports grounds and fitness facilities		100 % of Māori and manawhenua with easy access (bus or walking) to sports grounds and fitness facilities	?	?	Analysis of council data, or GIS analysis of manawhenua and Māori locations (based on IDI and CRM data) relative to fitness facilities
Economy	Presence/absence of commercial districts under independent manawhenua jurisdiction	#	Independent jurisdictions within X manawhenua commercial districts	Yes	Yes	Analysis of census and IDI data
	% of manawhenua and Māori adults, 16+, earning at least a median weekly income	%	X manawhenua and Māori adults, 16+, earning at least a median weekly income	No	Yes	Analysis of census and IDI data
	% of manawhenua and Māori adults, 16+, earning below the living wage	%	0 % of manawhenua and Māori adults, 16+, earning below the living wage	No	Yes	Analysis of census and IDI data
	% of households living below family household living income	%	0 % of households living below family household living income	No	Yes	Analysis of census and IDI data
	% difference between Māori & Manawhenua household wealth and average household wealth	%	0 % difference between Māori & Manawhenua household wealth and average household wealth	No	Yes	Analysis of census and IDI data
	GINI coefficient (inequality measure) score	%	GINI coefficient 20 or below	No	Yes	Analysis of census and IDI data
	% of economic activity generated by manawhenua-owned industry	%	20 % of economic activity generated by manawhenua-owned industry	No	No	Identification of manawhenua owned and operated commercial initiatives followed by multiplier analysis of expenditure
	% of economic activity generated by Māori (individuals and whanau) owned industry	%	35 % of economic activity generated by Māori (individuals and whanau) owned industry	No	Yes	Analysis of business surveys in IDI
	% of manawhenua and Māori with financial literacy skills	%	100 % of manawhenua and Māori with financial literacy skills	?	?	
Accessible, culturally aligned, quality education	% of Māori and manawhenua youth not in any education, employment, or training (NEET)	%	0 % of Māori and manawhenua youth not in any education, employment, or training (NEET)	Partial	Partial	Analysis of IDI and MoE data
	Early childhood enrolment rate for manawhenua and Māori as %	%	100 % of tamariki in early childhood education	Partial	Partial	Analysis of IDI and MoE data
	Primary school completion rate for manawhenua and Māori as %	%	100 % of tamariki completing primary school education	Partial	Partial	Analysis of IDI and MoE data
	Secondary school completion rate for manawhenua and Māori as %	%	100 % of rangatahi completing secondary school %	Partial	Partial	Analysis of IDI and MoE data
	High school graduation rate for manawhenua and Māori (NCEA level 3) for manawhenua and Māori as %	%	80 % of Māori and manawhenua graduate from secondary school	Partial	Partial	Analysis of IDI and MoE data
	University graduation rate for manawhenua and Māori	%	60 % of Māori and manawhenua graduate from University	Yes	Yes	
	% of manawhenua and Māori completing trade/industry training	%	30 % of manawhenua and Māori completing trade/ industry training	Yes	Yes	
	% of manawhenua and Māori with free access to early childhood, primary, secondary, and tertiary education	%	100 % of manawhenua and Māori with free access to early childhood, primary, secondary, and tertiary education	Partial	Partial	
	Ratio of teachers to manawhenua and Māori students across early childhood, primary, and secondary education	Ratio	Ratio of teachers to manawhenua and Māori students across early childhood 6:1, primary 11:1, and secondary education 9:1	Partial	Partial	Analysis of IDI, CRM, and MoE data
	% of teachers with a Masters degree or more across early childhood, primary, and secondary education	%	100 % of teachers with a Masters degree or more across early childhood, primary, and secondary education	Yes	Yes	Analysis of StatsNZ and MoE Data

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THEME	CURRENT STATE INDICATORS	Unit	TARGET STATE INDICATORS 2070	Data Available Now?	Data Stored but not available	FUTURE RESEARCH AND METHODS REQUIRED TO GATHER DATA IF NOT AVAILABLE
	Average income of teachers relative to the median income across working population	Ratio	Average income of teachers is 1.8X the median income across the working population	Yes	Yes	Analysis of StatsNZ and MoE Data
	% of manawhenua and Māori with easy access to bilingual and immersion education options across primary, second, and tertiary sectors	%	100 % of manawhenua and Māori with easy access to bilingual and immersion education options across primary, second, and tertiary	?	?	Ascertain locations of manawhenua and Māori students and bilingual and immersion education options and calculate accessibility by distance
	% of manawhenua and Māori with easy access to culturally congruent education options across primary, second, and tertiary sectors	%	100 % of manawhenua and Māori with easy access to culturally congruent education options across primary, second, and tertiary sectors	?	?	Quantitative survey needed
	% of manawhenua and Māori with free and easy access to professional remedial education support	%	100 % of manawhenua and Māori with free and easy access to professional remedial education support			Quantitative survey needed. OOT data from TRONT.
Health & Social	% of manawhenua and Māori with access to health and social navigation services to generate an integrated health and social well-being response	%	100 % of manawhenua and Māori with access to health and social navigation services to generate an integrated health and social well-being response	?	?	Whanau ora data?
	% of manawhenua and Māori that require mental health services that cannot access them	%	0 % of manawhenua and Māori that require mental health services that cannot access them	?	?	Analysis of DHB, IDI, and MoH data. Most likely quantitative survey needed
	% of manawhenua and Māori that require mental health services that are required to wait for them	%	0 % of manawhenua and Māori that require mental health services are required to wait for them	?	?	Analysis of DHB, IDI, and MoH data. Most likely quantitative survey needed
	% of manawhenua and Māori requiring mental health services that are discharged (from in-patient and out-patient) before feeling ready	%	0 % of manawhenua and Māori requiring mental health services that are discharged (from in-patient and out-patient) before feeling ready	?	?	Most likely quantitative survey needed
	% of manawhenua and Māori able to choose preferred mental health treatment option (e.g. Psychotherapy, Māori therapeutic approaches, medication etc.,)	%	100 % of manawhenua and Māori able to choose preferred mental health treatment option (e.g. Psychotherapy, Māori therapeutic approaches, medication etc.,)	?	?	Analysis of mental health treatment options open
	The presence/absence of transition services from discharge back to family and community settings	%	The presence of transition services from discharge back to family and community settings	?	?	Analysis of transition services
	Proportion of mental health treatment facilities that are well maintained and in good condition	%	100 % of mental health treatment facilities are well maintained and in good condition	?	?	Most likely quantitative survey needed
	% of manawhenua and Māori with free access to health care	%	100 % of manawhenua and Māori with free access to health care	Yes	Yes	
	% of manawhenua and Māori with easy and ready access to primary health care	%	100 % of manawhenua and Māori with easy and ready access to primary health care	No	No	Most likely quantitative survey needed
	Average waiting times for surgery experienced by Māori	Time	0 waiting time for surgery experienced by Māori	Partial	Partial	Surgery waiting times are available, however, would need to be combined with ethnicity and iwi variables
	Average waiting times for various treatments (e.g. Cancer and dental)	Time	0 waiting time for various treatments	Partial	Partial	Waiting times are available, however, would need to be combined with ethnicity and iwi variables
	Access to health screening services	%	Full access to health screening services	Partial	Partial	Waiting times are available, however, would need to be combined with ethnicity and iwi variables
	% of manawhenua and Māori able to meet vegetable intake guidelines of 2–3 vegetable servings per day	%	100 % of manawhenua and Māori able to meet vegetable intake guidelines of 2–3 vegetable servings per day	Partial	Partial	Data on intake available, however, would need to be combined with ethnicity and iwi variables

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THEME	CURRENT STATE INDICATORS	Unit	TARGET STATE INDICATORS 2070	Data Available Now?	Data Stored but not available	FUTURE RESEARCH AND METHODS REQUIRED TO GATHER DATA IF NOT AVAILABLE
	% of manawhenua and Māori able to meet fruit intake guidelines of 2 servings per day	%	100 % of manawhenua and Māori able to meet fruit intake guidelines of 2 servings per day	Partial	Partial	Data on intake available, however, would need to be combined with ethnicity and iwi variables
	% of manawhenua and Māori individual living in isolation, or removed from whanau and community support networks	%	0 % of manawhenua and Māori individual living in isolation, or removed from whanau and community support networks	No	No	Quantitative survey needed re: levels of social connection
	% of unwaged (children, unemployed, and retirees) manawhenua and Māori living in households without an income sufficient to meet living costs	%	100 % of unwaged (children, unemployed, and retirees) manawhenua and Māori living in households without an income sufficient to meet living costs	Yes	Yes	Analysis of census and Stats IDI data
	Current life expectancy, infant mortality, and unexpected infant death of Manawhenua and Māori .	Years	X life expectancy, infant mortality, and unexpected infant death of Manawhenua and Māori .	Yes	Yes	Stats NZ
	Current levels of respiratory disease, diabetes, stroke, heart disease, and autoimmune disease among Manawhenua and Māorii.	Per 100,000	X levels of respiratory disease, diabetes, stroke, heart disease, and autoimmune disease among Manawhenua and Māori	Yes	Yes	DHBs & StatsNZ
	Current levels of physical and mental disabilities	Per 100,000	X levels of physical and mental disabilities	Yes	Yes	DHBs & StatsNZ
	Current hospitalization rates for violence among Manawhenua and Māori	Per 100,000	X hospitalization rates for violence among Manawhenua and Māori	Yes	Yes	DHBs & StatsNZ
	Current conviction and imprisonment rates of Manawhenua and Māori	Per 100,000	X conviction and imprisonment rates of Manawhenua and Māori	Yes	Yes	NZ Police & StatsNZ
	Current rates of recorded child abuse among Manawhenua and Māori	Per 100,000	0 rates of recorded child abuse among Manawhenua and Māori	Yes	Yes	NZ Police & StatsNZ
Identity	% of manawhenua and Māori with knowledge of, and easy access to, cultural institutions including: marae, cultural practices, kaumatua, te reo Māori etc.	%	100 % of manawhenua and Māori with easy access to, and knowledge of, cultural institutions including: marae, cultural practices, kaumatua, te reo Māori etc.	No	No	Ascertain locations of manawhenua and Māori students via CRM and IDI. Analyse location relative to cultural institutions. Ascertain sociocultural barriers to access via quantitative survey.
	Strong identity emerges from many social, economic, and cultural phenomenon. Measuring it can be done through aggregating many related measures outlined above: e.g. strong cultural presence in schools, institutions, whānau, built infrastructure (such as urban design), the use of te reo, presence of economic and social independence, and presence of tino rangatiratanga etc.,					

Data availability

The data that has been used is confidential.

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